DIPLOMA IN ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

G – SCHEME

IMPLEMENTED FROM 2023 - 2024

SESHASAYEE INSTITUTE OF TECHNOLOGY

(Autonomous)

TIRUCHIRAPPALLI –620 010.

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PREFACE

The wave of liberalization and globalization has created an environment for free flow of information and technology through fast and efficient means the world over. This has lead to shrinking of world, bringing people from different cultures and environment together, giving rise to a global village. A shift has been taking place in India from closedeconomy to knowledge based and opens economy. In order to cope-up with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate knowledge, professional skills and attitude. Technical education system is one of the significant components for human resource development. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations. The initiatives being taken by to revise the curriculum as per the needs of the industry are laudable.

In order to meet the requirements of future technical manpower, constant efforts have to be made to identify new employment opportunities, carryout activity analysis and design need based curricula of diploma programmes. This curriculum document has beendesigned by identifying job potential and competency profile of diploma holders leading to identification of curriculum areas for the course. It is needless to emphasize that the real success of the diploma programme depends upon its effective implementation. This will require harnessing and effective utilization of resources. In addition to acquisition of appropriate physical resources, the availability of competent and qualified faculty is essential. It is time for the managers of technical education system to reorganize the system to accept the challenges of both quantitative and qualitative expansion of technical education.

There are various online training facilities created by the Government of India through MHRD for the benefit of both the Teaching and Student community. Facilities like Spoken-Tutorial, SWAYAM, NPTEL, e-Yantra must be exploited to its fullest extent to reap the benefits of interactive electronic media for teaching-learning process. It is hoped that polytechnics will carry out job market research on a continuous basis to identify the new skill requirements and develop innovative methods of course offering and thereby infuse dynamism in the system.

PRINCIPAL & CHAIRMAN

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Coordinator

DEPARTMENT VISION, MISSION, PO and PEOs

THE VISION AND MISSION OF THE DEPARTMENT

VISION:

To impart knowledge and excellence that brings out civil engineers with high technical competencies and promotes professional assignments to meet the current and future challenges in civil engineering.

MISSION:

- To promote activities that cultivates the spirit of entrepreneurship to the students.
- To impart quality education with moral values in emerging areas of employability skill.
- To create, disseminate and integrate knowledge of engineering, science and technology that expands the civil and environmental engineering knowledge base, which in turn enables the betterment of human society.
- To enrich and enhance the knowledge base for the best practices in various areas of Civil & allied Engineering
- To create competent professionals who are trained in the design and development of civil engineering systems and contribute towards need of industry requirements.

PROGRAM EDUCATIONAL OBJECTIVES:

- Students function effectively as civil engineering professional in industry, government or other organizations–designing, improving, leading and implementing efficient civil engineering practices.

- To inculcate in students professional and ethical attitude, effective communication skills and team work to become a successful Entrepreneur.
- To promote lifelong self learning abilities for gaining multidisciplinary knowledge through projects and industrial training to meet the social needs.

LIST OF PROGRAM OUTCOMES:

- Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.
- Problem analysis: Identify and analyze well-defined engineering problems using codified standard methods.
- Design/ development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
- Engineering Tools, Experimentation and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.
- Engineering practices for society, sustainability and environment: Apply appropriate technology in context of society, sustainability, environment and ethical practices.
- Project Management: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
- Life-long learning: Ability to analyze individual needs and engage in updating in the context of technological changes.

Program Specific Outcomes (PSOs):

1. Proficiency in construction techniques /Quality assessment with ability in quantity surveying and project engineering management by acquiring applied knowledge in the relevant domains.

2. Acquiring practical skills with entrepreneurial ability and readiness for higher studies.

Regulation 2023
Program Structure
Diploma in Civil Engineering

Program Outcomes (POS)

POS are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability, attitude, and behavior that students acquire through the program.

The POS essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POS define the professional profile of an engineering diploma graduate.

NBA has defined the following seven POS for an engineering diploma graduate.

PO1: Basic and Discipline-specific knowledge of basic mathematics, science and engineering fundamentals and an engineering specialization to solve the engineering problems.

PO2: Problem analysis: Identify and analyze well-defined engineering problems using codified standard methods.

PO3: Design/development of solutions: Design solutions for well-defined technical problems and assist with the design of systems components pr processes to meet specified needs.

PO4: Engineering tools, Experimentation, and Testing: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

PO5: Engineering practices for society, sustainability and environment: Apply appropriate technology in the context of society, sustainability, environment and ethical practices.

PO6: Project Management: Use engineering management principles individually, as a team member or as a leader to manage projects and effectively communicate about well-defined engineering activities.

PO7: Life-long learning: Ability to analyze individual needs and engage in updating in the context of technological changes.

PREAMBLE

Polytechnic colleges contribute significantly to the state's talent pipeline, and it is known that polytechnic was initially started with the primary objective of producing skilled technicians to support mass industrialization.

Today there is a changing manpower need, as TN's economy is beginning to focus on advanced technology and knowledge-based industries, rather than low-cost labour-intensive manufacturing. To produce future- ready talent and bridge the industry-academia gap, it is only pertinent to rethink the existing curriculum and revamp the syllabi.

The current dynamic ecosystem poses challenges that span across fields and demands multidisciplinary knowledge to address them; this has propelled the need for higher technical education to cover diverse areas such as STEM, arts, humanities, design, innovation, business, and entrepreneurship; hence the program is modelled to incorporate all these areas.

The challenges of the 21st century demand young diploma engineers to have a command of the ever-changing body of technical knowledge along with an array of personal, interpersonal, and system-building knowledge that will prepare them with skills & competencies to address the modern-day challenges by building a new generation of machines, methods and materials.

Higher technical institutions being the primary source for companies to source talent, are under pressure to design a dynamic system of technical education to meet the demands.

The program is offered through the core, electives, certifications, capstone projects and other ways to enable a student's transformation. Each domain is carefully crafted to cater to diversified needs, dynamic contexts, and differentiated expectations in a learner-centric environment.

Objective:

To retain and further strengthen the quality of the human capital produced by our higher technical education at the diploma level as the force behind the state's social, cultural, and economic pre-eminence.

To seed & nurture agents of change & transformation for the digital future with enduring skills and capabilities by cultivating technological capabilities through a skill-centred approach.

Admission:

(i)Candidates seeking admission to the first term of the Diploma program:

Should have passed the SSLC Examinations prescribed by the Government of Tamil Nadu or any examination of any other board or authority recognized by the Board of Secondary Education as equivalent thereto with eligibility for Higher Secondary Education in Tamil Nadu.

(ii)Lateral Entry Admission:

The candidates who possess a pass is the HSC [Academic] or equivalent prescribed in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board, with a pass in at least three of the following subjects: Physics / Chemistry / Mathematics / Computer Science / Electronics/ Information Technology / Biology / Informatics Practices / Biotechnology / Technical Vocational Subjects / Agriculture / Engineering Graphics / Business Studies / Entrepreneurship are eligible to apply for Lateral entry admission to the third term of Diploma programs, as per the rules fixed by the Government of Tamil Nadu. (Or) The candidates who possess a pass in 2-year ITI with appropriate grade or equivalent examination.

(iii)There is no **age limit prescribed for admissions to Diploma program.**

(iv)**The medium of instruction is English for all courses, examinations, seminar presentations and project work reports, except for the programs offered in Tamil Medium**.

Structure of the Program

The Redesigning and revamp of the Diploma program in the State of Tamil Nadu will focus on improving the employability and entrepreneurship outcomes of the campuses through skill-centric and industry allied curriculum and syllabi. The following structure is being proposed for the new curriculum.

Pathways for Progressive Learning Experience

The program offers 4 different pathways for progressive learning. Entrepreneurs, Higher Education, Technocrats and Technologists have different pathways from which the students will pick one of these pathways that they find fascinating and work to ameliorate their knowledge base over the desired pathway.

There are courses offered for the specific pathways in their final terms that will aid them to choose their career in their specific pathways. Pathway direction for the students can be assisted by faculty mentors from time to time.

- **Entrepreneur:**

  Students who aspire to transform opportunity into reality, and create social and economic value for themselves and for others.
- **Higher Education:**

  Students with aspirations of pursuing higher education to acquire higher-order skills and competencies in the domain of interest.
- **Technocrats:**

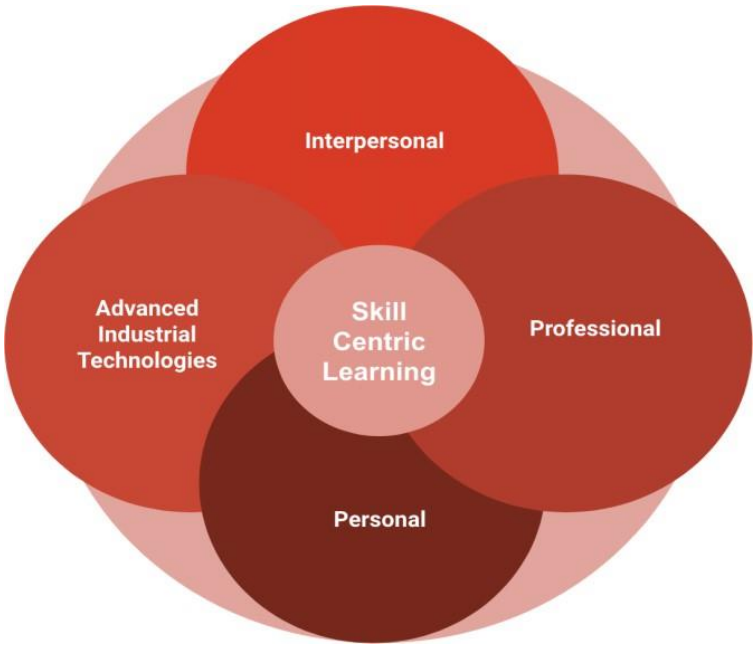
  Students who aspire to acquire mastery of technical tools and methods to manage people who manage the processes
- **Technologists:**

  Students who aspire to gain leadership in a particular discipline / technology to evolve into Problem Solvers & Innovators

Various Dimensions for Transformation:

Today's world is rapidly changing and increasingly interconnected, and the future talent pipeline to be sourced from the campuses needs to adapt to changes that will keep accelerating in the future. The new diploma program focuses on equipping learners with skills that will enable them to cope with the foreseeable social and economic changes and manage often unpredictable realities. The various dimensions of transformation are designed to nurture skills towards holistic human development. Such skills are acquired not only on formal courses but in a variety of contexts throughout the academic curriculum.

Four broad dimensions of skills to ensure holistic human development: (1) Personal, (2) Professional, (3) Interpersonal and (4) Advanced Industrial Technologies skills and competencies.



Integrated Curriculum:

An integrated curriculum is based on learning experiences that lead to the acquisition of disciplinary knowledge and its application in a professional environment interwoven with the teaching of personal, interpersonal, and professional skills, and ways in which the integration of emerging technological skills and multidisciplinary connections are made.

Course Levels:

A course is a component (a paper/subject) of a program. All the courses need not carry the same weightage. The course should have defined Course Objectives and Course Outcomes. A course may be designed to involve lectures/tutorials/laboratory work/project work/Internships/seminars or a combination of these, to effectively meet the teaching and learning needs and the credits may be assigned suitably.

The programs consist of various levels of courses, structured as

(1) Foundation (F), (2) Concentration (C) and the (3) Specialization (S) courses for a greater understanding of the core concepts of the fundamentals in the initial year of learning and thereby moving towards the specialization areas by choice.

- **Foundation (F) | Year I:** Foundation courses build strong fundamental requirements across mathematics, statistics, science, engineering domain, advanced technologies, social sciences and humanities.
- **Concentration (Cn) | Year II:** Concentration courses shall deliver domain-specific knowledge and technological skills. They are offered as core and electives to provide the requisite mandatory working knowledge of the chosen domain.
- **Specialization(S) | Year III:** Specialization courses are focused on a particular area of study leading to a specific pathway. Some of the courses can also be beyond the program, leading to skills and competencies in emerging technology domains.

Course Types:

Every diploma program shall have a curriculum with syllabi comprising Theory, Practicum and Practical courses with well-defined Program Outcomes (PO) as per the Outcome Based Education (OBE) model. The content of each course is designed based on the intended Course Outcomes (CO). Every program shall have a distinct curriculum with syllabi consisting of courses broadly categorized under:

1. Core (C)/Elective (E) - Core / Elective courses are offered to students of a particular program to gain basic and specialized knowledge/skills in a selected field. Core courses are mandatory to complete the program and shall not be exempted or provided with

credit equivalence. Elective Courses may be grouped into different domains/streams/specializations to enable the students to have at least 3 to 5 options. At least 20 students need to express their willingness, for the case of an elective course, to be offered.

2. Practicum (P) - Integrated course taught in a hands-on learning environment. This may be offered wherever theoretical concepts are to be learned simultaneously with relevant practical sessions. Such courses shall be offered only if sufficient laboratory facilities are available to conduct such courses, and both laboratory and theory components shall be considered for continuous assessment. Final evaluation based on the proportion of the credit awarded for the respective component.

3. Lab (L) - Practical Courses taught in a designated lab. This may be offered when conceptual learning has to be augmented by practical experiments and also to bring focus on acquiring skills through doing. Such courses shall be offered only if sufficient laboratory facilities are available to conduct such courses.

4. Field Study (FS) - Offered as a special / curriculum-enriching component to understand certain practical issues/work practices / hands-on training/immersion project/market survey. Field Study, if it forms a part of the course, then credit(s) shall be assigned accordingly; otherwise, such course(s) may be specified in the Grade Sheet without grades.

5. Certification (Cer) - Industry-driven course shall be offered, jointly with an industry that would result in learning the emerging trends / employment potential topics / solving real-time problems. The Contents of the course shall be jointly designed by an industry expert and a suitable faculty member, with relevant assessment and evaluation. Hybrid/Online learning options shall be available. Students are permitted to complete these courses through MOOCs / Professional Certification and credit equivalence (Program Elective or Open Elective), to a maximum of 6 credits.

6.In-House Projects (J) - Capstone Project shall be offered once a student completes >95% of the core courses related to the Diploma program. The Capstone Project is expected to involve concepts from fundamentals to recent developments and may be restricted to one domain or multi- domains / multi-disciplines. Capstone Project shall be offered only after completing all the fundamental courses and offered during the final term. It shall also focus on Environment, Society, Sustainability, Entrepreneurship and Project Management. In the case of a multidisciplinary project, a suitable co-supervisor shall be opted for the students from the relevant Department for successful completion. Capstone Project may be offered in phases, i.e. Phase I and Phase II (single topic or two different topics). Students are encouraged to submit the softcopy of the complete report for evaluation and abstract in the printed form during the final presentation.

7.Fellowship (Fs) - Up to 6 Months for professional and/or academic development offered by an external organisation identified and nominated by DoTE in India or abroad. Students shall be shortlisted for the same under sponsorship/scholarship by competent authorities and approved by the Head of the Institution.

8. Boot Camp (B) - 2-to-5-day training camps for imparting knowledge and skills in emerging areas. It may be offered jointly by a team of faculty members / external experts with course content that includes interdisciplinary topics from different domains, thereby enhancing the Professional Knowledge & Skills of the students. However, such courses shall not have any significant repetition of other courses offered in that particular diploma program. If a student fails to complete such a course on the first attempt or lacks attendance requirements, they may opt for a different course in the subsequent term and meet the minimum credit requirements of the program or may re- do the same course whenever offered.

9. Hackathon (H) - 3 to 6 days of problem-solving and building a solution for real-world problems in an intensive/accelerated manner. It may be considered as one of the course types in situations where multiple solutions are expected to a problem or multiple problems are expected to be solved, in a particular industry/research laboratory. Such a course shall be essentially a Practicum and may be offered in a workshop mode. Credit allocation, Assessment and Evaluation shall be based on the respective syllabi designed for the same.

10. Internship (I) - Internship is offered as a credit course with the Industry/Research Laboratories/ other Universities in India or abroad. Credit allocation, Assessment and Evaluation shall be based on the procedures given. Every student is encouraged to gain Credits through an Internship.

11. Audit Courses are optionally registered by a student to understand certain basic/advanced concepts in his / her own discipline or other disciplines offered by the college. In this case, if a candidate fails in an Audit Course, it is not mandatory to repeat that course and these courses shall not be considered for eligibility for awarding the Diploma. Grades shall be awarded as “Completed”.

Definition of Credit:

Credit is a kind of weightage given to the contact periods* to teach the prescribed syllabus, which is in a modular form. The credit distribution for theory, laboratory and project courses is mentioned in the table below.

Theory (L) - 15 periods	1 credit
Tutorial (T) - 15 periods	1 credit

Practical (P) – 30 periods	1 credit
Internship (I) - 45 periods	1 credit
Project (J) - 30 periods	1 credit

* 1 period = 50 minutes of class

Curriculum Structure:

Every program shall have a distinct curriculum with syllabi consisting of courses broadly categorized under Basic Sciences, Basic Engineering, Professional Core, Program Electives, Open Electives, and Certification Courses. Credit distribution for various categories of the courses will follow the guidelines given below, subject to minor variations, as may be suggested by the respective Boards of Studies.

Category	**Credit Range**
Humanitiesand Social Sciences	11
Basic Science Courses	17-20
Engineering Sciences	6-13
Programme Core	40-51
Program Elective	9-12
Open Elective	10
Industrial Training / Project Work	14
Audit Course	0
Integrated Learning Experiences	
Induction Program	Non-Credits Course
I&E / Club Activity / Community Initiatives	Non-Credits Course
Shop Floor Immersion	Industrial visit
Health & Wellness	PT,Yoga
Student-Led Initiative	Non-Credits Course
Special Interest Groups (Placement Training)	Non-Credits Course
Emerging Technology Seminars	TED, NPTEL Videos

Each program will consist of Basic Science (BS), Engineering Sciences (ES), Professional Core (PC), Program Electives (PE), Open Electives (OE), Audit Courses and In-House Project/Internships/Fellowships.

1. **Basic Sciences:** This course is common to all programs to develop fundamental knowledge of science and mathematics; it also enhances the reasoning and analytical skills amongst students.
2. **Engineering Sciences**: Engineering Science shall create awareness of different specializations of engineering studies. The goal of these courses is to create engineers of tomorrow, who possess the knowledge of all disciplines and can apply their interdisciplinary knowledge in every aspect. It could be any branch of engineering - Civil, Computer Science and Engineering, Electrical, Mechanical, etc.
3. **Professional Core:** This includes core courses designed in the program, which are major courses of the discipline, are required to attain desired outcomes and to ignite critical thinking skills amongst students.
4. **Program Elective:** This includes elective courses that can be chosen from a pool of courses which may be very specific or specialized or advanced or supportive to the program of study or nurtures the candidate's proficiency/skill. This is called a program elective course.
5. **Open Elective:** An elective course chosen generally from another discipline/ subject, to seek interdisciplinary exposure is called an open elective. While choosing the electives, students shall ensure that they do not opt for courses with syllabus contents which are similar to that of their departmental core/elective courses.
6. **Audit Courses:** An audit course is one in which the student attends classes, does the necessary assignments and takes exams. The Institute encourages students towards extra learning by auditing for the additional number of courses. The results of audit courses shall not be considered for the prescribed “carry over courses” limit.
7. **Humanities and Social Science:** Basic courses offered across language, communication and social science subjects, including any management skills and shall be categorized as Humanities and Social science.
8. **In-House Project/Internships/Fellowships:** Every student must do one major project in the Final year of their program. Students can do their major project in Industry or R&D Lab or in-house or a combination of any two or a fellowship in a reputed organization.

Outcome-Based Education:

Outcome-based education aims to create a clear expectation of results that students must achieve. Here, the outcome includes skills, knowledge and attitude. Outcomes inform both the way students are evaluated on a course and the way a course

will be organized. Effective learning outcomes are student-centered, measurable, concise, meaningful, achievable and outcome-based (rather than task-based). To identify achievable learning goals and develop plans to meet them, revised Bloom's Taxonomy framework is introduced to allow educators to assess learning on an ongoing basis, encouraging students to reflect on their progress.

All the programs offered should adopt Outcome Based Education (OBE) in order to enhance the opportunities for the students with respect to their career track (through a student-centric approach). The Program Outcomes (POs) of the respective program of study are achieved through the Course Outcomes (COs). Necessary remedial actions are taken at regular intervals to ensure the proper attainment of outcomes by the students. The evaluation procedures outlined are to be followed by the departments before arriving at the data for the Outcome attainment analysis.

1. OBE is an approach to education in which the decisions about the curriculum instruction and assessment are driven by the learning outcomes that the students should display at the end of a program or course.

2. The vision and mission statements are the guiding forces behind an institute / department. The vision statement provides insight into what the department focuses to achieve or become in the future. The mission statement communicates the process involved in achieving the vision. An effective vision statement should be concise, unambiguous, futuristic, and realistic. Aspirational, and inspirational. Furthermore, it shouldn't be generic but rather focus on outcomes specific to the department. A good mission statement should focus on the ways to achieve the vision of the department. It should be brief, clear, informative, simple, and direct.

3. Graduate Attributes (GAs) represent the standard abilities to be looked for in a graduate of any diploma program. They form the Program Outcomes (POs) that reflect the skills, knowledge, and abilities of diploma graduates regardless of the field of study. At the same time, POs are necessarily independent of disciplinary knowledge; rather, these qualities may be developed in various disciplinary contexts. POs are composite statements made-up of multiple aspects relevant to a broader outcome like domain knowledge, design, analysis, etc. They also ensure the holistic development of the students by covering aspects like communication, ethics, project management, etc.,

4. Assessments are designed to measure the POs, and POs give useful guidance at the program level for the curriculum design, delivery, and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. Real observability and measurability of the POs at the course level are very difficult. To connect high-level learning outcomes (POs) with course content, course outcomes and assessments are designed, they are necessary to bring further clarity and specificity to the program outcomes.

5. For each PO, the skills and competencies implied generally require a different assessment methodology. This helps us to create a shared understanding of the competencies that students want to achieve.

6. Course Outcomes (COs) are specific, measurable statements that help the learners to understand the capabilities to be attained by them at the end of the course. COs should highlight what the learner can attain by studying the course and undergoing the evaluation of outcomes prepared for the same. It includes the knowledge to be gained, skills to be acquired and the application of the same towards solving problems specific to the context. The topics for the course should be decided based on the course outcomes in such a way that the specific topics alone do not map to the specific course outcomes.

7. Revised Bloom's Taxonomy for Assessment Design: It attempts to divide learning into three types of domains (cognitive. affective, and behavioral) and then defines the level of performance for each domain. Conscious efforts to map the curriculum and assessment to these levels can help the programs to aim for higher-level abilities which go beyond remembering or understanding, and require application, and analysis, evaluation or creation.

8. CO-PO course articulation matrix should indicate the correlation between the CO and PO based on the extent to which the CO contributes to the PO. This is mapped at three levels 1, 2 or 3 representing low, medium and high respectively. This also ensures that every PO is covered across the courses offered as a part of the program. The matrix will be adopted for all the courses run by the department.

9. The attainment of COs of any course can be assessed from the performance of the students through continuous and final assessments. The goal of continuous assessment is to understand/realize the critical information about student comprehension throughout the learning process and provides an opportunity for the facilitator to improve their pedagogical approach and for students to improve learning outcomes. The goal of the final assessment is to evaluate student learning outcomes at the end of the course instruction. According to the new regulation, 40% weightage is for the continuous assessment, and 60% weightage is for the final assessment.

10. The PO assessment should be carried out by both direct and indirect assessment. The assessment can be estimated by giving 80% weightage to direct assessment and 20% weightage to indirect assessment. Direct assessment is purely based on CO attainment through the course Assessment Method, and indirect assessment is through the feedback taken from the relevant stakeholders of the system. Indirect assessment can be done in the form of a graduate exit survey where the student is required to answer a questionnaire that reflects their satisfaction with respect to the attainment of POs. The questionnaire should be carefully designed so as to not have the POs themselves as direct questions.

11. Each PO attainment corresponding to a specific course can be determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values. The threshold value of 60%, shall be set for the POs and the same can be modified with due approval of the Authorities.

12. The gap identified in the attainment of the COs and POs can be addressed by organizing talks from the industry, bridge courses, organizing workshops, arranging field visits (industrial visits) with respect to the course, improving the student performance under the innovative teaching-learning process of the institution, etc.,

Academic and Curriculum Flexibility

Academic and curriculum flexibility enhance a student's learning experience by providing various options such as adjusting the timeframe of courses, horizontal mobility, interdisciplinary opportunities, and other benefits through curricular transactions. The

types of Academic and curriculum flexibilities are listed below.

1. Break of Study
2. Course Add / Drop
3. Course Withdrawal
4. Credit Equivalence
5. Credit Transfer
6. Examination Withdrawal
7. Fast-Track Option
8. Flexi-Credit System
9. Bridge Course

Break of Study:

If a student intends to take a break / temporarily discontinue the program in the middle of a term/year, during the period of study, for valid reasons (such as Internships, accident or hospitalization due to prolonged ill health) and wishes to re-join the program in the next academic year, student shall intimate stating the reasons.

Break of study is permitted only once during the entire period of the Diploma program for a maximum period of **one year.** The student is permitted to rejoin the program after the break and shall be governed by the rules and regulations in force, at the time of rejoining.

The break shall be notified in the grade sheet. If a student is detained for want (shortage) of attendance or disciplinary issues, the period spent in that term shall not be considered a permitted Break of Study.

Course Add / Drop:

Subject to resource availability, a student has the option to add additional courses within a week after the regular term begins. Furthermore, a student can drop registered courses before completing the first Continuous Assessment (CA) test in a term, limited to a maximum of 6 credits. These dropped courses will not be considered as arrears, but the student will need to retake them when they are offered by the institution. In order to carry out these actions, students must obtain permission from the HoD, COE of the institution, and Head of the institution.

Credit Equivalence:

It is an option that can be exercised by a student under the following circumstances –

(i) credits earned through Extra and Co-curricular Activities (only against program elective / open elective – Global)

(ii) credits earned through online courses (only against Open Electives - Technical and Global and program electives)

(iii) credits accumulated through Capsule courses, One-Credit courses

Such courses and credits earned shall be presented in the Board comprising the Head of the department, COE, the Principal & Chairman Autonomous Examinations along with the Equivalent Credit(s). (Online Courses offered by Swayam, NPTEL.)

Credit Transfer:

Credits earned by a student through Credit Equivalence (as said above) and credits earned by attending and completing the courses successfully, offered by other approved Universities / Institutions / Professional Bodies (only against Technical and Global Open Electives and program electives) shall be considered as "Transferred Credits (specified in the Grade Sheet)" and considered for the calculation of CGPA.

Examination Withdrawal:

A student may be permitted to withdraw from appearing for the end term examination in any course or courses for valid reasons (medically unfit / unexpected family situations / sports approved by the Physical Director / HOD/Principal/DoTE).

This privilege can be availed **ONLY ONCE** during the entire program. Valid documents, for medically unfit / unexpected family situations, shall be submitted by the student within seven days before the commencement of the examination in that course or courses and also recommended by the Head of the Department, approved by the Head of the Institution and COE with intimation to DoTE.

Special cases under extraordinary conditions will be considered on the merit of the case if any student applies for withdrawal, notwithstanding the requirement of mandatory seven days' notice.

Those students who withdraw from any course or courses during the program are eligible for the award of first class and first class with distinction as per the requirement in this regard. Withdrawal is permitted for the end term examinations in the final term, only if the period of study, the student concerned, does not exceed 1 term after the regular period of 3 years so that his eligibility for distinction is considered.

The final approval for withdrawal will depend on the merit of the case and will be decided by the Head of the Institution.

Note: Exam fee paid will be adjusted in the subsequent term.

Fast-Track:

This option enables a student to complete the minimum credit requirements of a program, to enable

(i) His / her own entrepreneurial venture (start-up),

(ii) An internship in industry/research laboratories / fellowship.

This option is currently available for students to complete the two elective papers offered in Term 6 in advance [Recommended to be completed in Term 4 or 5] to avail the

last term for internship/fellowship/do his own start-up/enterprise/project outside the campus. However, such an option shall not be exercised to pursue higher education elsewhere. The duration of the study shall remain the same as per the prescribed syllabi for the fast-track option also.

Flexi-Credit System:

It offers a student to earn additional credits than that specified (minimum credits) to a program for which student has enrolled. Such additional credits earned shall be mentioned in the Grade Sheet, as 'Additional Credits Earned'. Credits earned through Flexi-Credit System shall not be considered for the calculation of SGPA or CGPA.

Bridge Course:

This is specifically designed for Lateral Entry (LE) students who join the Diploma Program in 2nd year (3rd Term). This course will be a 40 period in which the faculty gives the gist of important topics that the LE students may have missed in the first year of the program specific to the department concerned.

Integrated Learning Experience:

Integrated learning experiences encompass activities that foster the acquisition of disciplinary knowledge, personal and interpersonal skills, and technological proficiency. These experiences promote active engagement in meaningful real-life situations and establish connections between different curricula, co- curricular activities, and extracurricular pursuits across diverse disciplines. Integrated learning experiences are concatenated in the academic curriculum for each term enabling the students to learn, adapt and transform through experiential learning pedagogy.

This approach enriches the curriculum by incorporating dynamic and up-to-date co-curricular courses and activities that may not be directly aligned with the students' program of study. It prioritizes the holistic development of students, fostering their growth and well-roundedness.

1. Innovation & Entrepreneurship
2. Peer 2 Peer Learning
3. Growth Lab
4. Shop Floor Immersion
5. Health & Wellness
6. Induction Program
7. Special Interest Groups
8. Club Activity
9. Community Initiatives

10. Emerging Tech Seminars
11. Student Led Initiative
12. Industry-Specific Training

Innovation Track:

They are offered to the student, to bring awareness on start-up / entrepreneurial ventures through a series of courses/activities. Based on the inputs gained, students can select their electives, specialization, and capstone project and deferred placement option.

Peer 2 Peer Learning:

P2P learning involves interactions between students from senior classes, leading to valuable additions and deepening the understanding of certain concepts. This may happen as a part of a scheduled time-table or after instructional hours in a day, by Peers (from senior classes), leading to value addition, enriching the understanding of certain concepts and implementing practically (developing models, prototypes, proofs- of-concept) for learning satisfaction, participating in competitions / competitive examinations. These efforts are expected to improve teamwork, communication, and understanding of societal needs, project management and life-long learning activities.

Growth Lab:

Growth labs play an integral role to stimulate and develop a student's personality & skills in various fields of life. It also teaches about a growth mindset to tackle real-world problems and life challenges. It brings self-confidence and empowerment to transform the inter-personality of the student. The process brings the progression to achieve higher goals in life.

Shop Floor Immersion:

This introduces new ideas, inspires participants to further explore them on their own or may illustrate and promote actual process practice through seminars, workshops, Industrial Visits etc that result in learning hands-on skills as it gives the students an opportunity to try out new methods and fail in a safe environment.

Health & Wellness:

This aims to teach students about various aspects of health and fitness, including exercise, nutrition, yoga, Mental health, and substance awareness.

Induction Program:

It shall be organized to all the students, admitted into first year, to offer the course on Universal Human Value, awareness sessions on campus facilities, academic regulation and curriculum, highlight the culture, values and responsibilities of an Engineer in the Society and the Nation as a whole, besides Institutional infrastructure and facilities and student support systems. Awareness of domain-specific requirements to be organized in the

second year of induction.

Special Interest Groups:

The training is especially based on the placements on campus. Concepts required for aptitude tests, group discussions, resume building; personal interviews, industry-specific orientation and Business Case Competition are taught to the students.

Club Activity:

A small community that attracts people who share the same interests such as music, arts, or sports working on a common goal to develop a sense of unity and teamwork, learning how to work with others in reaching the same goals

Community Initiatives:

Community Initiatives involve activities that aim to define values, cultivate empathy, foster social skills, and enhance students' understanding of their community. Through these initiatives, students have the opportunity to build meaningful relationships, gain insights into different perspectives, and engage with diverse cultures. This engagement enables the development of crucial interpersonal skills.

Emerging Tech Seminars:

A technical presentation made by the Students & the cross-functional Members of the Faculty to showcase the technology adopted in the Industry. This collaborative teaching-learning session between the student & the faculty results in a better understanding of the use of technology in various applications.

Student-Led Initiative:

A student-led session will help students to acquire and share knowledge on emerging industrial technologies that will comprehend & introduce the emerging technology to the students. This includes student-led Tech talk series & other initiatives.

Industry Specific Training:

Gaining information about the industry's way of working and understanding the process. This enables one to understand the various non-technical skills & competencies required for the transformation from a Student to a professional.

Duration of the Program:

- A student is ordinarily expected to complete the Diploma program in 6 terms (for SSLC students) and four terms (for Lateral Entry students) but in any case, not more than 12 Terms for SSLC (or equivalent) students and not more than 10 terms for Lateral Entry students.

- Each term shall normally consist of 15 weeks with periods of 50 minutes each. The Head of the Institution shall ensure that every faculty imparts instruction as per the number of periods specified in the syllabus and that the faculty teaches the full content of the specified syllabus for the course being taught.
- The Head of the Institution may conduct additional classes for improvement, special coaching, conduct model tests etc., over and above the specified periods.
- The End Term Examination will normally follow immediately after the last working day of the term as per the academic schedule prescribed from time to time.
- The total period for completion of the program from the commencement of the first term to which the student was admitted shall not exceed the maximum period specified irrespective of the period of break of study in order that student may be eligible for the award of the degree. The minimum and maximum period of study shall be;

Diploma program	Min. Period	Max. Period
Full Time	3 Years	6 Years
Full Time [Lateral Entry]	2 Years	5 Years
Sandwich	3.5 Years	6.5 Years
Sandwich[Lateral Entry]	2.5 Years	5.5 Years

Attendance Requirements

- A student who has fulfilled the following conditions shall be deemed to have satisfied the requirements for completion of a Term.
- Ideally every student is expected to attend all classes of all the attendance.

1. However, in order to make provision for certain unavoidable reasons Participation in sports, the student is expected to attend at least 75% of the classes. Therefore, the student shall secure not less than 75% (after rounding off to overall attendance for each term.

2. However, a student who secures overall attendance between 65% and 74% in the current term due to medical reasons (prolonged hospitalization /accident / specific illness) / participation in sports events may be permitted to appear for the current term examinations, subject to the condition that the student shall submit the medical certificate / sports participation certificate attested by the Head of the Institution.

3. Candidates who have earned more than 50% attendance but fall short of the basic requirement of 65% attendance (in all subjects of the current term put together) shall be permitted to proceed to the next term, only one time during the course of study by considering all the papers in that current term as absent and to complete the program of study. For such candidates by default, the classification of class shall be Second class on successful passing of course.

4. Students who secure less than 50% overall attendance shall not be permitted to write the end Term examination and not permitted to move to the next term. They are required to repeat the incomplete term in the next academic year, as per the norms prescribed.

Award of Marks for Course Attendance

Award of marks for Course attendance to each Course Theory / Practical /Practicum /Project will be as per the range given below.

Sl.No	Course Attendance (%)	(Theory / Practical / Practicum) Marks	(Health & Wellness) Marks
1	75 % - 70%	1	4
2	81 % - 85 %	2	8
3	86 % - 90 %	3	12
4	91 % - 95 %	4	16
5	96 % - 100 %	5	20

Class Committee:

Every class shall have a class committee consisting of faculty of the class concerned, student representatives and a chairperson, who is not teaching the class. It is like the 'Quality Circle' (more commonly used in industries) with the overall goal of improving the teaching learning process. The functions of the class committee include:

- Regulations of the diploma program and the details of rules therein.

- Informing the student representatives, the academic schedule including the dates of assessments and the syllabus coverage for each assessment.

- Informing the student representatives, the details of regulations regarding weightage used for each assessment. In the case of practical courses (laboratory / drawing / project work / seminar etc.) the breakup of marks for each experiment / exercise / module of work, should be clearly discussed in the class committee meeting and informed to the students.

- Analyzing the performance of the students of the class after each test and finding the ways and means of solving problems, if any.

- -Identifying the slow-learners, if any, and requesting the faculty concerned to provide some additional help or guidance or coaching to such students.

- The class committee for a class under a particular branch is normally constituted by the Head of the Department. However, if the students of different branches are mixed in a class (like the first term which is generally common to all branches), the class committee is to be constituted by the Head of the Institution.

- The class committee shall be constituted within the first week of each term. At least 4 student representatives (usually 2 boys and 2 girls) shall be included in the class committee, covering all the elective courses.

- The chairperson of the class committee may invite the class adviser(s) and the Head of the Department to the class committee meeting.

- The Head of the Institution may participate in any class committee meeting of the institution.

- The chairperson is required to prepare the minutes of every meeting, submit the same to the Head of the Institution within two days of the meeting and arrange to circulate it among the students and faculty concerned. If there are some points in the minutes requiring action by the management, the same shall be brought to the notice of the Head of the Institution.
- The first meeting of the class committee shall be held within one week from the date of commencement of the term, in order to inform the students about the nature and weightage of assessments within the framework of the regulations.

- Two or three subsequent meetings may be held in a term at suitable intervals.

- During these meetings the student members representing the entire class, shall meaningfully interact and express the opinions and suggestions of the other students of the class in order to improve the effectiveness of the teaching-learning process.

Course Committee for Common Courses

Each common theory course offered to more than one discipline or group, shall have a "Course Committee" comprising all the faculty teaching the common course with one of them nominated as the course coordinator. The nomination of the course coordinator shall be made by the Head of the Department / Head of the Institution depending upon whether all the faculty teaching the common course belong to a single department or to several departments. The 'Course Committee' shall meet in order to arrive at a common scheme of evaluation for the test and shall ensure a uniform evaluation of the tests. Wherever feasible, the Course Committee may also prepare a common question paper for the internal assessment test(s).

Assessment and Examination

Performance in each course of study shall be evaluated for a maximum of 100 marks based on one of the following:

(i) Continuous Assessment [40%]:

- Continuous assessment shall be carried out for 100 marks [summation of multiple CAs] for all types of courses and converted to 40 marks.

- Every subject shall have its own framework for continuous assessment designed by the course committee and approved by the academic board as part of the curriculum. The continuous assessment shall be awarded as per the assessment proposed in respective syllabi.
- For One credit courses and Advanced Skill Certification programs, no end term examination shall be conducted, and final grade will be awarded based on continuous assessment only for 100 marks.

(ii) End Term Examination [60%]:

- The End Term Examination will be conducted for 100 marks and shall be converted to 60 marks in the final results.

- The End Term Examinations (Theory, Practical, Project) of three hours duration will be conducted.

- For Practicum courses, the end term examination will be conducted as a theory or a practical or a project examination based on the credits for each component, the decision on the mode of exam could be based on the recommendation by the internal committee duly forwarded and approved by Head of the Institute.

- For the project works, the Department will constitute a three-member faculty committee to monitor the progress of the project and conduct reviews regularly.

- If the projects are done in-house, the students must obtain the bonafide certificate for project work from the project guide and Head of the Department, at the end of the term. Students who have not obtained the bonafide certificate are not permitted to appear for the project Viva Voce examination.

- For the projects carried out in Industry, the students must submit a separate certificate from Industry apart from the regular bonafide certificate mentioned above. For Industry related projects there must be one Mentor / Supervisor from Industry (External), this is in addition to the regular faculty supervision.

- The final examination for project work will be evaluated based on the final report submitted by the project group (of not exceeding four students), and the viva voce by an external examiner.

- The split up of marks for Internal and End Term Viva Voce can follow the below mentioned rubrics.

Internal Mark Split (40 Marks)			End Term (60)		
Review 1 (10 Marks)	**Review 2 (15 Marks)**	**Review 3 (15 Marks)**	**Record (20 Marks)**	**Presentation (20 Marks)**	**Viva Voce (20 Marks)**
Committee: 5 Marks Supervisor: 5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5

- Students who are unable to complete the project work at the end of the term can apply for an extension to the Head of the Department, with the recommendation from the project guide for a period of a maximum of two months. For those students who extend the project work for two months, Viva Voce will be carried out and results will be declared separately. If the project report is not submitted even beyond the extended time, then students are not eligible to appear for Project Viva Voce Examination.

- The performance of each student in the project group would be evaluated in a viva voce examination conducted by a committee consisting of an external examiner and the Department project coordinator as an internal examiner.

- If a student indulges in malpractice in any of the End Term Examination / Internal Examinations, student will be liable for punitive action as prescribed by the college from time to time.

Passing Requirements for Award of Diploma

Student, who secures not less than 40% of total marks prescribed for the course [Internal Assessment + End term Examinations] with a minimum of 35% of the marks prescribed for the end term examination, shall be declared to have passed the course and acquired the relevant number of credits. This is applicable for both theory and laboratory courses (including project work).

(i) No Minimum marks for continuous assessment (Internal). (ii) Minimum Marks to be secured in end term exam is 35 out of 100, (iii) Those who secure minimum mark (35) in end term examination need to secure minimum of 19 out of 40 in continuous assessment to achieve overall pass percentage of 40% in that particular subject.

If a student fails to secure a pass in a theory course / laboratory course / elective course

(same elective course), the student shall register and appear only for the end term examination in the subsequent term. In such cases, the internal assessment marks obtained by the student in the first appearance shall be retained and considered valid for all subsequent attempts till the student secures a pass. However, from the third attempt onwards if a student fails to obtain pass marks (Internal Assessment + End Term Examination), then the student shall be declared to have passed the examination if the student secures a minimum of 35% marks prescribed for the end term examinations alone.

If any other Elective course is opted by the student, the previous registration is cancelled and henceforth it is to be considered as a new Elective course. The student has to register and attend the classes, earn the continuous assessment marks, fulfil the attendance requirements and appear for the end term examination.

If a student is absent during the viva - voce examination, it would be considered a failure.

If a student fails to secure a pass in Project Work, the student shall register for the course again in the subsequent term and can do Project Work.

The passing requirement for the courses which are assessed only through purely internal assessments, the passing requirement is 50% of the internal assessment (continuous assessment) marks only.

A student can apply for revaluation of the student's Term examination answer paper in a theory course, as per the guidelines of Autonomous Exam cell, SIT on payment of a prescribed fee along with prescribed application to the Autonomous Examination account.

The Autonomous Examination cell will arrange for the revaluation and the results will be intimated to the student concerned through institute web site

Revaluation is not permitted for laboratory courses and projects.

Award of Grades:

The award of letter grades will be decided using absolute grading principle. The performance of a student will be reported using letter grades, each carrying certain points as detailed below:

Letter Grade	Grade Points*	Marks
O (Outstanding)	10	91-100
A+ (Excellent)	9	81-90
A (Very Good)	8	71-80
B+(Good)	7	61-70
B (Average)	6	51-60
C (Satisfactory)	5	40-50
RA (Re-Appearance)	0	<40

SA (Shortage of Attendance)	0	0
W (Withdrawal)	0	0

A student is deemed to have passed and acquired the corresponding credits in a particular course if the

Student obtains any one of the following grades: "O", "A+", "A", "B+", "B", "C".

- 'SA' denotes shortage of attendance and hence prevents students from writing the end term examinations. 'SA' will appear only in the result sheet.

- "RA" denotes that the student has failed to pass in that course.

- "W" denotes withdrawal from the exam for the particular course. The grades RA and W will figure both in the Grade Sheet as well as in the Result Sheet. In both cases, the student has to appear for the end term examinations as per the regulations.

If the grade RA is given to Theory Courses/ Laboratory Courses it is not required to satisfy the attendance requirements, but has to appear for the end term examination and fulfill the norms to earn a pass in the respective courses.

If the grade RA is given to courses which are evaluated only through internal assessment, the student shall register for the course again in the subsequent term, fulfilling the norms as to earn a pass in the course. However, attendance requirements need not be satisfied.

For the Audit Course and Integrated Learning Experience, on its successful completion a 'completed' certificate will be issued by the head of the institute. Every student needs a minimum of 75% attendance in the Audit / integrated Learning experience compulsorily. However, for valid reasons, the Head of the Institution may permit a student to exempt/complete this requirement in the subsequent years. Successful completion of these courses is compulsory for the award of degree. These courses will be monitored by the central committee constituted by DoTE. The grades O, A+, A, B+, B, C obtained for the one/two credit course (not the part of curriculum) shall figure in the Grade Sheet under the title 'Value Added Courses/Internship/Industrial training'.

The courses for which the grades obtained are SA will not figure in the Grade Sheet.

Grade Sheet:

After results are declared, Grade Sheets will be issued to each student which will contain the following details: The College in which the student has studied, the list of courses registered during the term and the grade scored. The Grade Point Average (GPA) for the term and the Cumulative Grade Point Average (CGPA) of all courses enrolled from the first term onwards. GPA for a term is the ratio of the sum of the products of the number

of credits acquired for courses and the corresponding points to the sum of the number of credits acquired for the courses in the term. CGPA will be calculated in a similar manner, considering all the courses registered from the first term. RA grades will be excluded for calculating GPA and CGPA.

$$\text{CGPA} = \frac{\sum_{i=1}^{n} CiGPi}{\sum_{i=1}^{n} Ci}$$

where **Ci** is the number of Credits assigned to the course

GPi is the point corresponding to the grade obtained for each course

n is number of all courses successfully cleared during the particular term in the caseof GPA and during all the terms in the case of CGPA.

Award of Diploma

A student shall be declared to be eligible for the award of the Diploma provided the student has,

- Successfully gained the required number of total credits as specified in the curriculum
  Corresponding to the student's program within the stipulated time.

- Successfully completed the course requirements, appeared for the end term examinations and passed all the subjects within the period as prescribed

- Successfully passed any additional courses prescribed by the Directorate of Technical education whenever the student is readmitted under Regulations 2023 from the earlier regulations.

- Successfully completed the Integrated Learning Experience requirements.
- No disciplinary action pending against the student.
- The award of Diploma must have been approved by the Board of Examinations.

Classification of Diploma Awarded

FIRST CLASS WITH DISTINCTION:

A student who satisfies the following conditions shall be declared to have passed the examination in First class with Distinction:

- Should have passed the examination in all the courses of all the six terms (4 terms in the case of Lateral Entry) in the student's First Appearance. The duration of the program shall be extended up to one additional term in case of any withdrawals

from end term examination. Withdrawal from examination will not be considered as an appearance.

- Should have secured a CGPA of not less than 8.50.
- One-year authorized break of study (if availed of) shall be permitted within the four years period (three years in the case of lateral entry) for award of First class with Distinction.
- The candidates should NOT have been prevented from writing the end term examination due to lack of attendance in any term.

FIRST CLASS:

A student who satisfies the following conditions shall be declared to have passed the examination in First class:

- Should have passed the examination in all the courses in all six terms (4 terms in the case of Lateral Entry). The duration of the program shall be extended up to one additional term in case of any withdrawals from end term examination. Withdrawal from examination will not be considered as an appearance.
- One-year authorized break of study (if availed of) or prevention from writing the end term examination due to lack of attendance (if applicable) shall be provided with the duration of four years (three years in the case of lateral entry) for award of First class.
- Should have secured a CGPA of not less than 6.50.

SECOND CLASS:

- All other students who qualify for the award of the degree shall be declared to have passed the examination in Second Class.

Discipline:

Every student is expected to maintain disciplined and respectable behaviour both within and outside the college premises, refraining from engaging in any activities that may tarnish the reputation of the college.

The Head of the Institution shall constitute a disciplinary committee consisting of the Head of the Institution, Two Heads of Department of which one should be from the faculty of the student, to enquire into acts of indiscipline and notify the authorities about the disciplinary action recommended for approval.

In case of any serious disciplinary action which leads to suspension or dismissal, then a committee shall be constituted.

If a student indulges in malpractice in any of the end term examinations, student shall be

liable for punitive action as prescribed by the Board of Examination from time to time. For any malpractices in any continuous assessment, the same shall be reported to the Head of the Institution for disciplinary actions.

Revision of Regulation, Curriculum and Syllabi

The Directorate of Technical Education may from time-to-time revise, amend or change the regulations, curriculum, syllabus and scheme of examinations through the Leadership Committee with the approval of the Board.

SALIENT FEATURES OF THE DIPLOMA PROGRAMME IN CIVIL ENGINEERING

1. Name of the Programme	:	Diploma in Civil Engineering
2. Duration of the Programme	:	Three years
3. Entry Qualification	:	S.S.L.C or prescribed by Directorate of Technical Education and Lateral Entry in Second Year admission for Plus-two Students.
4. Intake	:	50+10
5. Pattern of the Programme	:	Term Pattern(I to VI)

EMPLOYMENT OPPORTUNITIES

Employment opportunities for diploma in Civil Engineering are visualized in following industrial at various levels / positions.

a. In Govt. Sectors -

PWD (Buildings, Irrigation), CPWD
Housing Board,WRD
State Highways, National Highways
Railways,
TWAD Board,
Environmental and Pollution Control board
Slum clearance board
Police Housing Department,
TANGEDCO

b. In Pvt. Sectors -

Larsen & Turbo
Larsen & Turbo (Hydrocorbon)
Nardril rebar detailing
Rebar detailing
M.D.S Rebar Detailing
Technip
Indomer
Woods land Detailing
Cad's software pvt ltd.

c. Research Organizations like CSIR, ISRO etc.

d. Entrepreneurs in Planning, Estimating, Design, and Civil Contractor, consultants etc.

Various designations for diploma holders in Civil Engineering are given as follows

1. Junior Engineer
2. Technical Assistant
3. Supervisor
4. Draughtsman
5. Maintenance Engineer
6. Planner
7. Consultant
8. Estimator
9. Builder
10. Contractor
11. Designer
12. Instructor

COMPETENCY PROFILE

Keeping in view the employment opportunities of diploma holders in Civil engineering the course is aimed at developing following knowledge and skills in the students:

1. Basic understanding of concepts and principles of civil engineering so as to enable the students to apply the knowledge.
2. Development of communication and interpersonal skills for effective functioning in the world of work.
3. Ability to read and interpret drawings related to Civil Engg.
4. Knowledge of various materials used in Civil Engg., their properties and specifications.
5. Ability to prepare plan, section and elevation of a building, bridge drawing and structural drawing.
6. Ability to calculate the estimate of the Building& Bridges etc.
7. Ability to Design the R.C.C. Structures and Steel Structures.
8. Appreciation of the need of clean and green environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations.
9. Development of generic skills of thinking and problem – solving, communication attitudes and value system for effective functioning in construction side.
10. Understanding of the basic principles of managing men, material and machines / equipment for construction of buildings and others.
11. Proficiency in the use of computers.
12. Basic manual and machining skills for maintaining the quality of materials.
13. Knowledge of properties of materials used for construction.
14. Development of good personality in order to have effective communication and business ethic.
15. Holistic development with happiness and prosperity for human harmony.

CURRICULUM AREAS AS DERIVED FROM COMPETENCY PROFILE

The following curriculum areas have been derived based on competency profile.

Sl.No.	Competency profile	Curriculum Areas / Subjects
1	Basic understanding of concepts and principles related to applied sciences like physics, chemistry and mathematics.	Physics Chemistry Mathematics
2	Development of communication and inter personal skill for effective functioning in the world of work.	Communication skills
3	Understanding of basic concepts and principles of mechanical, electrical and civil engineering.	Mechanics of solids General workshop practice
4	Ability to read and interpret drawings related to civil Engg. Etc,	Engineering drawing Building planning and drawing
5	Understand basic concepts and principles in hydrostatics, hydro- kinematics and hydrodynamics and their application in solving fluid flow problems	Hydraulics
6	Integrating Men and materials for Quality construction and maintenance of buildings	Construction Management
7	Identify Quality of various materials used and construction Techniques in Civil Engg.	Construction materials and Construction Practice
8	Knowledge of Civil Engg. Works in Transport(Road ways, Rail ways etc.,)	Transportation Engg.
9	Knowledge Of Planning Of Buildings And Other Structures.	Building planning and drawing
10	Proficiency in the use of computers	Computer Applications In Civil Engineering . Design and Drawing of Steel Elements
11	Ability to Analysis and Design the Structures(RCC & STEEL)	Theory of structures(SOM& MOS) Structural Engineering Structural Design

12	Prepare material estimates and cost estimates for various Civil Engineering works, basic knowledge regarding analysis of rates and contracting principles of valuation	Estimation, Costing and Valuation
13	Knowledge of earth's surface and calculation of areas and volumes of land.	Surveying Practice
14	Appreciation of the need of clean and green environment and its deterioration by various emissions from industries and traffics in roads of preventive procedures & impurities of water.	Environmental Engg.
15	Development of generic skills of thinking and problem-solving, communication, attitudes and value system for effective recruitment in placement.	Industrial visits Internship ,Project work Communication Skills &Aptitude class
16	Understanding of the basic principles of managing men, material and machines / equipment for optimum production	Entrepreneurship Management & Project Management with MIS
17	Holistic development with real understanding, relationship with human being for mutual happiness and physical facility with rest of nature for mutual prosperity leads to harmony.	Integrated Learning Experience.

CURRICULUM OUTLINE

Credit Distribution:

Term	No. of courses	Periods	Credits
Term I	8	640	20
Term II	8	625	20
Term III	8	640	21
Term IV	7	610	20
Term V	8	605	21
Term VI	3	700	18
		Total	**120**

Term III

Sl.no	Course category	Course type	Code	Course title	L-T-P	Periods	Credit	End exam
1	Program core	Theory	1G233110	Mechanics of Materials	3-0-0	45	3	Theory
2	Program core	Theory	1G233210	Construction Materials	3-0-0	45	3	Theory
3	Program core	practicum	1G233340	Surveying Practices	1-0-4	75	3	Practical
4	Program core	practicum	1G233440	Building Planning and Drawing	1-0-4	75	3	Practical
5	Program core	practicum	1G233540	Hydraulics	1-0-4	75	3	Practical
6	Program core	practicum	1G233640	Material Testing Lab	1-0-4	75	3	Practical
7	Open Elective	Advanced skill certification	1G233760	Advance Skill Certification -3	2-0-2	60	2	NA
8	Humanities& social science	Integrated Learning Experience	1G233880	Growth Lab	-	30	0	NA
9	Audit course	Integrated Learning Experience	1G233881	Induction Program -III	-	16	0	-
10	Audit course	Integrated Learning Experience	1G233882	I&E/Club Activity/Community Initiatives	-	16	0	-
11	Audit course	Integrated Learning Experience	1G233883	Shop floor Immersion	-	6	0	-
12	Audit course	Integrated Learning Experience	1G233884	Student led Initiative	-	24	0	-
13	Audit course	Integrated Learning Experience	1G233885	Emerging Technology Seminars	-	8	0	-
14	Audit course	Integrated Learning Experience	1G233886	Heath & Wellness	0-0-2	30	1	-
15	Test & Revision					60		
Total						**640**	**21**	

Note: Test & Revisions – 45 Periods / Library – 15 Periods

Term IV

Sl.no	Course category	Course type	Code	Course title	L-T-P	Periods	Credit	End exam
1	Program core	Theory	1G234110	Mechanics of Structures	3-0-0	45	3	Theory
2	Program core	Theory	1G234210	Transportation Engineering	3-0-0	45	3	Theory
3	Program core	practicum	1G234330	Soil mechanics and Foundation Engineering	2-0-2	60	3	Theory
4	Program core	practicum	1G234440	Concrete Technology	1-0-4	75	3	Practical
5	Program core	practicum	1G234540	Construction Practices	1-0-4	75	3	Practical
6	Program core	practicum	1G234640	Estimating and Costing	1-0-4	75	3	Practical
7	Open Elective	Advanced skill certification	1G234760	Advanced Skill Certification -4	2-0-2	60	2	NA
8	Audit course	Integrated Learning Experience	1G234882	I&E/Club Activity/Community Initiatives	-	40	0	-
9	Audit course	Integrated Learning Experience	1G234883	Shop floor Immersion	-	8	0	-
10	Audit course	Integrated Learning Experience	1G234884	Student led Initiative	-	25	0	-
11	Audit course	Integrated Learning Experience	1G234885	Emerging Technology Seminars	-	12	0	-
12	Audit course	Integrated Learning Experience	1G234886	Heath & Wellness	-	30	0	-
13	Audit course	Integrated Learning Experience	1G234887	Special Internet groups (Placement training)	-	30	0	-
14	Test & Revision					60	-	-
Total						**640**	**20**	-

Note: Test & Revisions – 45 Periods / Library – 15 Periods

Term V

Sl. no	Course category	Course type	Code	Course title	L-T-P	Periods	Credit	End exam
1	Program core	Theory	1G235110	Design of RCC Structures (Limit State Method)	4-0-0	60	4	Theory
2	Program Elective	Theory	1G2352XX	Elective-1	3-0-0	45	3	Theory
3	Program core	Lab	1G235320	Computer Applications in Civil Engineering.	0-0-4	60	2	Practical
4	Program core	practicum	1G235440	Construction Management and Safety Practice	1-0-4	75	3	Practical
5	Program core	practicum	1G235540	Environmental Engineering	1-0-4	75	3	Practical
6	Humanities& social science	practicum	1G235640	Innovation and Startup	1-0-2	45	2	Project
7	Project/ Internship	Internship	1G235773	Industrial Training* [Summer Vacation -90 Hours]	-	-	2	Project
8	Open Elective	Advanced skill certification	1G235860	Advanced Skill Certification -5	2-0-2	60	2	NA
9	Audit course	Integrated Learning Experience	1G235881	Induction Program -III	-	40	0	-
10	Audit course	Integrated Learning Experience	1G235884	Student led Initiative	-	45	0	-
11	Audit course	Integrated Learning Experience	1G235886	Heath & Wellness	-	30	0	-
12	Audit course	Integrated Learning Experience	1G235887	Special Interest Groups (Placement Training)	-	40	0	-
13	**Test & Revision**					60	-	-
				Total		635	21	-

*Internship shall be offered in the summer break 4th and 5th term followed by a review and award of credits in the 5th term.

Elective 1:

Sl.no	Course Category	Course Type	Code	Course Title
1	Program Elective	Theory	1G 23 5 2 11	Mechanical ,Electrical and Plumbing Services
2	Program Elective	Theory	1G 23 5 2 12	Irrigation and Water resources engineering
3	Program Elective	Theory	1G 23 5 2 13	Defects in Building and Remedies
4	Program Elective	Theory	1G 23 5 2 14	Urban Planning and Development
5	Program Elective	Theory	1G 23 5 2 15	Building Bye Laws and statutory drawings

Term VI:

Sl.no	**Course Category**	**Course Type**	**Code**	**Course Title**	**L-T-P**	**Period**	**Credit**	**End term Exam**
1	Open Elective	Theory	1G 23 6 1 XX	Elective-2(Pathway)	3-0-0	45	3	Theory
2	Open Elective	Practicum	1G 23 6 2 XX	Elective-3(Specialization)	1-0-4	75	3	Practical
3	Project/Internship	Project/Internship	1G 23 6 3 XX	In-house Project/Internship/ Fellowship	-	540	12	Project
Total						660	18	

Note:

**Every Student Should Select Any One From The In-House Project Or Internship Or Fellowship. The Guidelines Given Have to be followed.

Elective 2 (Pathway):

SL .no	**Course Category**	**Course Type**	**Code**	**Course Title**
1	Elective | Higher Education	Theory	1G 23 6 1 11	Advanced Engineering Mathematics
2	Elective | Entrepreneurship	Theory	1G 23 6 1 12	Entrepreneurship
3	Elective | Technocrats	Theory	1G 23 6 1 13	Project Management
4	Elective | Technocrats	Theory	1G 23 6 1 14	Finance Fundamentals
5	Elective | Technologists	Theory	1G 23 6 1 15	Advanced Environmental Engineering
6	Elective | Technologists	Theory	1G 23 6 1 16	Advanced Concrete Technology
7	Elective | Technologists	Theory	1G 23 6 1 17	Advanced Transportation Engineering
8	Elective | Technologists	Theory	1G 23 6 1 18	Advanced Surveying

Elective 3 (Specialization):

Sl.no	Course Category	Course Type	Code	Course Title
1	Elective	practicum	1G 23 6 2 41	Artificial Intelligence and Machine Language in Construction Management
2	Elective	practicum	1G 23 6 2 42	Structural Detailing For R.C.C Elements
3	Elective	practicum	1G 23 6 2 43	Design and Drawing of steel Elements

Project /Internship:

Sl.no	Course Category	Course Type	Code	Course Title
1	Project/Internship	Project/Internship	1G 23 6 3 51	Internship
2	Project/Internship	Project/Internship	1G 23 6 3 52	Fellowship
3	Project/Internship	Project/Internship	1G 23 6 3 74	In-house Project

EQUIVALENT PAPERS OF F-SCHEME TO G-SCHEME

SESHASAYEE INSTITUTE OF TECHNOLOGY (Autonomous), TRICHY-10

1: DIPLOMA IN CIVIL ENGINEERING SYLLABUS G-SCHEME
(To be implemented for the students admitted from the year 2023-24 onwards)

EQUIVALENT PAPERS OF F SCHEME TO G SCHEME EQUIVALENT PAPERS

F-SCHEME		G-SCHEME	
III TERM			
SUB CODE	**COURSE**	**SUB CODE**	**COURSE**
1F3201	Mechanics of solids	1G233110	Mechanics of Materials
1F3202	Construction Materials and construction practice	1G233210	Construction Materials
1F3203	Surveying	1G233340	Surveying Practices
1F3204	Building planning and drawing	1G233440	Building Planning and Drawing
1F3401	Civil engineering drawing and CAD Practical -I	1G233440	Building Planning and Drawing
1F3205	Material testing laboratory-I	1G233640	Material Testing Lab
1F3206	Surveying Practice-I	1G233340	Surveying Practices
IV TERM			
1F4301	Theory of structures	1G234110	Mechanics of Structures
1F4207	Hydraulics	1G233540	Hydraulics
1F4302	Transportation Engineering	1G234210	Transportation Engineering
1F4208	Hydraulics Laboratory	1G233540	Hydraulics
1F4303	Material Testing Laboratory-II		No Equivalent
1F4304	Construction Practice Laboratory	1G234540	Construction Practices
1F4305	Surveying Practice-II	1G233340	Surveying Practices
1F0006	Universal Human values		No Equivalent

V TERM			
1F5306	Structural Engineering	1G2350110	Design of RCC Structures (Limit State Method)
1F5307	Environmental Engineering	1G235540	Environmental Engineering
	Elective Theory-I		

1F5308.1	Remote sensing and Geo informatics		No Equivalent
1F5308.2	Concrete Technology	1G234440	Concrete Technology
1F5308.3	Geotechnical Engineering		No Equivalent
1F5402	Civil Engineering Drawing and CAD Practical-II		No Equivalent
1F5309	Environmental Engineering	1G235540	Environmental Engineering
	Elective Practical-I		
1F5310.1	Advanced surveying and Basic GIS Practical	1G236118	Advanced Surveying
1F5310.2	Concrete technology Practical	1G234440	Concrete Technology
1F5310.3	Geotechnical Engineering		No Equivalent
1F5501	Entrepreneurship and startup	1G236112	Entrepreneurship
1F0007	Concurrent career		No Equivalent
VI TERM			
1F6311	Construction Management	1G236113	Project Management
1F6209	Estimation, Costing and Valuation	1G234640	Estimating and Costing
	Elective Theory-II		
1F6312.1	Sustainable and Green Building		No Equivalent
1F6312.2	Urban Planning and Development	1G235214	Urban Planning and Development
1F6313.3	Water Resources Engineering	1G235212	No Equivalent
1F6403	Computer Applications in Civil Engineering Practice	1G235320	Computer Applications in Civil Engineering.
	Elective Practical-II		
1F6313.1	Estimation and Costing	1G234640	Estimating and Costing
1F6313.2	Highway Engineering		No Equivalent
1F6313.3	Water Resources Engineering		No Equivalent
1F6404	Project work and Internship	1G2363 XX	In-house Project/Internship/Fellowship

DETAILS OF ADDITION AND DELETION OF SUBJECTS

SESHASAYEE INSTITUTE OF TECHNOLOGY,

(AUTONOMOUS)

TRICHY-10.

COMPARISON BETWEEN F-SCHEME (AUTONOMOUS) AND G-SCHEME (AUTONOMOUS)

<table>
<tr><th>SUBJECT- AUTONOMOUS
(F-SCHEME)</th><th>Course Type
(F-SCHEME)</th><th>SUBJECT- AUTONOMOUS
(G-SCHEME)</th><th>Course Type
(G-SCHEME)</th></tr>
<tr><td>III-TERM</td><td></td><td>III-TERM</td><td></td></tr>
<tr><td>Mechanics of Solids</td><td>Theory</td><td>Mechanics of Materials</td><td>Theory - Theory</td></tr>
<tr><td colspan="4">Comparison:
Addition: Nil
Deletion: Chapter 1.2 Composite Sections.
Chapter:4.2 stress in shafts due to torsion
Chapter:5.2 analysis by graphical method</td></tr>
<tr><td>Construction Materials and Construction Practice</td><td>Theory</td><td>Construction Materials</td><td>Theory- Theory</td></tr>
<tr><td colspan="4">Comparison: This subject is split-up into two subjects in G-Scheme. (1. Construction materials 2.Construction Practices.)
Addition: Chapter 1.1 Eco friendly and green construction materials (Definition and any five Materials) - Energy efficient and sustainable building materials (Definition and any Five materials).
Chapter 1.3 Aggregates.
Chapter: 5.4.Elevation and façade materials
Deletion: Chapter 1.4 Rocks & Stones.
Chapter 1.6 Water.</td></tr>
<tr><td>1. Surveying (III Term)
2. Surveying Practice – I(III Term)
3. Surveying Practice – II(IV Term)</td><td>Theory
Practical
Practical</td><td>Surveying Practices</td><td>Practicum - Practical</td></tr>
<tr><td colspan="4">Comparison: The three subjects 1. Surveying 2. Surveying Practices –I 3.Surveying Practices –II are merged as single subject called surveying.
Addition: The field exercises in calculating areas of irregular site by trapezoidal and Simpsons rule is added.
Deletion: The analytical problem in theory is removed.
The exercises with G.P.S instrument were removed.</td></tr>
</table>

<table>
<tr><td colspan="4">Survey camp is removed.
Run a closed theodolite traverse and plot the traverse is removed.
The determination of elevation of an object when the base is inaccessible by Double plane method is removed.
The determination of distance and elevation of points by tangential tachometry is removed.</td></tr>
<tr><td>1. Building Planning and Drawing.
2. Civil Engineering Drawing andCAD Practical – I</td><td>Practical

Practical</td><td>Building Planning and Drawing</td><td>Practicum - Practical</td></tr>
<tr><td colspan="4">Comparison: The above two subjects in F-Scheme is converted to single subject.
Addition: All building drawings in Load bearing structures are converted to framed structures.</td></tr>
<tr><td>1. Hydraulics. (In IV term)
2. Hydraulics Laboratory.
(In IV term)</td><td>Theory.
Practical</td><td>Hydraulics</td><td>Practicum - Practical</td></tr>
<tr><td colspan="4">Comparison: The two subjects 1.Hydraulics 2.Hydraulics Laboratory is merged as single subject called Hydraulics.
Addition:
Deletion: Chapter: 1.3 Hydrostatic pressures on surfaces.
Chapter: 4.1 Flow through open channels.
The analytical problem in theory is removed.</td></tr>
<tr><td>1. Material Testing Laboratory– I (III Term)
2. Material Testing Laboratory– II(IV Term)
3. Concrete Technology Practical (V Term)</td><td>Practical</td><td>1. Material Testing Lab ((III Term)
2. Soil Mechanics and foundation Engineering. (IV Term)
3. Concrete Technology(IV Term)</td><td>Practicum – Practical
Practicum – Theory
Practicum – Practical</td></tr>
<tr><td colspan="4">Comparison:
All exercises in the F-Scheme, 3 subjects are present in the G-Scheme subjects as stated above except the following changes.</td></tr>
</table>

Addition: Using Auger Boring (Or) Any Boring Method, Identify Various Types Of Soil In Different Layer. Determination Of Soundness Of Cement By Le Chatlier's Method. Determination Of Silt Content In Sand. Non-Destructive Testing Of Concrete-Rebound Hammer Test. Determination Of Consistency Of Fresh Concrete By Flow Table Test. Determination Of Carbonation Depth On Concrete			
		Advance Skill Certification -3	**Open Elective - Advanced skill certification**
Comparison: Newly introduced subject to learn emerging technologies like Digital Skills course,etc..			
		Growth Lab	**Humanities& social science - Integrated Learning Experience**
Comparison: Newly introduced subject in G-Scheme			
		1. Induction Program –III **2. I&E/Club Activity/Community Initiatives** **3. Shop floor Immersion** **4. Student led Initiative** **5. Emerging Technology Seminars** **6. Heath & Wellness**	**Audit course- Integrated Learning Experience**
Comparison: Newly introduced subject in G-Scheme			
IV-TERM Theory:		**IV-TERM Theory:**	
Theory of Structures(IV Term)	**Theory**	**Mechanics of Structures (IV Term)**	**Theory- Theory**
Comparison: **Deletion:**			

Chapter: 1.2 Propped cantilevers are removed.

Chapter:3.1 Continuous Beams – Moment Distribution Method is removed

Chapter: 4.2 Combined bending and direct stresses are removed.

Chapter: 5.1 Masonry Dams are removed.

Chapter: 5.2 Earth Pressure And Retaining Walls are removed.

Transportation Engineering(IV Term)	**Theory**	**Transportation Engineering(IV Term)**	**Theory- Theory**

Comparison:

Addition: Airport and harbour engineering is added in unit –V.

Deletion:

Chapter: 1.4 Traffic Engineering

Chapter: 1.5 Sub Grade Soil

Chapter: 1.6 Road Arboriculture And Lighting:

Chapter: 2.6 Hill Roads

Chapter: 2.7 Parking

Chapter :3.5 Maintenance Of Track

Chapter :Rapid transport system

Unit V :Bridge engineering is removed

Construction Practice Laboratory(IV Term)	**Practical**	**Construction Practices(IV Term)**	**Practicum -Practical**

Comparison:

Addition:

1. Study of Safe bearing capacity of soil by standard penetration test (SPT).
2. Construct concrete block masonry wall of 1m height.
3. Apply two or more coats of Water proofing coats for sump / overhead tank wall on the prepared base of a given wall surface for the area of 1m x 1m using suitable brush/ rollers adopting safe practices.
4. Plastering with cement mortar on the prepared base of a given wall surface for the area of 1m x 1m adopting safe practices.

Deletion:

1. Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report (60,40, 20,10 mm).
2. Identify the available construction materials in the laboratory on the basis of theirsources.
3. Identify the grain distribution pattern in given sample of teak wood in the laboratory and draw the various patterns. (along and perpendicular to the grains).

4. Identify various layers and types of soil in foundation pit by visiting at least 3 construction sites in different locations of city and prepare report.
5. Select first class, second class and third class bricks from the stake of bricks and prepare report on the basis of its properties.
6. Measure dimension of 10 bricks and find average dimension and weight. Perform field tests - dropping, striking and scratching by nail and correlate the results obtained.

1. Estimation, Costing and Valuation (VI Term). **2. Estimation and Costing Laboratory (VI Term).**	**Theory** **Practical**	**Estimating and Costing (IV Term)**	**Practicum -Practical**

Comparison:

Deletion:

Chapter: 3.2.Embankments And Cuttings is removed.

Prepare detailed estimate using Trade system and Take off quantities for all items of works in the following types of structures:

- Industrial buildings with AC/GI sheet roof with steel trusses.
- Community Hall with columns and T-beams.
- Rain water harvesting-Shallow recharge well.
- R.C.C slab culvert.
- Water Bound Macadam Road.
- Prepare the list of items to be executed with units for detailed estimate of a given structure from the given drawing.
- Prepare a report on market rates for given material, labour wages, hire charges of tools & equipments required to construct the given structure as mentioned in at Serial number 1 above.
- Recording in Measurement Book (MB) for any four items.
- Prepare bill of quantities of given item from actual measurements. (any four items).
- Prepare approximate estimate for the given engineering works.
- Calculate the reinforcement quantities from the given set of drawings for a room size of 3 m x 4m with bar bending schedule.
- Prepare detailed estimate of bitumen road of one kilometer length from the given drawing.
- Prepare bar bending schedule for the given singly reinforced and doubly reinforced beams.
- Prepare bar bending schedule for the given continuous beam.
- Prepare bar bending schedule for the given one way slab.
- Prepare bar bending schedule for the given two way slab.

• Prepare bar bending schedule for the given square column and square footing			
		Advance Skill Certification -4	**Open Elective - Advanced skill certification**
Comparison: Newly introduced subject to learn emerging technologies			
		1. I&E/Club Activity/Community Initiatives. **2. Shop floor Immersion.** **3. Student led Initiative.** **4. Emerging Technology Seminars.** **5. Heath & Wellness.** **6. Special Internet groups (Placement training)**	**Audit course- Integrated Learning Experience**
Comparison: Newly introduced subject in G-Scheme			
V-TERM **Theory:**		**V-TERM** **Theory:**	
Structural Engineering	**Theory**	**Design of RCC Structures (Limit State Method)**	**Theory -Theory**
Comparison: **Design of steel structure in Unit V is introduced as a separate subject in G-Scheme.** **Addition:** Chapter:2.2 Planning of staircase **Deletion:** Chapter: 1.1 Introduction to working stress is removed. Design of cantilever steps. Design of doglegged stairs spanning parallel to the flight			
1. Environmental Engineering **2. Environmental Engineering Laboratory**	**Theory** **Practical**	**1. Advanced Environmental Engineering.** **2. Environmental**	**Theory – Theory** **Practicum –Practical**

		Engineering.	
Comparison: **Addition:** Chapter : 2.3 Water management Chapter : 5.2 Environmental poisoning **Deletion:** Study of air pollution control equipments (Gravity settling chamber, Cyclone filter with models/devices). Cutting, threading and joining of G.I.Pipes / cutting and pasting of PVC pipes using solvents.			
Concrete Technology	**Theory**	**Advanced Concrete Technology (VI Term)**	**Theory- Theory**
Comparison: **Addition:** Unit –I -Cement chemistry. Unit –III Durability, Permeability and Corrosion. Unit –IV Concrete structures in special environments. **Deletion:** Chapter:5.1 cracks in concrete structure and their prevention Chapter 5.2 joints, repairs and maintenance of concrete Chapter :4.1 pre-stressed concrete			
Civil Engineering Drawing and CAD Practical – II	**Practical**	**Structural Detailing for RCC Elements (VI Term)**	**Practicum -Practical**
letion: **UBLIC HEALTH ENGINEERING** Draw plan and sectional views of the following: • Rapid Sand Filter. • Septic Tank with dispersion Trench / Soak pit. • R.C.C square overhead tank supported by four columns **BRIDGE DRAWING** Draw plan and sectional views of the following: • Steel Foot over bridge across a highway. • Two span Tee Beam Bridge with square returns			

Elective-I	Theory	Elective-I	Theory- Theory
1. Remote sensing and Geo informatics. 2. Geotechnical Engineering		1. Mechanical, Electrical and Plumbing Services. 2. Irrigation and Water resource engineering. 3. Defects in Building and Remedies. 4. Urban Planning and Development. 5. Building Bye Laws and statutory drawings.	

Comparison:

Addition:

1. Mechanical, Electrical and Plumbing Services.
2. Defects in Building and Remedies.
3. Building Bye Laws and statutory drawings.

The above three subjects are newly added in G-Scheme.

Deletion:

The above two subjects were removed in G-Scheme.

4. **Irrigation and Water resource engineering**

Addition:

- Unit –I is newly added.
- Chapter 2.1 is newly added.

Deletion:

- Chapter: 3.1 Rivers and river training works.
- Chapter: 5.1 Water shed management.
- Chapter: 5.2 Water harvesting and recycling.

5. **Urban Planning and Development.**

Addition:

- Chapter 5.2 Sustainable Planning:

Deletion:

- Chapter: 3.1 Public Buildings.

<table>
<tr><td colspan="4">• Chapter: 3.2 Parks and Play Grounds.
• Chapter:5.2 Miscellaneous Topics</td></tr>
<tr><td>Elective-I</td><td>Practical</td><td></td><td></td></tr>
<tr><td colspan="4">Advanced surveying and Basic GIS Practical.
Geotechnical Engineering Laboratory.
Deletion:The above two subjects are removed in G-Scheme.</td></tr>
<tr><td>Entrepreneurship and Start-ups</td><td>Practical</td><td>Entrepreneurship</td><td>Theory -Theory</td></tr>
<tr><td colspan="4">Comparison:
Addition:
Unit –IV & V are newly added IN G-Scheme.
Deletion:
Unit –III, IV & V are removed</td></tr>
<tr><td></td><td></td><td>Innovation and Start-up</td><td>Practicum -Project</td></tr>
<tr><td colspan="4">Comparison:
The above subjects are newly added in G-Scheme.</td></tr>
<tr><td></td><td></td><td>Industrial Training</td><td>Project/Internship -Project</td></tr>
<tr><td colspan="4">Comparison:
The above subjects are newly added in G-Scheme.
Internship shall be offered in the summer break 4th and 5th term followed by a review and award of credits in the 5th term.</td></tr>
<tr><td></td><td></td><td>Advanced Skill Certification -5</td><td>Open Elective - Advanced skill certification</td></tr>
<tr><td colspan="4">Comparison:
The above subjects are newly added in G-Scheme.</td></tr>
<tr><td></td><td></td><td>1. Induction program –III
2. Student led initiative.
3. Health & Wellness.
4. Special Interests Groups (Placement Training)</td><td>Audit course - Integrated Learning Experience</td></tr>
<tr><td colspan="4">Comparison:
The above subjects are newly added in G-Scheme.</td></tr>
</table>

<table>
<tr><th>VI-TERM
Theory:</th><th></th><th>VI-TERM
Theory:</th><th></th></tr>
<tr><td>Construction Management(VI Term)</td><td>Theory</td><td>Construction Management and Safety Practice(V Term)</td><td>Practicum -Practical</td></tr>
<tr><td colspan="4">Comparison:
Deletion:
• Chapter 5.1 Entrepreneurship.
• Chapter 5.2 Information Management and Computers.
• Chapter 5.3 Financial Management.</td></tr>
<tr><td>Elective-II
1. Sustainable and Green Building Technology.</td><td>Theory</td><td>Elective-II</td><td>Theory- Theory</td></tr>
<tr><td colspan="4">Comparison:
2. Sustainable and Green Building Technology.
The above subjects are removed in G-Scheme.</td></tr>
<tr><td>Computer Applications in Civil Engineering Practice</td><td>Practical</td><td>Computer Applications in Civil Engineering(V Term)</td><td>Practical - Practical</td></tr>
<tr><td colspan="4">Comparison:
Addition:
• Analysis of R.C.C. Structures.
• Drafting of R.C.C. Structures.
Deletion:
Preparation of Bar Bending schedule for Simply supported two way slab, continuous one way slab, Restrained two way slab, Doglegged staircase and Square footing are removed.</td></tr>
<tr><td>Elective-II</td><td>Practical</td><td>-</td><td>-</td></tr>
<tr><td colspan="4">1. Highway Engineering Laboratory.
2. Water Resources Engineering Laboratory.
Comparison: The above two subjects are removed in G-Scheme.</td></tr>
<tr><td></td><td></td><td>1. Advanced Engineering Mathematics.
2. Project Management.
3. Finance Fundamentals.</td><td>Elective-2(Pathway)
(Open Elective) Theory - Theory</td></tr>
</table>

		4. Advanced surveying. **5. Advanced transportation Engineering.**	
Comparison: The above subjects are newly added in G-Scheme.			
		1. Artificial Intelligence and Mechanical Language in Construction Management. **2. Design and Drawing of steel Elements**	**Elective-3(Specialization)** **Practicum -Practical**
Comparison: The above subjects are newly added in G-Scheme.			
Project Work and Internship	**Project**	**Project/Internship**	**In-house Project/Internship/Fellowship - Project**
Comparison: Every Student Should Select Any One From The In-House Project Or Internship Or Fellowship. The Guidelines Given Have to be followed			

HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS:

Sl. N0 o	Course Code	Subject	Term	Core	Applied	Diversified	Value Added Course
Core							
1	1G233110	Mechanics of Materials	III	3			
2	1G233210	Construction Materials	III	3			
3	1G233440	Building Planning and Drawing	III	3			
4	1G233540	Hydraulics	III	3			
5	1G234110	Mechanics of Structures	IV	3			
6	1G234210	Transportation Engineering	IV	3			
7	1G234330	Soil mechanics and Foundation Engineering	IV	3			
8	1G234440	Concrete Technology	IV	3			
9	1G234640	Estimating and Costing	IV	3			
10	1G235110	Design of RCC Structures (Limit State Method)	V	4			
11	1G235440	Construction Management and Safety Practice	V	3			
12	1G235540	Environmental Engineering	V	3			
13	1G236115	Advance Environmental Engineering	VI	Elective –2 (3)			
14	1G236116	Advanced Concrete Technology	VI				
15	1G236117	Advanced Transportation Engineering	VI				
16	1G236118	Advanced Surveying	VI				
17	1G236242	Structural Detailing For R.C.C Elements	VI	ELECTIVE -3 (3)			
18	1G236243	Design and Drawing of steel Elements	VI				
Applied							
19	1G233340	Surveying Practices	III		3		
20	1G233640	Material Testing Lab	III		3		
21	1G234540	Construction Practices	IV		3		
22	1G235320	Computer Applications in Civil Engineering.	V		2		

23	1G2363XX	In-house Project/Internship/Fellowship	VI		12		
Diversified							
24	1G233880	Growth Lab	III			0	
25	1G233881	Induction Program -III	III			0	
26	1G233882	I&E/Club Activity/Community Initiatives	III			0	
27	1G233883	Shop floor Immersion	III			0	
28	1G233884	Student led Initiative	III			0	
29	1G233885	Emerging Technology Seminars	III			0	
30	1G233886	Heath & Wellness	III			1	
31	1G234882	I&E/Club Activity/Community Initiatives	IV			0	
32	1G234883	Shop floor Immersion	IV			0	
33	1G234884	Student led Initiative	IV			0	
34	1G234885	Emerging Technology Seminars	IV			0	
35	1G234886	Heath & Wellness	IV			0	
36	1G234887	Special Internet groups (Placement training)	IV			0	
37	1G2352XX	Elective-1	V			3	
38	1G235640	Innovation and Startup	V			2	
39	1G235773	Industrial Training* [Summer Vacation -90 Hours]	V			2	
40	1G235881	Induction Program -III	V			0	
41	1G235884	Student led Initiative	V			0	
42	1G235886	Heath & Wellness	V			0	
43	1G235887	Special Interest Groups (Placement Training)	V			0	
44	1G236111	Advanced Engineering Mathematics	VI			Elective –2 (3)	
45	1G236112	Entrepreneurship	VI				
46	1G236113	Project Management	VI				
47	1G236114	Finance Fundamentals	VI				
48	1G236241	Artificial Intelligence and Mechanical Language in Construction Management				ELECTIVE -3 (3)	
Value added course							
49	1G233760	Advance Skill Certification -3	III				2
50	1G234760	Advanced Skill Certification -4	IV				2

51	1G235860	Advanced Skill Certification -5	V				2
	Total credits			**43**	**23**	**8**	**6**

DETAILED SYLLABUS

III TERM

1G233110	MECHANICS OF MATERIALS	L	T	P	C
THEORY		3	0	0	3

Introduction:

This is a fundamental subject who covers broad elements of engineering mechanics and strength of materials. Strength of materials, also known as mechanics of materials, is a branch of engineering that deals with the behavior of solid objects when acted upon by objects. Because it deals with how objects deform under loading, strength of materials is an essential topic for civil engineers. Study of this subject enables the student to distinguish between different types of stress and strain in a material, under the action of external forces. The student will learn to analyze simple structural elements for their design which he usually needs in the professional life. Teachers while imparting instruction should stress on concepts and principles and provide considerable practice in problem solving.

OBJECTIVES:

- To understand the Stress, strain and elastic constants.
- To understand the nature of stresses induced in material under different loads.
- To plot the variation of shear force and bending moments over the beams under different types of loads.
- To study about geometrical properties of section and able to locate centroid and find out moment of Inertia.
- To understand the stresses in beams.
- To Analyze Pin jointed frames.
- Solving problems in the course of study.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Know stresses and strain and its application in Engineering field.

CO-2	Analyze the determinate beams and draw the SFD and BMD.
CO-3	Understand about geometrical properties of sections.
CO-4	Understand the stresses in beams
CO-5	Analyze pin jointed frames.

Pre-Requisites: Nil

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	-	2	-	3	3	1
CO2	3	3	2	-	2	-	3	3	1
CO3	3	3	2	-	2	-	3	3	1
CO4	3	3	2	-	2	-	3	3	1
CO5	3	3	2	-	2	-	3	3	-

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

This subject is introduced so that diploma holder in Civil Engineering may appreciate the concepts and principles of mechanics of materials of various elements of building and are able to apply the knowledge gained through the subject for the design of simple and small components. Teacher should give simple exercises involving the applications of various concepts and principles being taught in the subject. Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve the tutorial problems independently. Teacher may conduct weekly small quiz sessions to know the students' level of understanding and if need be, teacher may reinforce the concepts and principles related to mechanics of materials of elements/members of building components.

1G233110	MECHANICS OF MATERIALS	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	SIMPLE STRESSES AND STRAINS				
	1.INTRODUCTION TO STRESSES AND STRAINS Definitions of Force, Moment of force - Types of forces on structural members-Mechanical properties of materials –Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability- Definitions of stress and strain-Types of stresses, Tensile, Compressive and Shear stresses- Types of strains-Tensile, Compressive and Shear strains-Elongation and Contraction-Longitudinal and Lateral strains–Poisson's Ratio-Volumetric Strain-Simple problems in computation of stress, strain, Poisson's ratio. Hooke's law-Elastic Constants Definitions of: Young's Modulus of Elasticity–Shear modulus (or) Modulus of Rigidity-Bulk Modulus –Relationship between elastic constants (Derivations not necessary)-Simple problems. **1.2 Application of stress and strain in Engineering Field:** Behavior of ductile and brittle materials under direct loads - Load Extension curve (or) stress strain curve of a ductile material- Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress,- Deformation of prismatic and stepped bars due to uniaxial Load-Numerical problems.				9
UNIT- 2	SHEAR FORCE AND BENDING MOMENTS IN BEAMS				
	2.1 TYPES OF BEAMS AND LOADS Definition of a beam–Support conditions and diagrammatic				9

	representation – Types of supports-Types of beams based on support conditions–Diagrammatic representation of beams–Static equilibrium equations–Determinate and indeterminate beams- Load-Axial Loads-Transverse Loads-Types of loads (Concentrated, uniformly distributed and varying loads)- Diagrammatic representation of beams with different loads. **2.2 SHEAR FORCE & BENDING MOMENT:** Definition of Shear force and Bending Moment–Conventional signs used for S.F. and B.M - SFD &BMD – S.F and B.M of Cantilever beam with end point load/UDL for entire span & simply supported beams with central point load/ UDL for entire span and draw SFD&BMD. Numerical problems on SF& BM for cantilever beams (Maximum Three concentrated loads/UDL for entire span / Maximum Three point loads with UDL for entire span only) For simply supported beams (Central point load / Eccentric point load / Maximum Three point loads/UDL for entire span/Central point load with UDL for entire span only).	
UNIT- 3	**GEOMETRICAL PROPERTIES OF SECTIONS**	
	3.1 CENTROID: Geometrical properties–Definitions and examples of Symmetrical, Anti Symmetrical, Asymmetrical shapes - Definitions of center of gravity and centroid – Centroid of Symmetrical shapes (square, rectangular, circular,)- **3.2 MOMENT OF INERTIA:** Definitions of: Inertia, Moment of Inertia, Polar moment of inertia, Radius of gyration, Section Modulus, Polar modulus-Parallel and perpendicular axes theorems (statement only) - Numerical problems on M.I about centroidal axis, Section modulus, Radius of gyration of (solid/hollow)	9

	square, rectangular and circular sections (Derivation not required)– Numerical problems on M.I about centroidal axis.(T Section, I Sections Symmetrical with vertical axis only)	
UNIT- 4	**STRESSES IN BEAMS**	
	STRESSES IN BEAMS DUE TO BENDING: Types of Bending stresses–Neutral axis–Theory of simple bending–Assumptions–Moment of resistance – Flexure/bending equation M / I = E / R = σ/y (Derivation not required)– Bending stress distribution –Curvature of beam–Position of N.A and centroidal axis–Stiffness equation–Flexural rigidity–Strength equation–Significance of Section modulus–Numerical Problem on simply supported beam with symmetrical loads only.	9
UNIT- 5	**PIN JOINTED FRAMES**	
	ANALYSIS BY ANALYTICAL METHOD(METHODOFJOINTS): Definitions of: Frame / Truss, Pin Joint, Nodes, Rafters, Ties, Struts, Slings-Determinate and indeterminate frames–Classification of frames-Perfect and imperfect frames–Deficient/Instable and redundant frames-Resolutions of force-Designation of forces-Nature of force in the frame-Identification of member with zero force in a determinate truss- Methods of analysis-Analytical methods-Method of Joints and Method of Sections (Description only) - Problems on Analysis of cantilever (with not more than eight members) with vertical nodal loads by method of joints only) and simply supported perfect frames(with not more than ten members) with vertical nodal loads (Symmetrical frame only) by method of joints only.	9
Total Hours		45

Suggested student activities

1. Quiz.

2. Group discussion.
3. Seminar.
4. Surprise tests.
5. Laboratory tests on materials.
6. Class assignments.

Text Books:

1. Dr B.C.Punmia,Textbook of Strength of materials, 9th edition, Lakshmi publications, 2018.
2. Er.R.K.Rajput, Textbook of Strength of materials, 6th edition, S. Chand publications, 2015.
3. Dr R.S.Khurmi & N.Khurmi,Textbook of Strength of materials,26th edition, S. Chand publications , 2018.

Web resources:

1. https://nptel.ac.in/
2. https://ndl.iitkgp.ac.in
3. An introduction to stress and strain.

   https://www.youtube.com/watch?v=aQf6Q8t1FQE
4. Stress strain curve

   https://www.youtube.com/watch?v=7OXQNv73qr4
5. SFD and BMD

   https://www.youtube.com/watch?v=UahfUvcS24o&list=PL4K9r9dYCOopLQIqfKO5haEkR1FKKVJdU
6. Understanding Shear Force and Bending Moment Diagrams

   https://www.youtube.com/watch?v=C-FEVzI8oe8
7. SFD and BMD of simply supported beam

   https://www.youtube.com/watch?v=J7nyhgiJFmQ
8. SFD and BMD of cantilever beam

   https://www.youtube.com/watch?v=zYJuYQwIcJs

9. How to find Centroid of an I– Section

https://www.youtube.com/watch?v=v6VTMwxx4oA

10. M.I of T section

https://www.youtube.com/watch?v=dbiPJ5qJ_EI

11. Understanding stresses in beams

https://www.youtube.com/watch?v=f08Y39UiC-o

12. Understanding stresses in shaft

https://www.youtube.com/watch?v=1YTKedLQOa0

13. Understanding and Analysing Trusses

https://www.youtube.com/watch?v=Hn_iozUo9m4

1G233210	CONSTRUCTION MATERIALS	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

In Civil Engineering construction field, building materials can generally be divided into two Categories viz., natural and man-made construction materials. This Course is designed to understand various properties, Manufacturing process, characteristics and material suitability for different construction activities. Civil Engineers must know the quality, material standards and properties of materials used in any construction. Hence this course is designed as to provide in depth conceptual understanding about the various construction materials

OBJECTIVES:

The objective of this course is to enable the student to

- Understand about Physical, Mechanical, Chemical and Thermal properties of construction materials.
- Understand about new and advanced construction materials available around the globe.
- Compare the suitability of materials for different construction purpose.
- Understand the importance of durability any construction materials.
- Understand about the raw materials and manufacturing process of various construction materials.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Select suitable materials for construction activities and can have required technical knowledge on the same.
CO-2	Analyze the quality concern in the field of civil Engineering construction by adopting Suitable standards on materials.
CO-3	Handle the construction project as supervisor/site Engineer/project engineer by having

	Overall technical knowledge on materials.
CO-4	Prepare detailed specifications about materials used in construction activities.
CO-5	Do research and able to develop new sustainable/improved material for the future construction industry.

Pre-Requisites: Knowledge of basic science and basic knowledge on materials.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	1	1	1	2	3	1
CO2	3	1	1	1	1	1	2	3	1
CO3	3	2	2	2	2	2	2	3	1
CO4	3	1	1	1	1	1	1	2	1
CO5	2	2	2	2	2	2	2	3	0

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Since this course covers vast area, Teachers are expected to impart technical knowledge to the students about construction materials by screening the pictures /videos of various materials used in construction.
- Students shall be asked to visit various stores/dealers selling standard construction materials. (For better understanding about available market forms and cost of materials).
- Emphasis shall be given to understand durability and sustainability of materials used in construction.
- Apart from syllabus content, Students shall be encouraged to learn about modern construction materials through online sources.

1G233210	CONSTRUCTION MATERIALS	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	THEORY			
UNIT- 1	CONSTRUCTION MATERIALS AND PROPERTIES				
	1.1 Introduction: History of building materials-Conventional building materials-New and advanced materials -Eco friendly and green construction materials(Definition and any five materials)- Energy efficient and sustainable building materials(Definition and any Five materials). **1.2 Properties of construction Materials:** Density-Specific gravity - Porosity-Water absorption - Permeability - Chemical resistance-weathering resistance-Fire resistance-Thermal conductivity-Thermal expansion-sustainability to freezing and thawing - Durability-Factors affecting Durability of building materials. **1.3.Aggregates:** Classification of aggregates -Natural aggregates -Artificial aggregates - Light weight Aggregates-Heavy weight aggregates-Recycling of aggregates				9
UNIT- 2	BRICKS,MASONRY BLOCKS,CERAMIC PRODUCTS AND GLASS				
	2.1 Clay bricks: Brick-Brick earth-Composition of good brick earth-Classification and grades of bricks as per BIS-Compressive strength-Characteristics of good brick-Special types of brick and uses- Test on Bricks. **2.2. Masonry blocks:** Masonry blocks-Constituents ,Properties, Characteristics and uses of- Fly ash bricks-Solid blocks- Hollow blocks,-AAC blocks.				9

	2.3 Ceramic Products: Ceramic products- Properties, Characteristics and uses of Earthenware-Stoneware-Porcelain-Terracotta-Ceramic Tiles-Glazed tiles-Thermal care tiles-Roof tiles. **2.4 Glass:** Definition-Constituents of glass-Classification of glass-Size and thickness. **2.5 Floor Finishes:** Introduction-Materials used for floor finishing.	
UNIT- 3	**CEMENTITIOUS MATERIALS**	
	3.1 Cement: Cement - Composition of Ordinary Portland cement-Portland Pozzolanic cement -Grades of cement-Water cement ratio-Hydration of cement-Setting of cement-Formation of Bogus compounds. **3.2 supplementary cementitious materials:** Pozzolanic materials-Fly ash-Types-Ground Granulated blast furnace slag- Silca Fume- Natural Pozzolans. **3.3 Lime:** Sources of lime-Classification of lime-Uses of lime-Slaking of lime-Lime Mortar -Lime putty-Uses. **3.4. Bituminous materials:** Introduction-Bitumen-Tar-Asphalt-applications.	9
UNIT- 4	**TIMBER, MORTAR,CONCRETE,PROTECTIVE MATERIALS AND COATINGS**	
	4.1.Timber and wooden products: Classification of Timber-Seasoning of Timber-Methods of seasoning-	9

	Defects in Timber-Preservation of Timber-Wood Products. **4.2 Mortar:** Introduction-Classification-Characteristics of good mortar- mix ratios for different Works-Grouting-Guniting. **4.3 Concrete:** Concrete-Production- Mix ratios-Mixing-Workability-Ready mix concrete— Strength of concrete-Non destructive test on Concrete-Durability-factors affecting durability of concrete. **4.4 Protective & Insulating materials:** Damp proof-Water proof-Termite proof -Pest control in buildings-Heat insulating Materials-Sound insulating materials. **4.5.Paints and Varnishes:** Introduction-Characteristics of ideal paint-Types of paints-Distemper-Varnishes. **4.6 Wall finishes:** Introduction-Materials used for wall finishing	
UNIT- 5	**METALLIC,PLASTIC AND COMPOSITE MATERIALS**	
	5.1.Metals and composites: Metals used in construction-Steel-Galvanised iron-Stainless steel -Pipes-Structural steel-Market forms of steel sections-cold formed Light gauge sections- Aluminium and Composites. **5.2 Plastics in construction:** Plastics -Characteristics - plastic products-PVC pipes-UPVC Pipes, Doors and windows, Water tanks-CPVC-PVC materials used in water supply, sanitary and electricity plumbing- Standards as per BIS.	9

	5.3.Roofing materials: Types of roofing materials- RCC-AC Sheets-G.I Sheets-Galvalume sheets-Insulated roofing sheets-False ceiling-Materials used for false ceiling. **5.4.Elevation and façade materials:** Importance of facade design in architecture-Types of materials used--Insulated glass, Aluminum composite panels, Fibre cement, Wood Plastic composites, cladding- types	
Total Hours		**45**

Suggested student activities:

1. For better understanding about various construction materials, Student shall actively visit Standard stores, and different ongoing construction sites.
2. Web based learning is encouraged.

Text Books:

1. S.C.Rangwala, “Engineering Materials”, 43rd Edition ,Charotar Publishing House Pvt.Ltd, 2019.
2. P.C.Varghese, ”Building Materials”, 2nd Edition, Prentice Hall of India Pvt Ltd, 2015.
3. S.K.Duggal, “Building Materials”, 3rd Edition, New Age International (P) Ltd, 2012

Web resources:

1. Evaluation of construction and building materials: https://www.buildersmart.in/blogs/evolution-of-construction-and-building-materials.
2. Green building materials: https://www.coa.gov.in/show_img.php?fid=137 .
3. Energy efficient building materials:https://archiroots.com/10-best-energy-efficient-building-materials/

1G233340	SURVEYING PRACTICES	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

At the diploma level of Civil Engineering studies, students are expected to develop skills in managing sites, taking measurements, surveying and inspection. One of the main focuses of survey work is the development of townships, residential colonies, public buildings, and other structures. Hence, it is necessary to have a thorough knowledge of surveying principles and techniques such as chain surveying, compass surveying, levelling, Theodolite surveying, Tachometric surveying, and modern surveying. Teachers are expected to explain various concepts and principles by demonstrating the use of different equipment and conducting practical exercises in all types of surveying to benefit the students.

OBJECTIVES:

The objective of this course is to enable the student to

- Gain a foundational understanding of surveying by familiarizing with key concepts and surveying instruments.
- Explore the principles of chain, compass, levelling, and contour surveying, and learn about the various types of levels and levelling methods.
- Expand knowledge to include Theodolite, Tachometry surveying, Trigonometrical levelling, and GPS.
- Finally, discover the principles and applications of Total Station in civil engineering.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Explain the principle of chain surveying and Perform the operations involved in chaining and describe the operations involved in compass surveying like taking bearings and calculation of included angles and traversing.
CO-2	Explain the fundamental principles of levelling, tabulate the levelling field data, explain

	the computation of reduced levels, different types of levelling, and contour surveying.
CO-3	Apply the knowledge of principles and purpose of theodolite surveying and trigonometrically levelling.
CO-4	Apply the knowledge of principles and purpose of tacheometric surveying and areas and volumes.
CO-5	Know the principles and purpose of Total Station and GPS.

Pre-Requisites: NIL

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	2	2	2	-	3	3	2
CO2	3	-	2	2	2	-	3	3	2
CO3	3	-	2	2	2	-	3	3	2
CO4	3	-	2	2	2	-	3	3	2
CO5	3	-	2	2	2	-	3	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Teachers have the responsibility to provide theoretical knowledge on surveying equipment and its standard procedures. This will help students to understand the importance of each surveying equipment. Additionally, teachers should encourage students to practice using all surveying equipment.
- To ensure that learning is outcome and employability-based, a theory-demonstrate-practice-activity strategy can be implemented throughout the course. This approach will help students to better assimilate the knowledge they have acquired.
- Furthermore, teachers should encourage active participation from students in both theoretical and practical classes. This will help to increase their confidence in their learning abilities.

1G233340	SURVEYING PRACTICE	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	CHAIN AND COMPASS SURVEYING	
	1.1 Introduction Definition of surveying - object of surveying - Division of surveying - Surveying -Units and its conversion.	3
	1.2 Chain surveying: Ranging – Types - Direct and Indirect ranging - Survey stations- types - Baseline – Check line - Tie line - Chain triangulation - Offsets - Types.	
	1.3 Compass Surveying: Compass- Types – Purpose – Whole Circle Bearing and Reduced Bearing- Fore and Back bearing - Magnetic dip and Declination - Meridian - Types - Bearing – Types - Open and closed traverse.	3
	Exercises: 1. Study of FMB sketch/Land documents and instruments used for chain surveying**. (Not for examination)** 2. Determine the distance between two ground stations with the help of a chain. (Direct ranging). 3. Calculate the area bounded by the given points by chain triangulation. 4. Find the included angle of the given closed traverse by using a compass (Minimum 5 stations).	3 3 3
UNIT- 2	**LEVELLING AND CONTOURING**	
	2.1 Levelling: Levelling - Temporary adjustment – Terms used in Levelling - Back Sight -- Fore sight - Intermediate sight - Changepoint -Benchmark – Types - field	

	book – Methods of Reduction of levels - Height of collimation – Rise and Fall method. **2.2. Contour Surveying:** Definition - Contour - Contouring - Contour interval – horizontal equivalent-Characteristics of Contours - Contour Gradient – interpolation of contours - Uses of Contour plan and Map. **Exercises:** 5. Determine the elevations of given points (Minimum 6 points) by conducting fly levelling with Height of collimation method. 6. Determine the elevations of given points (Minimum 6 points) by conducting fly levelling with Rise and fall method. 7. Conduct a block contouring survey in the given irregular field and plot the contour lines. **(Not for examination)**	3 3 3 6
UNIT- 3	**THEODOLITE SURVEYING AND TRIGNOMETRICAL LEVELLING**	
	3.1 Theodolite surveying: Theodolite – Types - Transit and non-Transit - Vernier and Micrometer - Technical terms used - Temporary adjustments - Fundamental lines - Interrelationships – Horizontal angle determination by repetition method and reiteration method - Latitude and Departure - Consecutive coordinates - Independent coordinates. **3.2 Trigonometrical Levelling:** Definition - Uses - Finding elevation of objects - Base accessible – Base inaccessible - Single plane method (No derivation) - Double plane method. (No derivation). **Exercises:** 8. Determination of distance between two points when their bases are accessible, using Theodolite – Measuring Horizontal angles by	3 3

	repetition method and distances from a Theodolite station. 9. Determination of distance between two points when their bases are inaccessible, using Theodolite – Measuring Horizontal angles by reiteration method from a baseline. 10. Determine the elevation of an object when the base is accessible by trigonometrical levelling. 11. Determine the elevation of an object when the base is inaccessible by single plane method.	3 3 3
UNIT- 4	**TACHEOMETRIC SURVEYING AND AREAS & VOLUMES**	
	4.1. Tacheometry: Instrument used – System of Tacheometry - stadia and tangential - Fixed hair method and movable hair method - Tacheometric Constants - Anallactic lens (No Proof) – Uses - Distance and elevation formulae for horizontal and inclined line of sight (No derivation) - Uses of tacheometry. **4.2 Areas and volumes:** Methods of determining areas and volumes – Mid ordinate rule – Average Ordinate Rule – Trapezoidal Rule –Simpson's Rule – One level section and two level section. **Exercises:** 12. Determine the constants of the given tacheometer. 13. Determine the gradient between two points by stadia tacheometry. 14. Calculate the area of the given irregular field by using the Trapezoidal rule. 15. Calculate the area of a given irregular field by using Simpson's rule.	3 3 3 3 3
UNIT- 5	**MODERN SURVEYING**	
	5.1.Total station: Introduction – Components Parts – Accessories Used – Summary Of Total	3

	Station – Characteristics – Features Of Total Station – Applications Of Total Station – Instrument Preparation And Setting. **5.2Global Positioning System:** Introduction - Maps - Types of maps - Various satellites used in GPS – Fundamentals of GPS - Handheld GPS - Differential GPS – Applications of GPS in Civil Engineering field. **Exercises:** 16. Determine the Horizontal distance, slope distance, height, and horizontal and vertical angle of given points using Total Station. (Minimum 5 points). 17. Find the coordinates of closed traverse stations using the Total Station and determine the area of the traverse. 18. Determine the area of a field/ Land/College campus etc. using Total Station. **(Not for examination)**	3 3 6
	Total Hours	75

Suggested student activities:

3. Collect the information on survey instruments available in the market with specifications.
4. Watch educational videos on various surveying methods to understand the concepts.
5. Visit any construction site and make a report on different types of conventional and modern surveying equipment used.
6. Perform reconnaissance survey for alignment of road.
7. Additional surveying practices can be undertaken on the campus itself.

Text Books:

1. S. K. Duggal, Surveying Vol 1& 2, 5th edition& 4th edition, McGraw-Hill, 2019 & 2017.
2. S.S. Bhavikatti, Surveying and Levelling Vol I& II, 1st2nd edition, I K International Publishing House Pvt. Ltd, 2019.

3. B.C. Punmia , Ashok Kumar Jain, Arun Kumar Jain , Surveying Volume I & II, 17th edition, Laxmi Publications, 2016 & 2023

Web resources:

1. https://ndl.iitkgp.ac.in/
2. **https://nptel.ac.in/**
3. https://www.youtube.com/@iit
4. https://www.nptelvideos.com/

List of Equipments Required:

S.No	List of Equipments Required	Quantity Required
1	Chain with arrows	6 Nos
2	Ranging Rod	30 Nos
3	Cross Staff	6 Nos
4	Tape	6 Nos
5	Prismatic Compass with Stand	6 Nos
6	Dumpy Level with tripod	6 Nos
7	Levelling staff	6 Nos
8	Theodolite with tripod	6 Nos
9	Total Station with all accessories	3 Nos

1G233440	BUILDING PLANNING AND DRAWING	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Drawing is the language of engineers. Engineering is incomplete without a thorough knowledge of drawing. A Civil Engineering diploma holder must be capable of sketching detailed constructional drawing of various components of building for the purpose of communication with the craftsman. Planning of small buildings, developing a line plan, dimensioning, key plan, and drainage plan should be a part of curriculum. The diploma engineer must be conversant with reading and interpretation of drawings for execution of work.

OBJECTIVES:

The objective of this course is to enable the student to

- Impart basic knowledge of the principles of building planning and drawing
- Impart the knowledge of 2D building drawings required for various civil engineering applications.
- Enable the students to prepare submission drawings and service plans

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Understand the basic principles and terminology of building drawing and planning.
CO-2	Prepare a detail Computer Aided Drawing for residential buildings.(Load Bearing Structures)
CO-3	Prepare a detail Computer Aided Drawing for residential buildings. .(Framed Structures)
CO-4	Prepare a detail Computer Aided Drawing for public buildings.
CO-5	Prepare a detail Computer Aided Drawing for Industrial buildings.

Pre-Requisites:

- Basic Drawing Skills
- Understanding of Geometry
- Spatial Visualization Ability

- Computer Literacy
- Enough knowledge in Drafting Practice (**1000232320**) Subject which is available in II Term

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	3	1	2	2	3	2
CO2	3	2	1	3	1	2	2	3	2
CO3	3	2	1	3	1	2	2	2	2
CO4	3	2	1	3	1	2	2	2	2
CO5	3	2	1	3	1	2	2	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Start by introducing the importance of building drawing in architecture, engineering, and design.
- Explain basic terminology such as elevation, plan, section, perspective, etc.
- Provide examples of famous architectural drawings and discuss their significance.
- Encourage students to continue practicing and refining their drawing skills even after the course ends.
- Provide resources for further self-study and exploration in building drawing and related fields

1G233440	BUILDING PLANNING AND DRAWING	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT - I	**INTRODUCTION TO BUILDING DRAWING**	
	Theory Basic principle of building drawing-General – Conventions- Title block- Scales- Line work- Lettering -Symbols – Abbreviations-Conventional signs for materials like bricks, stone, concrete, wood, glass, earth, steel - water supply and sanitary fixtures like tap, wash basin, sink, W.C pan (Indian and European type), shower, flush tank.-Electrical installations like one way switch, Two way switch, Distribution Board, Socket, Ceiling fan, LCD bulb, Fluorescent Lamp, Bell-Doors-Windows-Furniture's-Structural Elements like steel bars, stirrups.	**3**
	Practical: 1. Sketch the Conventional signs for different construction materials.	**3**
	2. Sketch the Conventional signs for different water supply and sanitary fixtures.	**3**
	3. Draw the Conventional signs for Door, window and furniture items	**3**
UNIT - II	**PLANNING OF RESIDENTIAL BUILDINGS**	
	Theory Types of residential buildings- Usual Requirements-Types of Rooms – Minimum Size requirement for each type of rooms - Furniture arrangement in each room- Position of stairs / lifts- Position of Doors/ Windows.	**3** **5**
	4. Preparation of plan, section and elevation of a single storey	

	House with single bed room and attached bathroom with R.C.C. flat roof (load bearing structure) - **Manual drawing(Not for Examination)** 5. Preparation of plan, section and elevation of a single storey House with Double bed room and attached bathroom with R.C.C. flat roof (load bearing structure)	**5**
UNIT - III	**PLANNING OF RESIDENTIAL BUILDINGS**	
	Theory Drainage and Sanitary fittings – Sump/Water tanks -Plumbing Pipes. **6.** Preparation of plan, section and elevation of a single storey house with single bed room with RCC flat roof (Framed structure). 7. Preparation of plan, section and elevation of a single storey house with Double bed room with RCC flat roof (Framed structure).-	**2** **5** **5**
UNIT - IV	**PLANNING OF PUBLIC BUILDINGS**	
	Theory: Types of public buildings - Miscellaneous public buildings - Usual requirements- General requirements of Public Buildings -Landscape architecture. 8. Preparation of plan, section and elevation of a single storey Primary health centre for rural area with R.C.C flat roof. (Framed structure). 9. Preparation of plan, section and elevation of a Single storied Primary School building with R.C.C flat roof (Framed structure). 10. Preparation of plan, section and elevation of a Single storied Library building with R.C.C flat roof (Framed structure)	**3** **6** **6** **6**

UNIT - V	**PLANNING OF INDUSTRIAL BUILDINGS** **Theory :** Planning aspects - Requirements of industrial units - Sheets for pitched roof coverings – Rolling Shutters - Ramps- Stores- Public Toilets/ Bath rooms- Dining / Resting halls- Ventilation and Lighting. **11.** Draw the elevation of a King post roof truss. **12.** Preparation of plan, section and elevation of a Small workshop with north light steel roof truss (6 to 10m Span) over R.C.C. Columns. **13.** Preparation of plan, section and elevation of a Small Pre-Engineered building. 14. Preparation of approval drawing for two bed room residential building R.C.C. flat roof. **(Not for Examination)**	**4** **3** **5** **3** **2**
	Total Hours	**75**

Suggested student activities:

1. Visit architectural sites or use reference images to sketch building facades, architectural details, and urban landscapes, focusing on observation and capturing proportions and details.
2. Present drawings to the class and participate in critique sessions, providing feedback on peers' work and receiving constructive criticism on their own drawings.
3. Analyze and critique architectural drawings from historical and contemporary architects, discussing design principles, drawing techniques, and communication strategies.
4. Assign design projects where students create building drawings for specific scenarios or client requirements, incorporating elements such as site analysis, program development, and conceptual design sketches.

5. Organize group projects where students collaborate to create complex building drawings, simulating real-world teamwork and coordination in architectural practice.

Text Books:

1. National Building code of India 2023.
2. B.P.Verma ,Civil Engineering Drawing and house planning 13th edition, Khanna Publishers, 2023.
3. S.C.Rangwala, Civil Engineering Drawing, 3rd Edition, Charotar Publication, 2017.

Web resources:

1. http://ndl.iitkgp.ac.in/he_document/bharat_skills/bharat_skills/01_0853?e=2|building%20planning%20and%20drawing.
2. http://ndl.iitkgp.ac.in/he_document/bharat_skills/bharat_skills/01_0910?e=18|bond%20building%20drawing%20polytechnic%20engineering.
3. http://ndl.iitkgp.ac.in/he_document/bharat_skills/bharat_skills/01_0844?e=6|bond%20building%20drawing%20polytechnic%20engineering

List of Equipments:

S.No.	List of Equipments Required	Quantity required
1	Computers	30Nos.
2	Laser Printer	2Nos.
3	CAD Software	30Users

1G233540	HYDRAULICS	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Hydraulics which is also meant by Mechanics of Fluids helps in solving problems in the field of Civil, Environmental, Transportation, Mechanical, and Metallurgical Engineering. The subject deals with basic concepts and principles in hydro-statics, hydro - kinematics and hydro-dynamics and their application in solving fluid flow problems. The subject is also designed to study the practical applications of fluid flow problems.

OBJECTIVES:

The objective of this course is to enable the student to

- Understand parameters associated with fluid flow and hydrostatic pressure.
- Understand types of forces, energy and application of Bernoulli's theorem.
- Know the different types of Orifices and Mouth pieces and to derive discharge formulae and their practical applications.
- Know the different types of pipes in parallel flow / series flow connected to the reservoirs.
- State the different losses of head of flowing liquids in pipes and their equations.
- Know the different types of Notches, and deriving the discharge formulas and their Practical applications.
- Learn the construction details, specifications and efficiencies of Reciprocating Pumps and Centrifugal Pumps.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Define Parameters associated with fluid flow and hydrostatic pressure, types of flow, total energy and total head, Bernoulli's theorem .Determine the co-efficient of discharges of orifice meter, Venturimeter.

CO-2	Describe about the different types of Orifices and Mouthpieces and to derive discharge formulae and their practical applications and determine the co-efficient of discharges of Orifice ,mouthpiece
CO-3	Describe the losses of heads in pipes, major losses, minor losses, pipes in parallel flow / series flow connected to the reservoirs, determine the friction factor of the pipe.
CO-4	Describe the different types of Notches, and Derive the discharge formulas and their Practical applications and coefficient of discharges for different notches.
CO-5	Classify various types of pumps, Describe the advantages, working principles, construction details, specifications and efficiencies of Reciprocating Pumps and Centrifugal Pumps and Draw the characteristic curves for centrifugal and Reciprocating pumps.

Pre-Requisites: Knowledge of fluids.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	3	1	2	2	3	2
CO2	3	2	1	3	1	2	2	2	2
CO3	3	2	1	3	1	2	2	2	2
CO4	3	2	1	3	1	2	2	2	2
CO5	3	2	1	3	1	2	2	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.

- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome - and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G233540	HYDRAULICS	L	T	P	C
Practicum		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	INTRODUCTION	
	1.1 FLUID PROPERTIES & MEASUREMENT OF PRESSURE Hydraulics - Definition - Fluids - Properties of fluids - Types of pressures - Static pressure, Atmospheric pressure, Gauge pressure, Vacuum pressure and Absolute pressure-Measurement of Pressure-Simple Mercury Barometer - Piezometer Tube-Simple U-Tube Manometer-Differential Manometer.	3
	1.2 FLOW OF FLUIDS Types of Flow - Energy possessed by a Fluid Body - Potential Energy and Potential Head - Pressure Energy and Pressure Head - Kinetic Energy and Kinetic Head - Total Energy and Total Head - Bernoulli's Theorem (No proof) - Venturimeter - Orificemeter	
	Practical exercises: 1. Study of Manometers and Pressure Gauges. (Not for Exam) 2. Verification of Bernoulli's Theorem. 3. Flow through Venturimeter - Determination of Co-efficient of Discharge. 4. Flow through Orifice meter – Determination of Co-efficient of Discharge.	4 4 4 4
UNIT- 2	**FLOW THROUGH ORIFICE AND MOUTH PIECE**	
	Definitions - Types of orifices - Vena contracta - Hydraulic coefficients Cd, Cv and Cc - Formula - Large orifice - Definition - Discharge formula - Practical applications of orifices - Types of mouth pieces-External and	3

	internal mouth pieces-Discharge formula. **Practical exercises:** 5. Flow through orifice - Determination of Co-efficient of Discharge by Time fall-Head method. 6. Flow through orifice - Determination of Co-efficient of Discharge by Constant head method. 7. Flow through external cylindrical mouth piece - Determination of Co-efficient of Discharge by Timing fall in head method. 8. Flow through external cylindrical mouth piece - Determination of Co-efficient of Discharge by Constant head method.	4 4 4 4
UNIT- 3	**FLOW THROUGH PIPES**	
	Definition of pipe-Losses of head in pipes - Major losses - Minor losses - Sudden enlargement, sudden contraction, obstruction in pipes (No proof) - Energy/Head losses off lowing fluid due to friction – Darcy's equation – Chezy's equation (No derivation) - pipes in parallel flow / series flow connected to a reservoir. **Practical exercises:** 9. Determination of friction factor for the given GI pipe.	3 4
UNIT- 4	**FLOW THROUGH NOTCHES AND WEIRS**	
	Definitions-Types of notches - Rectangular, Triangular and Trapezoidal notches-Formula (No derivation)-Comparison of V-Notch and Rectangular Notch-Weir - definition - classifications of weirs-comparison of Weirs and Notches.-**End contraction of weir.** **Practical exercises:** 10. Determination of Co-efficient of Discharge for Rectangular Notch. 11. Determination of Co-efficient of Discharge for Triangular Notch.	3 4 4 4

UNIT- 5	PUMPS	
	Pumps - Definition - Classification of pumps - Reciprocating pump - Construction Detail and Working Principle - Types - Single Acting and Double Acting - Slip - Air Vessels - Discharge and Efficiency - Centrifugal pump - Advantages and Disadvantages over a Reciprocating pump - Layout - Construction Details - Priming of Centrifugal Pump - Construction and Working of the Pump - Classification - Functions of Foot Valve, Delivery Valve and Non - Return Valve - Fundamental Equation of Centrifugal Pump - Characteristics of a Centrifugal Pump - Discharge, Power and Efficiency.	3
	Practical exercises:	
	12. Prepare a Layout and indicate the construction parts of a Reciprocating pump / Centrifugal pump.(Not for Exam).	4
	13. Reciprocating pump - To draw characteristic curves and determine the efficiency.	4
	14. Centrifugal Pump - To draw characteristic curves and determine the efficiency.	4
Total Hours		75

Suggested student activities:

1. Explore and investigate the different types of fluids and provide real-time examples of each.
2. Presentation by students on major and minor losses of flow through pipes.
3. Seminar on the classification of pumps based on their working principle, design, and applications
4. Periodic class quizzes conducted on a weekly/fortnightly based on the course
5. Micro project that shall be an extension of any practical lab exercise to real-world application.

Text Books:

1. R.K. Bansal, Fluid Mechanics,2nd Edition, Laxmi Publications,2020,
2. John. M. Cimbala Yunus A. Cengel ,Fluid Mechanics: Fundamentals and Applications, 4th Edition,
   McGraw-Hill,2019.
3. S.Ramamrtham-Hydraulic Fluid Mechanics and Fluid Machines, , 9th Edition,DhanpatRai & Sons,2014.

Web Based /Online Resources:

1. https://youtu.be/OfViSGNSf4o?si=921H2Aqvt8xhiVZV
2. https://youtu.be/ikt-MxC3_1o?si=kitMRCScKWAQ4n2-
3. https://youtu.be/95vwYGJ3E48?si=LLB51FVO8VFa16MG
4. https://youtu.be/kcPawgvFehI?si=XsUjJ3wZ9YLKWyej
5. https://youtu.be/wdjmQ3JoP34?si=AKglGUnVZ6jHD3zC

LIST OF EQUIPMENTS (for a batch of 30 students):		
S.No.	**List of Equipment required**	**Quantity Required**
1	Bernoulli's theorem apparatus (closed circuit)	1No.
2	Venturimeter and Orifice meter apparatus (closed circuit)With all accessories (Combined or Individual)	1No.
3	Pipe Friction apparatus (closed circuit) with all accessories	1No.
4	Orifice and Mouth piece apparatus (closed circuit)with all Accessories (Combined or Individual)	1No.
5	Notch apparatus (closed circuit) with all accessories	1No.
6	Reciprocating Pump Testing Rig with all accessories	1No.
7	Centrifugal Pump Testing Rig with all accessories	1No.

1G233640	MATERIAL TESTING LAB	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Civil Engineering diploma holders have to supervise construction of various types of civil works involving, the use of various materials like stones, bricks and tiles, cement and cement-based products, lime, timber and wood-based products, paints and varnishes, metals and other miscellaneous materials. The students shall acquire knowledge regarding the characteristics, uses and availability of various building materials and skills in conducting tests as per BIS as well as international standards to determine the suitability of materials for various construction purposes.

COURSE OBJECTIVES:

This course is designed to conduct standard tests on various construction materials and specimens as per the Indian standard (IS code) and ASTM standards. Since the materials used in construction shall withstand all loads acting on it throughout the life of the structure and durable. Hence the students are expected to learn and have to perform Hands on training through laboratory practice.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Conduct appropriate test on materials such as Tension, Compression ,Torsion, Flexure and Shear strength
CO-2	Act as a quality controlling engineer in civil Engineering construction field...
CO-3	Conduct various tests on cement (binding material) and aggregates(Fine and Coarse Aggregates)
CO-4	Prepare various specimens for Conducting quality control tests.
CO-5	Follow the procedure and Standards laid down by Indian standards and ASTM standard testing procedure of civil Engineering materials and acceptable parameters.

Pre-Requisites: Basic knowledge on Civil Engineering Construction Materials.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	1	1	1	1	3	2
CO2	3	3	1	1	1	1	1	3	2
CO3	3	2	2	2	2	2	2	2	2
CO4	3	1	1	1	1	1	1	2	2
CO5	3	3	3	3	3	3	3	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Teachers shall deliver theoretical knowledge on each test and standard procedures to perform the test for better understanding and importance of the particular Test on materials.
- Teachers shall inculcate students on preparing specimen / samples as per the standard procedure and the same shall be demonstrated.

1G233640	MATERIAL TESTING LAB	L	T	P	C
Practicum		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	**TESTS ON MILD STEEL**	
	Introduction to Strength and durability of materials- Direct Tensile strength -stress strain relation for ductile materials-Direct Compressive strength-Flexural strength	3
	Practical exercises:	
	1. Conducting tensile test on mild steel /deformed bars and determining yield strength and finding important parameters.	4
	2. Conducting double shear test on Mild steel bar and finding the shear value.	4
	3. Conducting Torsion test on Steel bar and finding its Modulus of rigidity.	4
UNIT- 2	**TESTS ON MILD STEEL**	
	Deflection of beams-Bending compression-Bending tension-split tensile strength-Torsional strength- shears strength-impact strength-Hardness of materials.	3
	Practical exercises:	
	4. Conducting deflection test on simply supported beams and finding its young's modulus value on (i) Wooden and (ii)Steel.	4
	5. Conducting Hardness test and finding Brinnel's and Rockwell's hardness number on (i)Mild steel (ii)Brass (iii)Aluminium.	4
	6. Conducting an Impact test on brittle and ductile material by performing Izod/Charpy tests.	4
UNIT- 3	**TESTS ON AGGREGATES**	

	Importance of Crushing value of aggregates-Impact value-Elongation index-flakiness index and angularity index of aggregates. **Practical exercises:** 4. Conducting Crushing test on coarse aggregate and finding the crushing value of aggregate. 5. Conducting Impact test on coarse aggregate and finding the impact value of the aggregates. 6. Determination of Elongation Index, Flakiness index and angularity index of aggregates.	3 4 4 4
UNIT- 4	**TESTS ON AGGREGATES.**	
	Attrition and abrasive value of aggregates- Water absorption of construction materials- Effect / Impact of water absorption **Practical exercises:** 7. Conducting attrition test on coarse aggregate by Deval's (OR) Los angels method. 8. Conducting abrasion test on aggregate by Dorry's method. 9. Determination of bulk density and specific gravity of coarse and fine aggregate	3 4 4 4
UNIT- 5	**TEST ON CEMENT AND BLOCKS**	
	Cement -types of cement- water cement ratio-consistency-Fineness of cement-Initial setting time and final setting time **Practical exercises:** 10. Conducting fineness test on cement by Sieve analysis (OR) Blain's Air permeability apparatus. 11. Conducting compression test and determining direct compressive strength on (i) Wooden cube (ii) Brick/ Fly ash brick (iii) Masonry block	3 4 4

	(iv)Paver blocks (Any two shall be given in Examination. 12. Conducting flexural test on tiles and determining its flexural value.	4
Total Hours		**75**

Suggested student activities:

Student shall prepare specimen / sample of the construction material as per the testing standards and procedure.

Text Books:

1. M.S.Shetty, Concrete technology, Theory and Practice, 7th Edition S.Chand & Company Pvt .Ltd,2013.
2. Indian Standard, IS 383:2016, Coarse and Fine aggregates for concrete-specification.
3. Indian Standard IS 456:2000, Plain and Reinforced cement concrete.
4. Indian Standard, IS 2386(part-1):1963, Methods of test for aggregates for concrete.
5. Indian Standard, IS 2386(part-3):1963, Methods of test for aggregates for concrete.

Web Resources:

1. American Society for testing and Materials (ASTM) standards https://www3.epa.gov/hudson/pdf/sedc_2004-2005_append.pdf.
2. Bureau of Indian standards https://www.services.bis.gov.in/php/BIS_2.0/dgdashboard/Published_Standards_new/revised_standards

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students)

1. Universal testing machine (UTM)-Capacity 400 kN and above capacity with accessories with double shear arrangement.
2. Compression Testing Machine (CTM)1000 kN and above capacity.

3. Torsion testing Machine.
4. Impact testing machine for Izod /charpy test.
5. Rockwell cum Brinell harness testing machine.
6. Floor type deflection test arrangements magnetic stand, deflection gauge, weights and Beams made up of different materials.
7. Weighing balances with required capacity and accuracy.
8. Sieve sets for Cement IS sieve No.9 (90 Micron)made up od brass with 20cm dia.
9. Blains Air permeability apparatus.
10. Flexural testing machine for Tiles
11. Determination of bulk density and specific gravity of coarse and fine aggregate.
12. Conducting attrition test on coarse aggregate by Deval's (OR) Los angels method.
13. Conducting abrasion test on aggregate by Dorry's method.
14. Conducting Crushing test on coarse aggregate and finding the crushing value of aggregate.

IV TERM

1G234110	MECHANICS OF STRUCTURES	L	T	P	C
THEORY		3	0	0	3

Introduction:

Mechanics of structures is a fundamental subject in Civil engineering that deals with understanding the behavior of structures under various loads. It forms the backbone of designing safe and efficient structures. Study of structural behavior, analysis and design is a principal part of civil engineering courses and is essential for professional accreditation. This subject enhances the structural analytical ability of the students. This subject is conceptual applications of principles of mechanics of rigid and deformable bodies in Engineering, helps in determining statics response of statically determinate and indeterminate structures. This course has been designed for Diploma civil engineering students or those interested in developing a deeper understanding of introductory structural analysis concepts and methods. The lectures cover the essential concepts and methods of structural analysis and provide examples demonstrating their applications.

OBJECTIVES:

- Define and describe the basic concept and principle of structure Analysis.
- Analyze determinate and indeterminate structures using various methods.
- Gain a solid understanding of how structures behave Under various loads.
- To understand the different techniques for analysis of structures.
- Identify different types of structural elements and their behaviour.
- Ability to distinguish between determinate and indeterminate structures.
- Ability to compute and draw normal, shear and bending moment diagrams for beams and frames.
- Apply knowledge of mathematics and Engineering in calculating slope and Deflections.
- The column subjected to axial loads, buckling behavior will also helps the students in developing the basic concepts of structural analysis.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Determine the slope and deflection of determinate beams by area moment method.
CO-2	Analyze of Fixed beams by Area-Moment method and draw SFD, BMD.
CO-3	Analyze continuous beams by Theorem of Three moments and draw SFD, BMD.
CO-4	Analyze of Portal frames by Moment Distribution Method and draw SFD, BMD.
CO-5	Define the different types of columns and finding critical loads of columns.

Pre-Requisites: Mechanics of Materials, Engineering Mechanics.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	1	2	3	2	3	2
CO2	3	3	2	1	2	3	2	3	2
CO3	3	3	2	1	2	3	2	3	2
CO4	3	3	2	1	2	3	2	3	2
CO5	3	3	2	1	2	3	2	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

This subject is introduced so that diploma holder in Civil Engineering may appreciate the concepts and principles of mechanics of materials of various elements of building and are able to apply the knowledge gained through the subject for the design of simple and small components. Teacher should give simple exercises involving the applications of various concepts and principles being taught in the subject. Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve the tutorial problems independently. Teacher may conduct weekly small quiz sessions to know the students' level of understanding and if need be, teacher may reinforce the concepts and principles related to mechanics of materials of elements/members of building components.

1G234110	MECHANICS OF STRUCTURES	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	THEORY			
UNIT- 1	SLOPE AND DEFLECTION OF BEAMS				
	Deflected shapes / Elastic curves of beams with different support conditions –Definition of Slope and Deflection- Flexural rigidity and Stiffness of beams- Mohr's Theorems – Area Moment method for slope and deflection of beams – Derivation of expressions for maximum slope and maximum deflection of standard cases by area moment method for cantilever and simply supported beams subjected to symmetrical UDL& point loads. Numerical problems on determination of slopes and deflections at salient points of Cantilever Beam with maximum two point loads, udl throughout the beam, udl for the half length from fixed end and Combination of single point load and udl throughout the beam only- Determination of slopes and deflections at salient points of Simply supported beams with central point load, Two equal point loads at one third points, udl throughout the beam and Combination of central point load and udl throughout the beam only from first principles and by using formulae.				9
UNIT- 2	FIXED BEAMS – AREA MOMENT METHOD				
	Introduction to fixed beam - Advantages –Degree of indeterminacy of fixed beam- Sagging and Hogging bending moments- Points of Contra flexure. – Determination of fixing end(support) moments(FEM) by Area Moment method– Bending moment diagram(BMD)-Free BMD –Fixed BMD- Fixed beam subjected to concentrated load at mid span, Single eccentric point load, udl throughout the beams. Numerical Problems for Fixed beams subjected to concentrated load at mid span, Single eccentric point load, Two equal point loads at one third points, udl throughout the beams,				9

	Combination of central point load and udl throughout the beam only. Drawing SF and BM diagrams for Fixed beams with supports at the same level (sinking of supports or supports at different levels are not included).	
UNIT- 3	**CONTINUOUS BEAMS – THEOREM OF THREE MOMENTS METHOD**	
	Introduction to continuous beams-Advantages–Deflected shapes of continuous beam-Degree of indeterminacy of continuous beams with respect to number of spans and types of supports –Simple/ Fixed supports of beams- General methods of analysis of Indeterminate structures – Clapeyron's theorem of three moments–Application of Clapeyron's theorem of three moments for the following cases–Two span beams with both ends simply supported –Two span beams with one end fixed and the other end simply supported. Numerical Problems on Two span beams with both ends simply supported –Two span beams with one end fixed and the other end simply supported -Sketching of SFD and BMD for all the above cases.	9
UNIT- 4	**PORTAL FRAMES- MOMENT DISTRIBUTION METHOD**	
	Introduction to moment distribution method- Carry over moment-Carryover factor and Stiffness factor (Derivation not required)-Distribution moment-Distribution factor—Stiffness Ratio or Relative Stiffness- Concept of distribution of un balanced moments at joints - Sign conventions, Definition of Frames– Types–Bays and Story - Sketches of Single/Multi Story Frames, Single/Multi Bay Frames- Portal Frame– Sway and Non- sway Frames-Deflected shapes of Portal frames under different loading / support conditions- Numerical problems of Non sway (Symmetrical) Portal Frames for Joint moments by Moment Distribution Method and drawing BMD only.	9
UNIT- 5	**COLUMNS AND STRUTS**	

	Columns and Struts–Definition–Short and Long columns–End conditions – Equivalent length / Effective length– Slenderness ratio – Axially loaded short column - Axially loaded long column – Euler's theory of long columns-Assumptions – Expression for Critical load of Columns standard cases of end conditions-Limitations of Euler's formula – Modes of failure of column-Buckling of column-Buckling load-crushing load-safe load- Factor of Safety–Expression of Rankine's formula for Crippling load of Columns - Simple problems for circular column, Hollow circular column, Rectangular column, Single I section without cover plate only.	9
	Total Hours	45

Suggested student activities

1. Quiz.
2. Group discussion.
3. Seminar.
4. Surprise tests.
5. Laboratory tests on materials.
6. Class assignments.

Text Books:

1. S.Ramamrutham,"Theory of structures",9th Edition, Dhanpat Rai Publications, 2014.
2. Bhavikatti S.S,Structural Analysis-Vol.1,4th Edition, Vikas Publishing House Pvt.Ltd.,NewDelhi-4, 2011.
3. Bhavikatti S.S,Structural Analysis-Vol.2,4th Edition, Vikas Publishing House Pvt.Ltd.,NewDelhi-4, 2011.

Web resources:

1. **Slope And Deflection Of Beams**: https://youtu.be/U0uj67OwF4U?si=pxxtxfYoxP4Of3xc
2. **Fixed Beams–Area Moment Method:** https://youtu.be/0iIvT8x01wI?si=57CGtfvWi5LO2CZk
3. **Continuous Beams– Theorem Of Three Moments Method** : https://youtu.be/pk6z6STv_uw?si=TnKEFKJDaNoFv5hT
4. **Portal Frames Moment Distribution Method:** https://youtu.be/xSDpRiTaoLg?si=ySvDfTcGq0GXQL0h
5. **Columns And Struts**: https://youtu.be/hwpGAxa8UoI?si=vMGt1P20H_hTL4DO

1G234210	TRANSPORTATION ENGINEERING	L	T	P	C
THEORY		**3**	**0**	**0**	**3**

INTRODUCTION:

Construction of roads is one of the areas in which diploma holders in Civil Engineering get employment. These diploma holders are responsible for construction and maintenance of highways. Basic concepts of road geo-metrics, surveys and plans, road materials, construction of rigid and flexible pavements find place in this course. In addition, this subject will cater the needs of those technicians who would like to find employment in the construction of railway tracks, airport and harbour. The subject aims at providing broad based knowledge regarding various components and construction of railway track, airport and harbour components.

OBJECTIVES:

The objective of this course is to enable the student to

- Make the students learn the basics of transportation engineering.
- Get knowledge about the various types of roadways and its geometric design.
- Acquire knowledge about railways, rail components and its uses.
- Know the various types of stations, signaling and interlocking in railways.
- Study the general aspect of airport and harbour planning and design aspects.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Understand the importance of the roads, development of roads and classification of roads, highway pavements, and geometrical design.
CO-2	Study the highway alignment, road machineries and construction of different types of Roads.
CO-3	Understand the components of rail and methods of laying the rail.
CO-4	Learning the rail fixtures, types of stations, signaling and control of movement of trains.

CO-5	Study the general aspects of airport and harbor engineering.

Pre-Requisites: Knowledge of basic highway, railway, airport and harbour components.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	3	3	1	3	2	3	1
CO2	3	2	2	3	3	3	3	3	1
CO3	3	1	2	1	3	1	1	3	1
CO4	3	2	3	3	2	1	2	3	1
CO5	2	1	1	1	1	3	3	3	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G234210	TRANSPORTATION ENGINEERING	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	THEORY			
UNIT- 1	HIGHWAY ENGINEERING				
	1.1 General-Development of Roads in India-Modes of transportation-Advantages of Roads –Requirements of an ideal road–Indian Road Congress-Classifications of Highways - Highway Pavements-Objectives-Types of Pavement–Flexible and Rigid Pavements- Comparative study of Flexible and Rigid pavements. **1.2** Road structure- Right of way– Width of formation-Road Camber-Super elevation-Sight distances–Road gradient-Road Curves-Horizontal curves-Vertical curves-Types- Widening of pavement on horizontal curves. Functions of IRC, CRRI, MoRT & H, NHAI, Concept of Smart highways				10
UNIT- 2	ROAD ALIGNMENT AND CLASSIFICATION				
	2.1 Principles for ideal highway alignment-Factors affecting highway alignment-Excavating equipments-Tractor, Bulldozer, Grader, Scraper, Asphalt recycling equipment, Motor graders -Compaction equipments. **2.2** Water Bound Macadam roads , Bituminous Roads, cement concrete roads (Construction with sketches, Advantages and Disadvantages for these roads) - Surface dressing of Bituminous Roads-Types.				9
UNIT- 3	RAILWAY ENGINEERING				
	3.1 Introduction to Railways -Classifications of Indian Railways –Rail Gauges– Requirements of ideal rail-Types of rail sections - Coning of wheels- Creep of rails – Causes and prevention of creep- Ballast-Functions of Ballast-Requirements of ballast – Materials used as ballast. **3.2** Functions of Sleepers-Types of sleepers – Requirements of sleepers – Sleeper density-Rail joints-Types-Rail fastenings-Fish plates - Fish bolts-Spikes– Chairs and Keys-Bearing plates-Blocks-Elastic fastenings-Anchors and anti-creepers.				10

UNIT- 4	RAILWAY ENGINEERING(Contd.)	
	4.1 Definition of station -Types of stations -Platforms–Passenger and Goods platforms -Definition of Yard–Types of yard-Level crossings-Engine shed-Triangles-Turntable-Traverses-Scotch Block-Buffer stops- Fouling marks. **4.2** Points and crossings-Turnouts-Right hand and left hand turn outs-Crossings-Types of crossings - Objects of signaling –Types of signaling based on functions and location- Principles of interlocking.-**Maintenance of Railway Track.**	8
UNIT- 5	**AIRPORT AND HARBOUR ENGINEERING**	
	5.1 Airport classification- airport planning; objectives, components, layout characteristics, orientation of Runways and correction factors for runway as per ICAO stipulations, parking-wind rose diagram. **5.2** Harbour, port, satellite port, docks, waves and tides-planning of harbors: requirements ,classification, location-harbour layout and terminal facilities-coastal structures : piers, break waters, wharves, jetties, quays, spring fenders, dolphins and floating landing stage	8
Total Hours		**45**

Suggested student activities

1. Presentation/Seminars by students on any recent technological developments in Highway Engineering.
2. Periodic class quizzes conducted on a weekly/fortnightly based on the course.
3. Prepare Models of road geometric structures, points and crossing in railways etc.
4. Visit nearby road construction activities, Railway stations ,Airports and Harbours.

Reference Books:

1. S.K.Khanna and C.E.G Justo, “Highway Engineering”,10th edition,Nem Chand and Bros Publisher,Roorkee,2017.
2. Rangwala, “Highway Engineering” ,11th Edition, Charotar Publishing House Pvt.

Ltd.,2017.

3. Rangwala,“Railway Engineering”, 27th edition,Charotar Publishing House Pvt. Ltd.,2017.

Web resources:

1. https://youtu.be/3oNa9Z94Hiw?si=KaE7Cu7w6SvwVdek
2. https://www.digimat.in/nptel/courses/video/105107220/L04.html
3. https://youtu.be/37WMS483T7Y?si=0qkDRyZj6WeaTCcE
4. https://youtu.be/SC5GIAHuCQY?si=HhOK_zuWdM-SV_el
5. https://youtu.be/NznOF2ukTy4?si=URsRhChYEfpBCCn5

1G234330	SOIL MECHANICS AND FOUNDATION ENGINEERING	L	T	P	C
PRACTICUM		2	0	2	3

INTRODUCTION:

Civil Engineering diploma engineers are required to supervise the construction of roads and pavements, dams, embankments, and other Civil Engineering structures. As such, the knowledge of basic soil engineering is a pre-requisite for these engineers for effective discharge of their duties. This necessitates the introduction of Soil mechanics and foundation Engineering subject in the curriculum for Diploma Course in Civil Engineering. The subject covers only such topics as will enable the diploma engineers to identify and classify the different types of soils, their selection and proper use in the field for various types of engineering structures. The emphasis will be more on teaching practical aspects rather than theoretical concepts.

OBJECTIVES:

The objective of this course is to enable the student

- To impart knowledge about the index, Engineering properties of soil and its classification
- To impart knowledge about the methods of determination of soil properties
- To Estimate permeability and shear strength of soil
- To know the various methods of compaction, consolidation and determination of field density of soil
- To know the various types of foundations, bearing capacity of soil and its importance
- To learn various soil sampling & soil stabilization and its methods

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Identify and classify various types of soils. Interpret the physical properties of soil related to given Construction activities

CO-2	Apply permeability, effective stress and shear strength test for foundation analysis
CO-3	Compute optimum values for moisture content for maximum dry density of soil
CO-4	Interpret bearing capacity soil and selection of foundation.
CO-5	Apply different methods for improving the Engineering properties of soil, Soil sampling and Stabilization.

Pre-Requisites: Knowledge of basics of soil properties and test methods.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO1
CO1	3	1	1	3	2	2	2	3	2
CO2	3	1	1	2	2	2	2	3	2
CO3	3	1	1	2	2	2	2	3	2
CO4	3	1	1	2	2	2	2	3	2
CO5	3	1	1	2	2	2	2	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

The teacher while imparting instructions are expected to lay greater emphasis on the practical aspects rather than theory. To bring clarity regarding concepts and principles involved, teachers should organize demonstrations in the laboratories and fields. Efforts should be made in the practical classes that students perform practical exercises individually.

1G234330	SOIL MECHANICS AND FOUNDATION ENGINEERING	L	T	P	C
PRACTICUM		2	0	2	3
	END TERM PATTERN	Theory			
UNIT- 1	SOIL PROPERTIES AND ITS CLASSIFICATION				
	Introduction to Soil Mechanics-Origin of soil, Three phase diagram - Definitions- Cohesive soil, Cohesion less soil, Void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters (Only formula) -Simple problems- BIS soil classification. **Practical:**				6
1	Determination of Specific Gravity of Sand				2
2	Determination of void ratio and porosity of sand				2
3	To determine the moisture content of given sample of soil				3
4	Determine Grain size distribution of given soil sample by Sieve Analysis				3
5	Determination of liquid limit and plastic limit of the given soil sample				3
UNIT- 2	PERMEABILTY, TOTAL STRESS AND SHEAR STRENGTH OF SOIL				
	Permeability -Definition, Factors affecting permeability, Determination of coefficient of permeability (Constant head and falling head method - Procedure only)-Darcy's law- Differentiate Darcy velocity and seepage velocity - Definition and Significance of total stress, effective stress, Pore water pressure, Capillary phenomena & quick sand condition - Shear Strength -Definition, Factors affecting shear strength of soil- Test on shear strength of soils (Name and uses only) **Liquefaction - Definition** **Practical:**				6
6	Determination of shear strength of soil by direct shear				3
UNIT- 3	CONSOLIDATION AND COMPACTION				

	Consolidation-Definition, Factors affecting Consolidation - Compaction – Definition, Factors affecting compaction, Compaction Curve- Field methods of compaction - rolling, ramming and vibration. Suitability of different types of rollers - smooth wheel roller, sheep foot roller, pneumatic tyred roller. CBR Test Procedure only **Practical:**	6
7	Determination of field density of soil by sand replacement method (OR) Core cutter method.	4
8	Determination of field density & optimum moisture content using Proctor's Compaction Test (OR) Modified Proctor Compaction Test.	4
UNIT- 4	**TYPES OF FOUNDATION AND BEARING CAPACITY OF SOIL**	
	Types of foundation–Suitability and application of Isolated, strip, raft, Pile, well foundation. Uses of Pile groups and Sheet piles. Terzaghi's theory Assumption and Equation of bearing capacity for different footing (only formula) – Effect of water table on bearing capacity- Definition and significance of bearing capacity, ultimate bearing capacity, Net safe bearing capacity, Safe bearing capacity of soils and Negative skin friction - Factors affecting bearing capacity of soil. **Practical:**	6
9	Using Standard Penetration test, Identify various types of soil in different layer and prepare detailed report(Demonstration with models/video/Field visit)	2
UNIT- 5	**SOIL SAMPLING AND STABILIZATION**	
	Sampling and types of samplers, undisturbed, disturbed and representative samples-Area ratio, recovery ratio of samples - Materials used in soil stabilization-Geo-materials, Synthetic, natural polymers, Cement, Lime & Fly ash. Different methods of soil stabilization - Deep Mixing Method,	6

	Grouting Method, Mechanical Stabilization of Soil.	
10	Using Auger boring (or) Any boring method, Identify various types of soil in different layer.	4
Total Hours		60

Suggested student activities

- Visit any two construction site, Examine different types of soil and its properties. Finally the test results are compared with BIS standard.
- Visit any two construction site, Examine bearing capacity of soil using SPT/Pile load test.
- Visit any one construction site, Examine suitable methods of soil stabilization / ground improvement techniques

Reference Books:

1. Braja M Das, "Principles of Geotechnical Engineering", 8th Edition, Cengage Learning India Private Limited, 2014.
2. Venkatramaiah, C., "Geotechnical Engineering", 4th Revised Edition, New Age International (P) Limited, Publishers, , 2012.
3. Punmia, B.C., "Soil Mechanics and Foundations", 16th Edition, Laxmi Publications Pvt. Ltd. New Delhi, 2017.

Web resources:

1. Video films on Geo-technical Laboratory Practices by Vinod Kumar; NITTTR, Chandigarh
2. e-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh
3. https://swayam.gov.in
4. https://nptel.ac.in/courses/105/103/105103097
5. https://nptel.ac.in/courses/105106142
6. https://nptel.ac.in/courses/105101160

7. http://law.resource.org/pub/in/bis/S03
8. https://www.astm.org/standards/geotechnical-engineering-standards

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students)

S.No.	Description	Number required
1	Pycnometer	1No.
2	Hot air oven with all accessories such as Glass cup, Desiccators, etc.,	1No.
3	Weighing balance 100kg,1kg	1No.
4	Sieve test for fine aggregate made of brass 200mm dia complete set.	1No.
5	Sieve test for coarse aggregate made of brass 200mm dia complete set	1No.
6	Liquid limit and plastic limit devices with all accessories	1No.
7	Direct shear machine with complete accessories	1No.
8	Proctor's compaction test **(OR)** Modified proctor compaction test apparatus with all accessories	1No.
9	Sand replacement test Apparatus(OR)core cutter Devices with all accessories with all accessories	1No.
10	Auger boring (or) Any boring -Soil sampling Apparatus with all accessories	1No.

1G234440	CONCRETE TECHNOLOGY	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Concrete is the most widely used building material. It is versatile, has desirable engineering properties, can be moulded into any shape. The knowledge of concrete's controlled production, maintenance and testing is vital for a designer to ensure its optimal use. The need for better understanding the behaviour of concrete, especially in challenging environmental conditions, it is required to have sound knowledge on selection of materials, mix proportioning and quality control methods.

OBJECTIVES:

On successful completion of this course, the students will be able to:

- Understand the properties and strength of cement and aggregates.
- Investigate the properties of cement and aggregate by conducting laboratory test.
- Determine the properties and strength of fresh and hardened concrete
- Design the mix proportioning of concrete.
- Describe the Manufacture of concrete, Form work and Quality control.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Explain the properties of cement, types and grades.
CO-2	Explain the properties and classification of aggregate, water.
CO-3	Describe the grades of concrete and properties of fresh and hardened concrete.
CO-4	Understand the concept of mix design and evaluate their strength
CO-5	Understand the manufacturing process of concrete, form work and quality control.

Pre-Requisites: Basic Science, Physical properties of various materials and their behavior.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	2	1	1	2	3	2
CO2	3	2	2	2	1	1	2	3	2
CO3	3	3	3	2	2	2	2	3	2
CO4	3	2	3	2	1	1	1	3	2
CO5	3	2	2	2	2	2	2	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- The course content shall be delivered through lectures, PowerPoint presentations, and videos demonstrations and field visits
- The Activity criteria shall be conducted / executed by the student to be submitted to the faculty.
- The PRACTICE (Performance criteria) shall be conducted by the student and Report of work done to be submitted at the end of each session to the faculty.

1G234440	CONCRETE TECHNOLOGY	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	Practical			
UNIT- 1	CEMENT				
	1.1 Chemical constituents : Bogue's compound & their properties- hydration of cement-Physical and chemical Properties of OPC cement-IS requirements of OPC & PPC **1.2 Laboratory tests**: Fineness, Standard Consistency, Setting Time, Soundness, Compressive Strength -Different Grades of OPC-Storing of cement **Practical:**				6
1	Determination of normal consistency and initial setting time of the given cement.				3
2	Determination of soundness of cement by Le Chatlier's method.				3
3	Determination of Compressive Strength of Cement.				3
UNIT- 2	AGGREGATES AND WATER				
	2.1 Aggregates: Classification According to Size and Shapes **2.2 Fine Aggregates:** Properties- Size- Specific Gravity- Bulk Density- Water Absorption- Bulking- Fineness Modulus, Grading Zone of Sand, Silt content- Concept of Crushed Sand- Requirements of good aggregate. **2.3 Coarse Aggregates:** Properties- Size- Shape- Surface texture- Water Absorption- Soundness- Specific Gravity- Bulk Density- Fineness Modulus of Coarse Aggregate- Grading of Coarse Aggregates- Crushing Value- Impact Value- Abrasion Value-Requirements of good aggregate **2.4 Water:** Quality of Water- Impurities in Mixing water and Permissible Limits for				2 2 2

	Solids as per IS 456:2000. **Practical:**	
4	Determination of silt content in sand.	3
5	Determination of bulking of river sand/M-sand.	3
6	Determination of fineness modulus of fine/coarse aggregate by sieve analysis	3
UNIT- 3	**CONCRETE AND ITS PROPERTIES**	
	3.1 Grades of concrete: Different Grades of Concrete- Provisions of IS 456-Effect of Water Cement-Ratio on Concrete- Duff Abram Water Cement(w/c) Ratio Law-Significanceof w/c Ratio- Selection of w/c Ratio for Different Grades **3.2 Properties of Fresh Concrete:** Workability-Factors affecting Workability of Concrete-Workability-Requirement for different types of Concrete Works-Segregation,Bleeding, honey combing and Preventive Measures **3.3 Properties of Hardened Concrete:** Strength, Durability, Impermeability of concrete **Practical:**	6
7	Determination of workability of concrete by slump cone test	3
8	Determination of workability of concrete by compaction factor test	3
9	Determination of workability by Vee- Bee Test	3
UNIT- 4	**CONCRETE MIX DESIGN AND TESTING**	
	Concrete Mix Design-Concept of mix design- Factors influencing the choice of mix-proportions-Methods of Mix Design- Procedural Steps of Mix Design asper IS-10262- Illustrative Example for Concrete Mix Design as per IS10262:2019-Sampling and Acceptance criteria.	9

	Practical:	
9	Determination of compressive strength on concrete cubes	3
10	Non-Destructive Testing of Concrete-Rebound Hammer Test	3
UNIT- 5	**MANUFACTURING OF CONCRETE AND QUALITY CONTROL**	
	5.1Manufacture of concrete: Manual and R.M.C -Concreting Operations-Batching-Mixing-Transportation, Placing,Compaction, Finishing, Curing **5.2 Formwork for concreting**: Types of formwork for Beams, Slabs and Columns-Materials used for Formwork-Requirements of a Good Formwork Stripping time for Removal of Form work as per IS:456-2000 **5.3 Quality Control of Concrete:** Necessity of supervision-Errors in concrete construction-Check list Before commencing concreting. **Practical:**	9
10	Determination of consistency of fresh concrete by flow table test.	3
11	Determination of carbonation depth on concrete	3
Total Hours		75

Suggested student activities

- Conduct field test on cement
- Compare properties of manufactured sand with Natural River sand
- Study on Recycled coarse aggregate and prepare a report
- Visit the construction site and study the concrete operations and prepare a report
- Conduct a site visit to RMC plant /Cement plant and Prepare a report.

Reference Books:

1. M.S.Shetty, Concrete Technology (Theory and Practice),8th Edition, S.Chand& Company Ltd, 2018.
2. M L Gambhir, Concrete Technology,5th Edition, McGraw Hill Education,2017.
3. S.S.Bhavikatti, Concrete Technology, 1st Edition, Dream Tech Press, 2019.

Web resources:

1. https://archive.nptel.ac.in/courses/105/102/105102012/
2. https://www.youtube.com/watch?v=cx5gPKp9QEc&list=PLbMVogVj5nJQU7M0LdA77p XaaWBJni

Equipment/Facilities required to conduct the Practical Course. (Basic Strength: 30 students)

S.NO	LIST OF EQUIPMENT REQUIRED	QUANTITY REQUIRED
1	Weigh balance digital up to 10kg capacity with 1gm accuracy battery backup with 8 hours	1 No.
2	Lechatlier Apparatus	1 No.
3	Compression Testing Machine, 1000kN capacity	1 No.
4	Cement mortar cube mould of size 70.6mm	3 No's
5	Sieve test for coarse aggregate made of brass 200mm dia complete set	2 sets
6	Sieve test for fine aggregate made of brass 200mm dia complete set	2 sets
7	Slump cone apparatus	2 No's
8	Compaction factor apparatus	1 No.
9	Vee Bee Consistometer	1 No.
10	Cement mortar cube mould of size 150mm	3 No's

1G234540	CONSTRUCTION PRACTICES	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Building Construction is a core subject in Civil Engineering, which deals with the construction processes of substructure, superstructure, Building finishes and maintenance of buildings. This course essentially imparts the knowledge of construction technology along with the processes involved in it and various construction equipment used for effective execution of various construction activities. This knowledge shall be used for effective and efficient up keeping of building after construction. This will enable the students to undertake the activities in comparatively shorter period of time

COURSE OBJECTIVES:

- Describe the different types of foundations and Set out foundation in the field for spread footing and column footing for a building
- Describe the classification of stone masonry & brick masonry.
- State the different types of doors, windows, lintels & stairs.
- Describe the types of floors and roofs.
- Describe the different methods of pointing, plastering and termite proofing.
- Describe procedure of colour washing, white washing, painting and varnishing.
- Cutting, hooking, cranking of specimen reinforcement bar and arrangement of reinforcement for a lintel cum sunshade, one way roof slab, beam, and column with footing.
- Apply two or more coats of selected paint on the prepared base of a given wall surface
- Apply termite chemical on given damaged sample of timber.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Recommend suitable type of foundation and set out in the field.
CO-2	Identify suitable type of superstructure and recommend the appropriate construction techniques to be used.
CO-3	Identifying doors, windows, ventilators types, applying suitable methods of water proofing &Damp proofing
CO-4	Recommend suitable stair, flooring,& roof for different buildings
CO-5	Apply selected paints on wall surface and apply anti-termite chemical on damaged timber

Pre-Requisites: Basic Science, Basic Mathematics, Physical properties of various materials.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	2	1	1	2	3	3
CO2	3	2	2	2	1	1	2	3	2
CO3	3	2	2	2	1	1	2	2	2
CO4	3	2	2	2	1	1	2	3	2
CO5	3	2	2	2	1	1	2	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

NOTE 1: The course content shall be delivered through lectures, PowerPoint presentations, video demonstrations and field visits

NOTE 2: The Activity criteria shall be conducted / executed by the student to be submitted to the faculty.

NOTE 3: The PRACTICE (Performance criteria) shall be conducted by the student and observations and report to be submitted at the end of each session to the faculty.

1G234540	CONSTRUCTION PRACTICES	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	**THEORY PORTION /INTRODUCTION**	
	1.1 INTRODUCTION TO STRUCTURES Permanent and temporary structures - Life of structures - Sub structure - super structure - load bearing structure - framed structure - concept of framed structure - advantages of framed structure. **1.2 FOUNDATION** Definition - objectives of foundation - Bearing capacity of soil – Definition - maximum/ultimate and safe bearing capacity - Bearing capacity of different types of soils - Requirements of a good foundation - Types of foundations - - Deep foundation: Pile, Types of piles- Causes of failure of foundation - Remedial measures **1.3 Practical Exercises *** 1.Prepare and develop a centre line plan, foundation Plan and set out spread footing in the field for the given line sketch of a building 2.Prepare and develop a centre line plan, foundation Plan and set out the layout of columns and footing in the field for the given line sketch of a building (Framed structure). 3. Study of Safe bearing capacity of soil by standard penetration test(SPT).	**3** **12**
UNIT- 2	**MASONRY**	
	2.1 STONE MASONRY Definition - Common terms used -Classification of stone masonry - Rubble masonry - Ashlars masonry - points to be considered in the	

	construction of stone masonry - Tools used(Names only) **2.2 BRICK MASONRY** Definition - Common terms used -Bond - Types Header, stretcher, English bond & Flemish bond –Features-Comparison-Points to be considered in the construction of brick masonry - Defects in brick masonry **2.3 Practical Exercises *** 4. Arrangement of bricks using English bond in one brick thick wall and half brick thick for right angled corner. 5.Arrangement of bricks using English bond in one brick thick wall and half brick thick for Tee junction 6.Arrangement of bricks using English bond in one brick thick wall and Two brick thick wall square pillars	**3** **12**
UNIT- 3	**WATER PROOFING,DOORS AND BLOCK MASONRY**	
	3.1 WATER PROOFING AND DAMP PROOFING Dampness - Causes of dampness - Effects of dampness – Damp proofing - Damp proof courses (DPC) - Water proofing coats for sump / overhead tank wall - Methods of grouting **3.2 DOORS, WINDOWS AND VENTILATORS** Standard sizes of doors and windows - Location of doors and windows - Different materials used - Doors Component parts -Types – Windows-Types -Ventilators – Definition, purpose-Types **3.3 BLOCK MASONRY CONSTRUCTIONS** Types of cement blocks-Consideration for use of hollow concrete blocks-Laying of hollow blocks-Compound walls in Block work **3.4 Practical Exercises** 7. Construct concrete block masonry wall of 1m height. 8. Cutting, hooking, cranking of specimen reinforcement bar and arrangement of reinforcement for a Lintel cum sunshade.	**3** **12**

	9.Apply two or more coats of Water proofing coats for sump / overhead tank wall on the prepared base of a given wall surface for the area of 1m x 1m using suitable brush/ rollers adopting safe practices.	
UNIT- 4	**STAIRS,FLOORS AND ROOFS**	
	4.1 STAIRS Definition - Terms used - Location of stair- types **4.2 FLOORS AND FLOORING** Floors - Definition - Types - Materials used - Selection of flooring **4.3 ROOFS** Definition - Types of roof - Technical terms – Types of trusses **4.4 Practical Exercises** 10.Cutting, hooking, cranking of specimen reinforcement bar and arrangement of reinforcement for a one way roof slab 11.Cutting, hooking, cranking of specimen reinforcement bar and arrangement of reinforcement for singly reinforced Beam 12. Cutting, hooking, cranking of specimen reinforcement bar and arrangement of reinforcement for a Column and footing	**3** **12**
UNIT- 5	**POINTING,PLASTERING AND WHITE WASHING**	
	5.1 WEATHERING COURSE Weathering course – Purpose –Laying Procedure. **5.2 POINTING** Objectives - Mortar for pointing - Types of pointing **5.3 PLASTERING** Definitions - Objectives – Methods of plastering-Defects in plastering. **5.4 WHITE WASHING, COLOUR WASHING , DISTEMPERING,** **5.5 PAINTING & VARNISHING** White washing – preparation and application –Distempering- process	**3**

	and application-Painting –preparation and application. **5.6 ANTI-TERMITE TREATMENT** Definition - objectives and uses - Methods of termite treatment. **5.7 Practical Exercises** 13. Apply two or more coats of selected paint on the prepared base of a given wall surface for the area of 1m x 1m using suitable brush/ rollers adopting safe practices. 14. Plastering with cement mortar on the prepared base of a given wall surface for the area of 1m x 1m adopting safe practices. 15. Apply the relevant termite chemical on given damaged sample of timber	**12**
Total Hours		**75**

Suggested student activities:

1. Prepare a report on stabilized mud block and preterm block masonry construction.
2. Study and present the standard size of doors, windows & ventilators for different types of buildings.
3. Study the suitability of staircases, ramps, elevators and escalators in different types of buildings.
4. Study and present advanced surface finishing textures and its suitability
5. Study and present advanced water proofing techniques and painting
6. Visit a construction site and prepare a report of laying(before, during and after)

Text Books:

1. Duggal, S.K, Building Materials, 5th Edition , New Age International (P) Limited Publishers., Jan 2019,

2. Peter A. Claisse, Civil Engineering Materials, 1st Edition, Butterworth- Heinemann, 2016,

3. Kathryn E. Schulte Grahame, Steven W. Cranford, Craig M. Shillaber, and Matthew J.

Eckelman, Essentials of Civil Engineering Materials, 1st Edition, Cognella Academic Publishing, San Diego, 2020.

Web resources:

1. www.nptel.ac.in
2. http://thebooksout.com/downloads/%20%20of%20building%20materials%20bc%20punmia%20%20ebook.
3. https://sites.google.com/a/mitr.iitm.ac.in/iitmcivil/ce2330

Equipment/Facilities required to conduct the practical course (Batch Strength : 30 students)

S.No.	List of Equipments	Quantity Required
1	Pegs, thread, Hammer, Measuring tape, Lime powder	As required
2	Steel rods, sprit level, straightedge, Trowel, string, plumb bob	As required
3	Consumables like Bricks, steel rods, string, etc	As required
4	Consumables like Water proof paints, anti-Termite chemicals	1 litre each

1G234640	ESTIMATING AND COSTING	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Students enrolled in the Civil Engineering diploma program are expected to acquire essential skills and knowledge in estimation and costing, critical for managing construction sites and overseeing development projects such as townships, residential colonies, and public buildings. Proficiency in estimation and costing involves a comprehensive understanding of various concepts, principles, and methodologies utilized in the construction industry. Throughout the course, teachers will utilize a combination of lectures, demonstrations, hands-on practical sessions, and field visits to facilitate learning and comprehension of estimation and costing principles. Emphasis will be placed on developing critical thinking, problem-solving, and decision-making skills essential for successful careers in the construction industry.

OBJECTIVES:

- Understand the fundamental ideas behind estimation and costing in construction projects
- Recognize the different methods used for estimating construction costs.
- Prepare effective budget planning for construction projects.
- Expertise in preparation of reports and writing specifications for proposed works
- Prepare bill of quantities for proposed works.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Understand the procedure of approximate estimate for various construction projects.
CO-2	Understand rate analysis for various items of works using Standard data and Schedule of Rates.
CO-3	Write Technical reports on the proposed projects
CO-4	Write specification for various items of work.
CO-5	Prepare detailed estimate of quantities of various items of works.

Pre-Requisites: Basic Science, Basic Mathematics, Physical properties of various materials.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	-	-	-	-	3	3	2
CO2	3	2	-	-	-	-	3	2	2
CO3	3	1	-	-	-	2	3	2	2
CO4	3	1	-	-	-	2	3	2	2
CO5	3	2	-	-	-	-	3	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- The teachers are expected to drive the attention of the students to improve the student's learning ability.
- Assist the students in learning and appreciating the concepts and objectives of estimating and cost analysis of the projects they come across.
- Making the students expertise in the subject by arranging suitable activities for all the topics.
- Activity based demonstration for better understanding.
- Guide the students to correct work on an activity where there could be source of errors.

1G234640	ESTIMATING AND COSTING	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	INTRODUCTION	
	1.1 ESTIMATE: Estimation – Definition of Estimate – Approximate estimate – Detailed estimate - Main estimate - Revised estimate – Supplementary estimate – Sub estimate – Annual maintenance estimate – Repair estimate – Complete estimate. **1.2 APPROXIMATE ESTIMATES:** Necessity – Types – Plinth area method – Cubical content method – Service unit method – Typical bay method. **Practical exercises :** 1. Prepare approximate cost for a proposed building comparing the cost of an existing one and considering the cost of escalation in materials and labour by Plinth area method. 2. Prepare approximate cost for a proposed building comparing the cost of an existing one and considering the cost of escalation in materials and labour by cubical content method. 3. Prepare approximate cost for a proposed building comparing the cost of an existing one and considering the cost of escalation in materials and labour by Service Unit Method.	3 4 4 4
UNIT- 2	**MEASUREMENTS & MATERIAL REQUIREMENTS,PREPARATION OF DATA**	
	Units of measurements for works and materials – Degree of accuracy in measurements -Deduction for openings in masonry, plastering andwhitewashingarea–Paintingco-efficient–outturnofworks-workingout of materials requirements – cement, sand, bricks, aggregates etc.based on thumb rules for different works.	3

	2.2 PREPARATION OF DATA Data–Types–Main and sub data–Observed data–lead statement-Schedule of rates – Standard data book – Sundries – Lump sum provision – Preparation of data using standard data and schedule of rates. **Practical exercises:** 4. Prepare the list of items to be executed with units for detailed estimate of a given structure from the given drawing. 5. Prepare data for the given items of work with necessary sub data.	4 4
UNIT- 3	**SPECIFICATION AND REPORT WRITING**	
	3.1SPECIFICATION: Specification – Necessity – Types of specifications – Essential requirements of specifications – Specification for various materials like Cement, Sand, Brick, Timber, Reinforcement Steel, Stone Aggregate, Water - Specifications for various items of works – General Specifications for a building - Culvert - Concrete Roads . **3.2 REPORT WRITING:** Report writing – Definition – Necessity of report- Points to be considered while writing a report- Documents to accompany the report. **Practical exercises:** 6 .Prepare a report on market rates for given material, labour wages hire charges of tools &equipment required to construct the given structure. 7. Prepare detailed Specification for Earthwork, Foundation concrete, R.C.C in Beam, R.C.C in Slab and Column.	3 4 4
UNIT- 4	**DETAILED ESTIMATE**	
	Introduction - Taking off Quantities: Systems – Trade system – Group system – Methods – Long wall and Short wall method – Centre line method– Preparation of data – Lump sum provision and contingencies– Quantity	3

	surveyor – Duties – Essential Qualities. **Practical exercises(Trade system):** 8. Prepare detailed estimate for the given set of drawings using standard measurement sheet for load bearing residential structure using description of item from 1BHK building. 9. Prepare detailed estimate for the quantity of items of work from the given set of drawings using standard measurement sheet for RCC framed structure using description of item 1BHK building. 10. Prepare detailed estimate for the given Septic tank. **GROUP SYSTEM:** Introduction –Advantages of group system – Taking off, squaring dimensions – Abstracting and Billing. (Definitions only).-Dimension paper format.	4 4 4
UNIT- 5	**VALUATION**	
	CHAPTER: 5.1 VALUATION Purpose of valuation – Types – Book value – Market value – Salvage value – Scrap value – Depreciation – Obsolescence – Sinking fund –Land valuation – Mortage & Lease – Problems on valuation – Annuity –Definition & types only. **CHAPTER: 5.2 RENT CALCULATION** Fixation of rent – Outgoing – Gross & Net income – Years‟ Purchase –Capital cost – Standard rent – Market rent – Economical rent – Problems on rent calculation. 11.A owner occupied property is required to be valued for the wealth tax purpose on land and buildings.The following particulars are available.Find the present value of the property. Value of the land Rs.5,50,000 Cost of building Rs.15,00,000 Age of the building 40 years Estimated cost of repairs Rs.60,000 Depreciation to be allowed 0.8% per annum. 12.Calculate the fair rent for a building to be used for residential purposes	4 4 4 4 4

	from the following data Cost of building at the present market rate Rs.4,50,000 Age of the building 20 years Materials used RCC and teak wood Area of the plot : 200m^2 Cost of land Rs.1500/ m^2 Sanitary, water supply amenities and electrical fittings Rs.50, 000	
Total Hours		75

Suggested student activities

1. Quiz.
2. Group discussion.
3. Seminar.
4. Surprise tests.
5. Laboratory tests on materials.
6. Class assignments.

Reference Books:

1. B.N. Dutta, Estimating and Costing in Civil Engineering, 28th edition , CBS Publishers and distributors Pvt. Ltd., 30 December 2020
2. M. Chakraborti, Estimating, Costing, Specification and Valuation in Civil Engineering, 24th Edition, M.K. Publishers and distributors Pvt Ltd., 2010
3. Rangwala, Estimating, Costing and Valuation, 17th edition , Charotar Publishing House Pvt. Ltd., 1 January 2017

Web resources:

1. Estimation of Building - https://www.youtube.com/watch?v=lOUt8b-PzuU
2. How To Prepare Construction Cost Estimation Format In Excel For Projects https://www.youtube.com/watch?v=iRFjOwaMYdA
3. How To Calculate Material Cost - https://www.youtube.com/watch?v=HpNLucXrc54
4. Estimation using Center Line Method - https://www.youtube.com/watch?v=grJ8YLOk8kI

V TERM

1G235110	DESIGN OF R.C.C STRUCTURES (LIMIT STATE METHOD)	L	T	P	C
THEORY		4	0	0	4

INTRODUCTION:

This is a core subject which covers broad elements of RCC design of various structural elements. Diploma holders in Civil Engineering will be required to supervise RCC construction. They may also be required to design simple structural elements and make changes in design depending upon the availability of materials (bars of different diameters).

This subject thus deals with elementary design principles as per Indian Standard practice IS:456 - 2000 by limit state method.

OBJECTIVES:

The objectives of the course is to enable the students to

- Analyse and design simple RCC elements like singly, doubly reinforced rectangular beams, and singly reinforced simply supported T-beams for flexure and shear.
- Design One way/ two ways simply supported slabs.
- Design axially loaded Columns and Footings.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Demonstrate the basic concepts of reinforced cement concrete and the design of beams for flexure.
CO-2	Describe the design of rectangular beams for shear and designing of staircase.
CO-3	Analyse the T- beams and continuous beams and design for flexure.
CO-4	Design the one-way and two way slabs.
CO-5	Explain the design of columns and column footings.

Pre-Requisites:

Mechanics of Materials and Mechanics of Structures.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	-	2	-	3	3	2
CO2	3	3	2	-	2	-	3	2	2
CO3	3	3	2	-	2	-	3	2	2
CO4	3	3	2	-	2	-	3	2	2
CO5	3	3	2	-	2	-	3	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- This subject is introduced so that diploma holder in Civil Engineering may appreciate the concepts and principles of RCC structural elements of buildings and are able to apply the knowledge gained through the subjects of mechanics of materials and mechanics of structures. The design of simple structural elements like beams, slabs, column and footings will be demonstrate to the students to expose them in the field.
- Teacher should give simple exercises involving the applications of various concepts and principles being taught in the subject.
- Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve the tutorial problems independently and visit to local construction site to understand the behavior and uses of structural elements.
- Teacher may conduct weekly small quiz sessions to know the students' level of understanding.

1G235110	DESIGN OF RCC STRUCTURES (LIMIT STATE METHOD) 1G2350110	L	T	P	C
THEORY		4	0	0	4
	END TERM PATTERN	THEORY			
UNIT- 1	INTRODUCTION TO LIMIT STATE METHOD OF DESIGN IN CONCRETE				
	1.1INTRODUCTION TO LIMIT STATE METHOD OF DESIGN IN CONCRETE. Reinforced Cement Concrete Materials used in R.C.C and their basic requirement- Purpose of providing reinforcement-Different types and grades of cement and steel - Characteristic strength and grades of concrete as per IS 456 - 2000. Limit State Method - Concept -Advantages- Different limit states Characteristic strength and design strength of materials - Characteristic loads and design loads - Partial safety factors for loads and material strength - Limit state of collapse in flexure - Assumptions -Limiting values of neutral axis of singly reinforced section for different grades of steel - Moment of resistance of singly and doubly reinforced rectangular sections- Problems. **1.2 DESIGN OF RECTANGULAR BEAMS FOR FLEXURE:** Design requirements-Effective spans of cantilever and simply supported beams - Breadth and depth requirements of beams - Control of deflection - Minimum depth requirement for stiffness-Minimum concrete cover to reinforcement steel for durability and fire resistance - Minimum and maximum areas/ spacing for main reinforcement and side face reinforcement as per IS 456 -2000- Development Length - Anchorage values of bends and hooks - Curtailment of reinforcements- Design bending moments - Design of singly and doubly reinforced rectangular beams (Cantilevers and Simply supported beams carrying udl only)- Problems.				12
UNIT- 2	DESIGN OF RECTANGULAR BEAMS FOR FLEXURE AND SHEAR				
	2.1 DESIGN OF BEAMS FOR SHEAR:				12

	Limit state of collapse in shear - Design shear strength of concrete - Design shear strengths of vertical / inclined stirrups and bent up bars - Principle of shear design - Critical sections for shear- S.F Coefficients specified by IS:456-2000 - Nominal shear stress - Minimum shear reinforcement - Design of rectangular beams using vertical stirrups by limit state method. **2.2 PLANNING OF STAIRCASE:** Types of stairs – Effective span of stairs as per IS code – Classification based on structural behaviour –standard dimensions- Planning of dog legged staircase.	
UNIT- 3	**DESIGN OF T-BEAMS AND CONTINUOUS BEAMS**	
	3.1 DESIGN OF T-BEAMS FOR FLEXURE: Cross sections of Tee and L-beams- Effective width of flange- Neutral Axis and M.R of Singly Reinforced T-Sections- Design of singly reinforced T-beams for flexure-Problems on Simply supported T- beams carrying udl only. **3.2 DESIGN OF CONTINUOUS BEAMS FOR FLEXURE:** Methods of analysis of continuous beams- Effective Span- Arrangement of Loading for Critical Bending Moments- B.M coefficients specified by IS:456-2000-Design of rectangular continuous beams (Singly Reinforced) using B.M. coefficients (equal spans &u.d.l only) for sagging and hogging moments.	12
UNIT- 4	**DESIGN OF SLABS**	
	4.1 DESIGN OF ONE WAY SLABS: Classification of Slabs Effective spans - Loads (DL and IL) on floor/roof slabs and stairs (IS:875-1987) - Strength and Stiffness requirements - Minimum and maximum permitted size, spacing and area of main and secondary reinforcements as per IS 456 - 2000- Cover requirement to reinforcements in slabs- Design of cantilever/simply supported one way slabs by limit state	12

	method - Check for shear and stiffness. **4.1 DESIGN OF TWO WAY SLABS:** Introduction -Effective spans -Thickness of slab for strength and stiffness requirements - Middle and Edge strips - B.M coefficients as per IS:456 for Simply supported and Continuous slabs - Design of simply supported two way slabs.	
UNIT- 5	**DESIGN OF R.C.C. COLUMNS AND COLUMN FOOTINGS**	
	5.1 DESIGN OF R.C.C. COLUMNS: Limit state of collapse in compression - Assumptions - Limiting strength of short axially loaded compression members - Effective length of compression members - Slenderness limits for columns - Classification of columns - Minimum eccentricity for column loads - Longitudinal and Transverse reinforcement requirements as per I S 456-2000 - Cover requirement – Design of axially loaded short columns with lateral ties. **5.2 DESIGN OF COLUMN FOOTING:** Basic requirements of Footings-Types of R.C footings - Minimum depth below GL- Footings with uniform thickness and varying thickness (sloped footing) – Critical sections for BM, Transverse/Punching Shears – Minimum reinforcement - Development length, Anchorage, Cover, Minimum edge thickness requirements as per IS 456- 2000 – Design of Isolated square and rectangular footings.	12
Total Hours		60

Suggested student activities:

- Visits to nearby construction site and study about
    1. Foundation and Footings.

2. Column reinforcements.
3. Grade beam and lintel level beam reinforcement arrangements.
4. Reinforcement details for beams and slabs

- Study the bar bending details of structural drawings.
- Learning the reinforcement arrangements given in SP-34 (Hand book on concrete reinforcement and detailing)

Text Books:

1. B.C.Punmia "Limit state Design of Reinforced concrete"revised edition, Lakshmi publications, Delhi, 2016
2. P.C.Varghese "Limit state design of reinforced concrete", 2nd edition PHI Learning Pvt. Ltd, 2008
3. S.S.Bhavikatti "Design of RCC and structural elements", 1st edition, New age International Publications, 2016
4. IS 456 -2000, IS 875-1987, IS 800-2007 , BIS.

Web resources:

Limit state method :
https://youtu.be/jhVh4qNa_x8?si=YNSfiPtXo1DDZANC

Analysis of singly reinforced beams : https://youtu.be/o4-EAjGhzSw?si=IlD2GPM_ZcvIqx3e

Design of flanged beams in flexure : https://youtu.be/BOtUb1yk8sI?si=RSfF6k9F_SHnZium

Design of slabs : https://youtu.be/TQLehidE6Hc?si=eTEtZDufiXFmvp9-

Design of columns :https://youtu.be/n-D56dTyiyk?si=SGY0E46YRd1LZucG

1G235211	MECHANICAL ,ELECTRICAL AND PLUMBING SERVICES	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Diploma holders in Civil Engineering are expected to coordinate with Mechanical, Electrical and Plumbing works in a structure while construction. Apart from Civil Engineering, some of the topics dealing with HVAC, Electrical and plumbing are discussed in this subject to impart theoretical knowledge to the students.

OBJECTIVES:

The objectives of the course is to enable the students to

- Mechanical systems encompass heating, ventilation, and air conditioning (HVAC), ensuring indoor comfort and air quality.
- Electrical systems for designing power distribution, lighting, and security systems, ensuring a safe and efficient electrical supply.
- Plumbing systems incorporated water supply, drainage, and fire protection systems, ensuring proper sanitation and safety measures.
- Calculate Heat load, Electrical panel schedule and assigning size of a pipe.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Describe the MEP services and its importance
CO-2	Encompass the heating, ventilation, and air conditioning (HVAC) systems.
CO-3	Aspect of installation of electrical wiring, lighting, power distribution, and safety systems
CO-4	Know the Plumbing system deals with water supply, drainage, sewage, and fire fighting systems.
CO-5	Calculate the Heat load for HVAC, Electrical panel schedule and assigning size of a pipe used in plumbing

Pre-Requisites: Environmental Engineering

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	2	-	3	3	2	1	1	2
CO2	2	2	-	3	3	2	1	1	2
CO3	2	2	-	3	3	2	1	1	2
CO4	2	2	-	3	3	2	1	1	2
CO5	2	2	-	3	3	2	1	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- This subject introduced to the Diploma students to expose the MEP (Mechanical, Electrical, and Plumbing) works that will be installed in a building for effective functioning of various services.
- Nowadays, the diploma Engineers also expected to carried out these works during construction with the help of other services personnel. Hence this subject gains importance now to learn the basics of MEP.
- Faculty should give simple exercises involving the applications of various concepts and principles being taught in the subject.
- Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged / guided to solve the tutorial problems independently and visit to local construction site to understand the behaviour and uses of MEP.
- Faculty may conduct weekly small quiz sessions in every week to know the students' level of understanding

1G235211	MECHANICAL ,ELECTRICAL AND PLUMBING SERVICES	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	THEORY			
UNIT- 1	INTRODUCTION TO M.E.P				
	Introduction to MEP – MEP services - Scope, Importance and future application – Types of building - Introduction to AutoCAD, Revit software and other software's – Study of building components	6			
UNIT- 2	HVAC SYSTEM DESIGN				
	Introduction to HVAC- scope, importance and future- functions of HVAC systems – heating – ventilation and air-conditioning – Codes and standards – ASHRAE, ISHRAE, IMC- Ducts and its types, Duct fittings, Flexible ducts etc. Duct elbows selections, Vanes, dampers and their importance - Duct designing methods (manual calculations) using Equal friction/Velocity reduction method-Pipe sizing methods- Chilled water pipe sizing, Pump size – Introduction to Software's – MACQUAY, HAP, Trane Trace 700.	9			
UNIT- 3	ELECTRICAL SYSTEM DESIGN				
	Introduction to Electrical system-Symbols-NEC codes-Types and selection of wiring systems, wires and cables - Lighting, power circuit -Types of Light fittings and power sockets- wiring diagrams- sensors and applications- Conduit Layout Design, Lighting and Power load estimation - Load balancing- Types and selection of Circuit Breakers and underground cables- UPS & Inverters- Fire protection and Alarm System - Earthing and lightning protection system- Introduction to software – Electrical system drafting(CAD) and modeling(Revit), Comcheck, Visual, Dialux	9			
UNIT- 4	PLUMBING SYSTEM DESIGN				
	Fundamentals of plumbing system - fixtures, faucets & fixture fittings – IPC code and symbols - External & internal water supply and return system – Sanitary	9			

	drainage system - vent pipe system - Storm water drainage system – Gas line – Fire Fighting Systems – Fire Extinguishers and sprinkle system – Dry & wet riser systems – pipe selection and sizing.	
UNIT- 5	**CALCULATION FOR HVAC, ELECTRICAL AND PLUMBING**	
	HVAC: Heat Dissipation – Internal Heat Load – External Heat Load – Temperature differential – outside temperature – Inside temperature - Heat load calculation for a building. **ELECTRICAL FOR A BUILDING:** Lighting, ceiling fan, receptacles watts - Panel schedules for a building. **PLUMBING:** Velocity pressure - Pipe selection and Sizing for a building.	12
Total Hours		45

Suggested student activities:

- Visits to nearby construction site and study about
    1. HVAC.
    2. Electrical works.
    3. Plumbing works.
- Study the MEP drawings.
- Do MEP design for a small building.

Text Books:

1. Walter T. Grondzik, Alison G. Kwok and Benjamin Stein," Mechanical and Electrical Equipment for Buildings" 11th edition, Wiley Publisher, 2009
2. A K Mittal," Electrical and Mechanical Services in High Rise Buildings" 2nd edition, CBS Publishers & Distributors, 2015.
3. Allan R. Hambley," Electrical Engineering: Principles & Applications", 6th edition, Pearson Education ,India, 2016

Web resources:

1. https://www.youtube.com/watch?v=zjfLuiMk16g
2. https://www.youtube.com/watch?v=FwGay2rhEFQ
3. https://www.youtube.com/watch?v=NcvwKxKzzmw.
4. https://www.youtube.com/watch?v=bsdt310LESw
5. https://www.youtube.com/watch?v=Y3wLzo-nIX4
6. https://www.youtube.com/watch?v=6Z5ymsIdkh0

1G235212	IRRIGATION AND WATER RESOURCES ENGINEERING	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Diploma holders in civil engineering have to supervise the construction, repair and maintenance of canals, head works, cross drainage works, regulatory and other works. Some of diploma holders are also engaged for preventing water logging and irrigation by various methods. This subject imparts knowledge regarding basics of Irrigation, Methods of Irrigation, soil water plant relationship, Crop water Requirement, Hydrology, Ground water, constructional features of head works, cross drainage works, causes and prevention of water logging.

OBJECTIVES:

The objectives of the course is to enable the students to

- Understand the concept of necessity of irrigation in India.
- Recognize different crops and their water requirements.
- Know about rainfall and runoff.
- Understand the components of hydrological cycle and hydrograph. Understand the occurrence of ground water and ground water exploration methods.
- Know about measurement of rainfall and read rain gauges and hydrographs.
- Monitor construction and maintenance work of canal and canal linings.
- Supervise maintenance and construction work of canal head works and cross regulators.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Describe the different methods to increase the yield of Crops, various methods of irrigation and their suitability
CO-2	Explain the soil-water plant relationship, water requirements of crops and cropping pattern in India
CO-3	Explain the concept of Hydrology, measurement of rain gauge , ground water resources and measurement of yield of well
CO-4	Design the different hydraulic structures like dams, spillways, weir and Barrages and

	the concepts of maintenance shall also form part.
CO-5	Describe about the construction and maintenance work of canal and canal linings, canal head works and cross regulators

Pre-Requisites: Nil

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	1	2	2	2	2	2
CO2	3	3	1	1	2	2	2	2	2
CO3	3	3	1	1	2	2	2	2	2
CO4	3	2	1	1	2	2	1	2	2
CO5	3	2	3	1	2	2	1	2	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological application.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G235212	IRRIGATION AND WATER RESOURCES ENGINEERING	L	T	P	C
		3	0	0	3
THEORY	END TERM PATTERN	THEORY			
UNIT- 1	IRRIGATION AND ITS METHODS				
	1.1INTRODUCTION: Definition of Irrigation – Water resources in India – Necessity - Benefits of Irrigation – Ill-effects of Irrigation – Types of Irrigation - Command area development - Impact of irrigation on environment **1.2 METHODS OF IRRIGATION:** Function of Irrigation water – Standards of Irrigation water - Methods of applying water to crops – Surface irrigation - Uncontrolled flooding – Free flooding – Contour Laterals – Border strip method – Check flooding – Basin flooding – Zig-Zag method – Furrow method – Contour farming – Sub-Surface Irrigation – Micro irrigation - Drip Irrigation – Sprinkler irrigation				3 6
UNIT- 2	SOIL WATER PLANT RELATIONSHIP AND WATER REQUIREMENTS OF CROPS				
	2.1 SOIL WATER PLANT RELATIONSHIP : Soil-water plant relationship - Soil moisture contents- Depth of soil water available to plants- Infiltration - Permanent and Ultimate Wilting point – Soil Fertility. **2.2 WATER REQUIREMENTS OF CROPS:** Depth and Frequencies of Irrigation - Duty and Delta of water - Factors affecting duty - Problems - Command area and Intensity of Irrigation - Consumptive use of water and Evapo-Transpiration - Irrigation Efficiencies - Problems - Crops and crop seasons in India - Cropping pattern - Crop Rotation - Assessment of Irrigation water.				3 6
UNIT- 3	HYDROLOGY AND GROUND WATER				
	3.1HYDROLOGY : Introduction - Definition -Application of Hydrology in engineering – Hydrological				6

	cycle - Precipitation - forms of Precipitation - measurements of rain fall - Rain gauge - Types of rain gauges - Rain gauge network - Mean rainfall over a drainage Basin - Methods - Radar and Satellite Measurements of rainfall runoff -Estimation of runoff - Losses - Hydrograph - Unit Hydrograph- Uses. **3.2 Ground Water :** Ground water resources- Zones of Ground water-Aquifer - Types- Terms used - porosity, permeability, yield, specific yield, specific retention, coefficient of storage, specific capacity - Measurement of yield of well - Pumping test- Recuperation test- Ground water exploration.	3
UNIT- 4	**DAMS, SPILLWAYS AND DIVERSION HEAD WORKS**	
	4.1 :DAMS AND SPILLWAYS: Classification of Dams – Comparison of Earthen and Gravity Dams - Earthen Dams – Components and their function, typical cross section - Types of failures of earthen dams and remedial measures - Gravity Dams - Typical cross section - Drainage gallery – Spillways –Definition, function, location and components – Types. **4.2DIVERSION HEAD WORKS :** Diversion Head Works - Components, layout, function and types - canal head regulator, silt excluders and silt ejectors. Barrages – components and their function - Difference between weir and barrage.	6 3
UNIT- 5	**IRRIGATION CHANNELS, CROSS DRAINAGE WORKS AND CANAL REGULATION**	
	5.1 DESIGN OF IRRIGATION CHANNEL: Canals - Classification of canals - Design of the most economical canal section – Comparison of Kennedy's silt theory and Lacey's regime theory - Canal lining – Definition - Types and advantages of canal lining - Properties of good canal lining material – Water Logging – Causes of Water-Logging – Remedial Measures. **5.2 CROSS DRAINAGE WORKS AND CANAL REGULATION WORKS:**	6 3

	Cross Drainage Works (CD Works) – Types of CD works – Canal Fall – Canal Escapes – Cross regulator and Distributaries head regulator - Canal Outlet.	
Total Hours		45

Suggested student activities:

- Presentation/Seminars by students on any recent technological developments based on the Irrigation
- Periodic class quizzes conducted on a weekly/fortnightly based on the course
- Prepare Models of dams/ spillways
- Compare various irrigation methods and identify the suitable irrigation method for the various crops.
- Presentation/Seminars by students on the necessities of cross drainage works and canal regulation work

Text Books:

1. Santhosh Kumar Garg, Hydrology and water resources engineering, 25th edition, khanna publishers, Delhi, 2018
2. K.Subramanya, Engineering hydrology, 5th edition, Tata McGraw-Hill publishing company ltd., New Delhi, 2020.
3. B.C. Punmia, Ashok Kumar Jain ,Arun Kumar Jain ,Pande Brij Basi Lal ,Introductory Irrigation Engineering, 17th edition, Laxmi Publication, Delhi, 2021

Web resources

1. Introduction : https://youtu.be/ibzY0LjHu38
2. Soil Water : https://youtu.be/mg6UoXcBkyA
3. Crop Water Requirements : https://youtu.be/e7pckUDQ9oI
4. Evapo-transpiration : https://youtu.be/tSA18XoqMVQ
5. Irrigation Efficiencies : https://youtu.be/rZ4c-nB0ukQ
6. Sprinkler Irrigation : https://youtu.be/tZ1K3PFF0NU
7. Drip Irrigation :https://youtu.be/aMPRw71MIyw

1G235213	DEFECTS IN BUILDING AND REMEDIES	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

This course is framed to offer an inclusive introduction to the field of Construction and Maintenance of Civil Engineering Infrastructure to catering essential knowledge through various sub-disciplines with in this field. It is tailored to meet the educational requirements typically outlined in the syllabus for diploma studies in Civil Engineering. A diploma holder in Civil Engineering is expected to acquire the knowledge and training to supervise and construct the building and to detect the defects in building and remedies. They should also be aware of the maintenance of building in effective manner.

OBJECTIVES:

The objectives of the course is to enable the students to

- Classify the type of cracks.
- Understand the causes of cracks in building.
- Know the methods of maintenance of building.
- Examine the defects in building and
- Study the assessment methodology of damaged building.
- Choose the suitable repairing materials required for damaged building.
- Understand the methods and inspection technique required for damaged building.
- Have knowledge of repair and strengthening of RCC members.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Detect the reason for cracks and method of maintenance required in building.
CO-2	Observe the defects in building and their assessment methodology.
CO-3	Select the suitable repairing materials needed for damaged building.

CO-4	Examine the methods and inspection technique required for damaged building.
CO-5	Be familiar with repair and strengthening of RCC members.

Pre-Requisites: **Construction Materials and Practice**

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	1	1	2	3	1	3	3	2
CO2	3	1	1	2	3	1	3	3	2
CO3	3	1	1	2	3	1	3	3	2
CO4	3	1	1	2	3	1	3	3	2
CO5	3	1	1	2	3	1	3	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Engage and Motivate: Teachers should actively engage students to boost their learning confidence.
- Real – world Relevance: Teachers are expected to physically show various causes of development of cracks while imparting the instructions. Students should be encouraged to collect the various reasons for the development of cracks and failure of RCC structure.
- Interactive Learning: Teachers are expected to organize demonstration and field visits to show about the various operations involved in the repair and rehabilitation of RCC structures.
- Application – Based Learning: Throughout the course, a theory demonstrates – practice – activity strategy may be used to ensure the outcome of the learning is employability- based one.
- Simulation and Real–World Practice: In addition to the theoretical instructions, different activities pertaining to the simulated Environment, transitioning to real – world scenarios when possible, like expect lectures, seminars, visits to Construction plant may also be organized.
- Encourage Critical Analysis: Foster an environment where students can understand the experiment outcomes and infer the potential sources of error in case of any discrepancies.

1G235213	DEFECTS IN BUILDING AND REMEDIES	L	T	P	C
		3	0	0	3
THEORY	END TERM PATTERN	THEORY			
UNIT- 1	CRACKS IN BUILDINGS AND MAINTENANCE				
	Cracks – Definition - Reasons for cracks in concrete - Classification of cracks - Wall cracks - Micro cracks - Macro cracks - Plastic shrinkage cracks - Plastic settlement cracks - Drying Settlement cracks - Thermal cracks - Map cracks due to alkali aggregate reaction - Longitudinal cracks due to corrosion - Transverse cracks due to loading - Shear cracks due to loading. Maintenance – Definition-Objective of maintenance - Maintenance Services - Safety of Buildings - Classification of Maintenance – Names only.				9
UNIT- 2	DEFECTS IN BUILDING AND THEIR ASSESSMENT				
	Defects – Definition - Damage assessment procedure - Visual observation - Sketches of typical defects found by visual inspection - Testing of concrete - Quality Control tests - Slump tests - Compression test - Non-destructive test - Rebound / Schmidt hammer test - Ultrasonic Pulse Velocity Test - Acoustic Emission Test - Cover thickness survey - Rapid Chloride Permeability Test – Sorptivity Test - Core sampling and testing – Precautions during core drilling.				9
UNIT- 3	METHODS AND INSPECTION TECHNIQUES				
	Inspection – Definition - First Survey - Second Survey - Carbonation test - Corrosion of reinforcing bars - Assessment of cracks - Assessment of evidence of water leakage - Deterioration of concrete strength - Assessment of a large deflection - Assessment of surface deterioration - Third Survey - Corrosion of beam – Cracking - Water leakage - Large deflection - Surface deterioration.				9
UNIT- 4	REPAIRING MATERIALS FOR RCC MEMBERS				
	Repair – Definition - Repair materials - Criteria for selection of repair materials - Methodology for selection of repair materials - Material properties - Factors				9

	affecting the selection of a repair material - Essential parameters for repair materials - Classification of repair materials - Patch repairing - Cement patching mortar and concrete - Polymer concrete and mortar - Epoxy resin mortar and concrete - Quick setting compounds – Ferrocement – SIFLON – SIMCON – Grouts – Shotcrete - Bonding agents.	
UNIT- 5	**REPAIR AND STRENGTHENING OF RCC MEMBERS**	
	Rehabilitation – Retrofitting – Definition - Crack injection repair to concrete structures - Epoxy resins - Polyurethane resins – Jacketing - Plate bonding - Strengthening of foundation - Techniques to restore original strength of Columns, Beam and Slabs – Stitching - Repair procedure for corrosion damaged elements - Treatment of distressed floor in Toilets / Kitchen - Strengthening solution using FRP Plates.	9
Total Hours		45

Suggested student activities:

- Prepare a report of a field visit to nearby construction site.
- Prepare a report of a field visit to nearby damaged building.
- Study the development of cracks in the existing building and prepare the report.
- Study the causes of collapse of existing building and prepare the report.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.

Text Books:

1. R.N. Raikar, Learning from Failures, Dhanpatrai& Sons, New Delhi, 2008.
2. K.S.Jagadish, B.Reddy,V. Venkatarama&Rao, K.S. Nanjunda, Alternative Building Materials and Technologies, New Age Publisher, New Delhi, 2007.
3. Dr.S.Thirugnanasambandam, Building repairs and maintenance, Annamalai University, Tamil Nadu, 2023

Web resources

1. https://www.academia.edu/33846701/General_Building_Defects_Causes_Symptoms_and_Remedial_Work
2. https://www.irjet.net/archives/V6/i3/IRJET-V6I31180.pdf
3. https://www.bd.gov.hk/en/safety-inspection/building-safety/index_bsi_defects.html

1G235214	URBAN PLANNING AND DEVELOPMENT	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Urban planning and development also known as town planning, city planning, regional planning, or rural planning in specific contexts, is a technical and political process that focuses on the development and design of land use and the built environment. Urban planning focuses on the physical layout of cities, including buildings, roads, parks, and public spaces. It considers how different activities (residential, commercial, and industrial) are distributed within the urban area. Urban planning aims to enhance the quality of life for residents by addressing social needs and equity. In the late 20th century, the concept of sustainable development gained prominence. It aims to meet present needs without compromising the ability of future generations to meet their own needs.

OBJECTIVES:

The objectives of the course is to enable the students to

- Introduction to urban planning development understanding the basic terms and principles of town planning.
- Gain knowledge about housing agencies.
- Familiarize students with the master plan and deplaning.
- Students can able to understand the basic functions of traffic management.
- Awareness of advancement in town planning.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Understand the principles of town planning and surveys
CO-2	To know the requirements of housing and slum clearance
CO-3	Prepare master plan and re planning of existing towns
CO-4	Understand the requirements and types of urban roads and traffic management

CO-5	Describe the various policies and schemes of town planning and sustainable development planning.

Pre-Requisites: **Knowledge of basic science.**

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	3	-	2	3	3	1	2
CO2	3	-	2	2	-	-	3	1	2
CO3	3	2	3	-	2	3	2	1	2
CO4	2	2	2	2	-	2	2	1	2
CO5	2	-	3	-	-	3	2	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

1. It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
2. To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
3. The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
4. Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome and employability-based.
5. Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G235214	URBAN PLANNING AND DEVELOPMENT	L	T	P	C
		3	0	0	3
THEORY	END TERM PATTERN	THEORY			
UNIT- 1	TOWN PLANNING PRINCIPLES				
	1.1 General - Evolution of planning - Objects of town planning – Economic justification for town planning - Principles of Town planning - Necessity of town planning – Types Of Urban Planning **1.2** Surveys – Zoning - Origin of towns - Growth of towns – Stages in town development - Distribution of land - Forms of planning - Site for an ideal town - Requirements of new towns - Planning of a modern town - Cost of Town planning - Present position of Town Planning in India				9
UNIT- 2	HOUSING AND SLUMS				
	2.1 HOUSING General - Importance of housing - Demand for houses - Building site - Requirements of residential buildings -Classification of residential buildings - Design of residential areas - Rural Housing - Agencies for housing - Investment in housing - HUDCO – CIDCO - Housing problems in India. **2.2 SLUMS** General - Causes of slums - Characteristics of slums - Effects of slums-Slum clearance - Problems in removing slums - Resources for slum clearance- Programmes - The Indian slums.				9
UNIT- 3	MASTER PLAN AND RE-PLANNING OF EXISTING TOWNS				
	3.1 MASTER PLAN General – Objects – Necessity - Factors to be considered - Data to be collected - Drawings to be prepared - Features of master plan- Planning standards – Report – Stages of preparation – Method of Execution - Conclusion. **3.2 RE-PLANNING**				9

	General - Objects of re-planning – Analyzing the defects of existing towns- Urban renewal projects- merging of suburban areas– Decentralization - Satellite Towns – Smart cities Planning- definition and features.	
UNIT- 4	**URBAN ROADS AND TRAFFIC MANAGEMENT**	
	4.1 URBAN ROADS: General - Objects - Requirements of good city road – Factors to be considered - Classification of urban roads - Types of street systems - Through and By-pass roads - Outer and inner ring roads - Expressways -Freeways - Precincts - Road aesthetics. **4.2 TRAFFIC MANAGEMENT** General - Object - Traffic survey - Traffic congestion - Traffic control – Traffic diversion - Road junction - Parking - Traffic capacity of road - One way traffic - Road traffic problems - Use of islands and flyovers at crossings - causes of road accidents - Traffic signal - Road sign -Road marking.	9
UNIT- 5	**BUILDING BYE LAWS & SUSTAINABLE PLANNING**	
	5.1 BUILDING BYE LAWS: General-Objects of bye-laws- Importance of bye-laws – Function of local authority – Plot coverage –Set back- Floor space index- Development control rules –General rules of metropolitan Area –CMDA rules – Tamil Nadu Combined Development And Building Rules – 2019. **5.2 SUSTAINABLE PLANNING:** Urban Development Missions in India - Sustainable Planning Techniques - Social Infrastructure - Green Buildings - Sustainable Building Planning - Urban Planning Using Remote Sensing - Industrial Corridors.	9
Total Hours		45

Suggested student activities:

- Presentation/Seminars by students on any recent technological developments in Urban Planning and Development
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Presentation/Seminars by students on the Urban Development Missions in India.

Text Books:

1. K.S.Rangwala and P.S.Rangwala,. “Town Planning”,Charotar Publishing House,15th Edition,1999.
2. Tumlin Jeffrey, "Sustainable Transportation Planning” Tools for Creating Vibrant Healthy and Resilient Communities", John Wiley And Sons, 2012.
3. “National Building Code of India”- Part-III.(2005).

Web resources

1. **Town Planning Principles: https://Youtu.Be/6N-1kww0-Mq?Si=Cwka_Pup7-Bzayu0**
2. **Housing and Slums: https**
3. **Master Plan and Re-Planning Existing Towns:https://Youtu.Be/Kxawhd34jpy?Si=Saxvbl8opqor0csn**
4. **Urban Roads and Traffic Management https://Youtu.Be/Rmtdmbpb6pa?Si=0roxjkhjuqufygkg**
5. **Sustainable In Town Planning https://Youtu.Be/XE_2dbcaoh0?Si=Qnxnawtoejukkewy**

1G235215	BUILDING BYE LAWS- AND STATUTORY DRAWINGS	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

This course provides an in-depth understanding of building bye-laws, regulations, codes, statutory drawings, Vaastu that govern the construction and maintenance of buildings. Students will learn about the legal framework, safety standards, and environmental considerations involved in building design and construction.

OBJECTIVES:

The objectives of the course is to enable the students t

- Understand the fundamental principles of bye-laws in India.
- Explore the legal framework governing construction practices, including permit procedures and regulatory compliance.
- Gain insight into the role of regulatory bodies and their enforcement mechanisms in ensuring building safety and sustainability.
- Learn to interpret and apply structural design standards, fire safety regulations, and environmental considerations in building projects.
- Develop practical skills for navigating the complexities of building bye-laws through case studies and real-world scenarios.
- Acquire knowledge of ethical and professional responsibilities in upholding building regulations and safety standards.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Understand the fundamental principles of building bye-laws in India.
CO-2	Interpret and apply relevant building regulations, including permit procedures and compliance standards. Evaluate building plans and designs to ensure compliance with legal and regulatory requirements.

CO-3	Analyse structural design principles, fire safety regulations, and environmental considerations in building projects.
CO-4	Demonstrate proficiency in drafting statutory drawings and documentation required for building permits. Contribute positively to the development of safe, sustainable, and compliant built environments.
CO-5	Understand the principles of Vaastu science and can apply wherever it is necessary.

Pre-Requisites: Knowledge of the basic Science, Engineering graphics

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	1	2	2	2	1	2	1	2
CO2	2	3	3	3	3	1	2	1	2
CO3	2	3	3	1	3	-	3	1	2
CO4	3	2	2	2	1	-	2	1	2
CO5	3	1	1	2	1	-	1	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- To engage the students by explaining basic concepts applied in our daily life and real world applications.
- To make the students understand the views by the use of 3D drawings and realistic approach.
- To explain about the laws and principles through real life situations to the students.

THEORY	BUILDING BYE LAWS- AND STATUTORY DRAWINGS	L	T	P	C
		3	0	0	3
1G235215	END TERM PATTERN	THEORY			
UNIT- 1	INTRODUCTION TO BUILDING BYE LAWS				
	1.1 Introduction – Scope and Applicability of bye-laws –Definition of terms –Role of regulatory bodies (BIS) and local authorities - Classification of buildings - Residential, commercial, industrial, and institutional buildings. **1.2** Special regulations for heritage structures and earthquake-prone areas - Written permission for development of land (layout) - Competent authority for approval.				9
UNIT- 2	LEGAL FRAMEWORK AND COMPLIANCE				
	2.1 Legal Framework Overview - Regulatory Bodies Role - Building Classification Systems - Types of Occupancies - Understanding Zoning Laws - Urban Planning Fundamentals – Development Authorities Functions - Compliance Importance. **2.2** Rules for obtaining building permission as per National Building Code - Submission of Building Plans -Application Process - Plan Scrutiny - Compliance Check - Approval Process - Issuance of Building Permission - Inspections and Monitoring – Completion Certificate - Occupancy Certificate - stability certificate for commercial and institutional buildings - Renewal and Amendments.				9
UNIT- 3	SAFETY AND STRUCTURAL REGULATIONS				
	3.1 Structural design principles and standards - Compliance requirements for earthquake-resistant buildings - Standards for parts of building such as basement, wall, floor, roof, parapet, chimney - Exit requirements -				9

	Types of exits - Number and size of exits - Arrangements of exits - Passenger elevators or lifts. **3.2** Fire safety regulations and prevention measures - Fire resistance ratings for building materials - Fire resistance of a building or its structural and non-structural elements - Emergency evacuation procedures - fire safety equipment.	
UNIT- 4	**STATUTORY DRAWINGS**	
	4.1 Importance and purpose of statutory drawings - Overview of regulatory approval process - Types of statutory drawings - Site Plans - layout, dimensions, setbacks and site features - Floor Plans- layout of interior spaces, dimensions, room names - Elevations - exterior views of the building, material specifications - Sections - vertical views showing building components and heights. **4.2** Development of Site plan - Site survey and data collection - Plotting site boundaries, contours, and utilities - Creating a comprehensive site plan with all necessary details - List of forms required for Approval as per NBC (Names only).	9
UNIT- 5	**BUILDING PLANNING AS PER VAASTU SCIENCE**	
	5.1 Definition - Importance of Vaastu - Five Elements and Directions - Concept of Pancha Bhutas (Five Elements) - Influence of directional energies - Significance of cardinal directions (North, South, East, West) - Site Selection and Evaluation - Criteria for selecting a suitable site. 5.2 Remedies for site defects and imbalances - Building Layout and Orientation - Principles of building orientation - Ideal placement of rooms, entrances, and utilities - Designing according to Vaastu - Vaastu Remedies and Corrections - Implementation of Vaastu in existing buildings.	9
Total Hours		45

Suggested student activities:

- Students have to submit a report after visiting a local building approval authority such as Town and Country Planning office.
- Students have to visit an Architect office and prepare a report on the learning.
- Students have to develop a comprehensive checklist of building bylaws at national, state, and local levels.
- Students have to identify and map zoning regulations and land use classifications in urban areas.
- Students have to analyze the layout, orientation and design elements of building related to Vaastu principles and discuss the effectiveness of Vaastu based design.
- Students have to prepare a building plan for a congested area in their locality by applying bye-laws and Vaastu sciences after doing site survey.

Text Books:

1. National Building code Volume 1, Third Revision, Bureau of Indian Standards, 2016
2. National Building code Volume 2, Third Revision, Bureau of Indian Standards, 2016
3. Tamil Nadu Combined Development and Building Rules, Government of Tamil Nadu, 2019

Web resources:

1. https://www.youtube.com/watch?v=Dpy40oDxtfw&list=PLjAhkhzIQqze_YT8wtZJXVE8DlXFdlo-W&index=17
2. https://www.youtube.com/watch?v=XQHBLcnS-r0&list=PLjAhkhzIQqze_YT8wtZJXVE8DlXFdlo-W&index=5
3. https://www.youtube.com/watch?v=ufg47bzzobI&t=54s
4. https://www.youtube.com/watch?v=9_UIJOkwFog

1G235320	COMPUTER APPLICATIONS IN CIVIL ENGINEERING.	L	T	P	C
PRACTICAL		0	0	4	2

INTRODUCTION:

Computers play a very vital role in present day life, more so, in all the professional life of engineering. In order to enable the students use the computers effectively in problem solving, this course offers various engineering applications of computers in civil engineering.

OBJECTIVES:

The objectives of the course is to enable the students to

- To provide hands-on experience for the students with software's in structural analysis, design and estimating.
- To enable the students to do the practical problems by using the available application software packages.
- To impart the knowledge of 3D building modeling.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Prepare the estimation sheet and design data using Electronics Spread sheet.
CO-2	Carry out the analysis and design of structures using a available software
CO-3	Develop detailed 3D drawing of building

Pre-Requisites:

Students should have enough knowledge in Mechanics of Structures, Estimation and Costing, Design of RCC Structures subjects.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	1	-	-	3	-	-	1	1	2
CO2	-	-	2	3	-	-	1	1	2
CO3	-	-	-	3	-	-	1	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Align the lab activities with the overall course curriculum, ensuring that each lab session complements the theoretical concepts taught in lectures.
- Define clear objectives for each lab session.
- Provide step-by-step tutorials and hands-on practice sessions to familiarize students with available software's.
- Regularly update lab materials, incorporate new technologies and software tools, and adapt teaching strategies based on student needs and industry trends.

1G235320	COMPUTER APPLICATIONS IN CIVIL ENGINEERING	L	T	P	C
		0	0	4	2
PRACTICAL	END TERM PATTERN	PRACTICAL			
PART -A	ELECTRONIC SPREAD SHEET USING SOFTWARE				
	1. Prepare the Estimate and Abstract sheet with given data (provide all the measurement details) and calculate the quantity and Total Amount using formula bar.	4			
	2. Calculate Effective depth "d" and Area of Steel "Ast" using Formula Bar for given singly reinforced section.	4			
	3.Finding centre of gravity; Ixx and IYY of I, L, T and channel sections.	4			
	4.Calculate Area and Elongation using formula bar	4			
PART-B	**ANALYSIS OF R.C.C. STRUCTURES** **Note:** Analyse the Structure using any one of the available Software Packages-Staadpro, SAP ,etabs,Tekla,Cads3d etc.)				
	5. Carryout the analysis of Continuous Beam with given size.	6			
	6. Carryout the analysis of Portal Frame structure with given size.	6			
	7. Carryout the analysis of king post roof truss.	8			
	8. Carry out the analysis and design of 1 BHK residential house with given Structure.	8			
PART-C	**DRAFTING OF R.C.C. STRUCTURES** Draw the Structure using any one of the available 3D drafting Software Packages – Autodesk Revit Architecture, ArchiCAD, Autodesk Civil3D Sketchup etc..)				
	9. Preparation of plan, section and elevation of a House with single bed room and attached bathroom with R.C.C. flat roof (Framed structure).	8			
	10. Preparation of plan, section and elevation of a Single storied School building with R.C.C flat roof (Framed structure).	8			
Total Hours		**60**			

Suggested student activities:

- Task students with creating complex 3D models of civil engineering structures using advanced features in software
- Assign exercises where students model and analyze complex structures, considering material properties, boundary conditions, and loading scenarios.
- Explore advanced BIM concepts using software.

Text Books:

1. T.S.Sharma ,Staad Pro V8i for Beginners With Indian Examples, 1st edition, Notion Press, 2014
2. Linkan Sagar , Revit 2019 Architecture Training Guide, 1st Edition , BPB PUBLICATIONS, 2018
3. R.K.Anand, Computer Application in Civil Engineering , 1st Edition, Vayu Education of India, 2013.

Web-based/Online Resources:

1. **https://youtu.be/zR4fndvVEFU?si=bv7LZ1VW-NWH3hbw**
2. **https://youtu.be/w5-Qx61s-eA?si=0cMNNyD9Cqrxshep**
3. **https://youtu.be/qNm_6inyqQc?si=nm74Dg5Z5niJHz-J**
4. **https://youtu.be/aa4tqsCbtjU?si=-dDFWP1FIBsSxC5K**

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students):

S.No	List of the Equipments	Quantity Required
1	Computers	30 Nos.
2	Suitable Software for Electronic Spread Sheet	30 Users
3	Suitable Structural Analysis Software	30 Users
4	Suitable 3D drafting Software	30 Users

1G235440	CONSTRUCTION MANAGEMENT AND SAFETY PRACTICE	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

This course combines essential aspects of construction management and safety practices to equip students with the skills needed for successful careers in the construction industry. Students learn project management fundamentals such as planning, scheduling, resource management, and budgeting, alongside estimation and costing techniques crucial for overseeing development projects. Microsoft Project is powerful project management software that will be introduced to students as a tool for planning, scheduling, and managing construction projects effectively. In parallel, emphasis is placed on safety practices, covering occupational health and safety regulations, hazard identification, risk assessment, and emergency response protocols.

OBJECTIVES:

The objectives of the course is to enable the students to

- Describe the importance of construction Management
- Carry out the Feasibility study of a project
- Understand contract documents and different types of contract.
- Prepare construction scheduling and resource management.
- Describe the aspects of inspection and quality control methods
- Describe the labour law sand legislation.
- Know about the safety practices followed in construction project.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Understand how construction projects are managed, assess their feasibility, and Plan resources effectively for civil engineering projects.
CO-2	Understand contracts and tenders, as well a show construction companies manage money and paperwork, including the importance of keeping good records.
CO-3	Understand how to plan construction projects, schedule activities, and manage resources to meet project goals within budget and time constraints.
CO-4	Understand the importance of quality in construction, learn methods to maintain it, and gain knowledge about resolving disputes in construction projects.

CO-5	Understand the importance of safety in construction and the roles of different Parties involved in safety management.

Pre-Requisites: Construction Materials And Practice

CO-Pos Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3				1	2	3	3	2
CO2	3				1	2	3	3	2
CO3	3	1	1	2	1	2	3	3	2
CO4	3			2	1	2	3	3	2
CO5	3	1	1	2	1	2	3	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Engage and Motivate: Teachers should actively engage students to boost their learning confidence.
- Real – world Relevance: Teachers are expected to physically show various causes of development of cracks while imparting the instructions. Students should be encouraged to collect the various reasons for the development of cracks and failure of RCC structure.
- Interactive Learning: Teachers are expected to organize demonstration and field visits to show about the various operations involved in the repair and rehabilitation of RCC structures.
- Application – Based Learning: Throughout the course, a theory demonstrates – practice – activity strategy may be used to ensure the outcome of the learning is employability- based one.
- Simulation and Real–World Practice: In addition to the theoretical instructions, different activities pertaining to the simulated Environment, transitioning to real – world scenarios when possible, like expect lectures, seminars, visits to Construction plant may also be organized.
- Encourage Critical Analysis: Foster an environment where students can understand the experiment outcomes and infer the potential sources of error in case of any discrepancies.

1G235440	CONSTRUCTION MANAGEMENT AND SAFETY PRACTICE	L	T	P	C
		1	0	4	3
Practicum	END TERM PATTERN	PRACTICAL			
UNIT- 1	CONSTRUCTION MANAGEMENT				
	1.1 Introduction Construction Management – Definition- Need – Scope - Role of government and private construction agencies – Types of construction sectors - Construction practice: - the owner, consultant, and contractor - Duties and responsibilities – List of various stages of a construction project. **1.2 FEASIBILYTY STUDY AND PLANNING OF CIVIL ENGINEERING PROJECT:** Feasibility– Technical feasibility, Financial feasibility, Ecological feasibility, Resource feasibility - Economical Analysis - Objectives of planning – Administrative approval – Technical sanction.				3
UNIT- 2	CONTRACT MANAGEMENT				
	2.1CONTRACT MANAGEMENT: Types of contracts - Contract documents - Tender notice – Types – Earnest Money Deposit (EMD) and Security Deposits (SD) - Scrutiny and acceptance of a tender - Contract agreement – Work order –Sub contract - Rights and duties of sub-contractor. **2.2 CONSTRUCTION ORGANISATIONS AND DEPARTMENTAL PROCEDURE:** Forms of business organizations - Decentralization - Percentage completion report - Organization of P.W.D.- Accounting procedure (administrative sanctions, technical sanctions, payment of bills) – Imprest and Temporary accounts – Cash book - Works register – Importance of M-book and its entries – Nominal Muster Roll (N.M.R) – Daily Labour Reports (D.L.R)				3
UNIT- 3	SCHEDULING AND TIME MANAGEMENT				
	3.1 SCHEDULING AND TIME MANAGEMENT :				3

	Definition – uses and advantages – Classification of Schedules – Methods of scheduling – Activity – Event – Dummies – Rules for developing networks – Fulkerson's rul99e for numbering the events - Critical Path Method Critical and Subcritical paths – Critical and Non critical activities/ events – Significance of critical path. **3.2 RESOURCE MANAGEMENT:** Definition – Need for resource management –Optimum utilization of resources - Resource planning – Resource leveling and its objectives – Construction planning–Crashing – Need for crashing an activity – Methods and tips for crashing – Time Vs Cost optimization curve – Cost slope and its significance in crashing.	
UNIT- 4	**QUALITY MANAGEMENT AND CONSTRUCTION DISPUTES**	
	4.1 QUALITY MANAGEMENT: Importance of quality – Elements of quality – Quality assurance techniques (inspection, testing, sampling) – Construction Disputes - Introduction – Development of disputes – Categories of disputes – Modes of settlements - Arbitration. **4.2 CONSTRUCTION LABOUR AND LEGISTATION:** Need for legislation - Payment of wages Act - Factories Act – Contract labour (Regulation and abolition) Act – Employees Provident Fund (EPF) Act.	3
UNIT- 5	**SAFETY IN CONSTRUCTION**	
	5.1 SAFETY IN CONSTRUCTION: Importance of safety –Causes of accidents – Role of various parties (designer / employer /worker) in safety management – Benefits – Approaches to improve safety in construction. **5.2 ETHICS IN ENGINEERING:** Human values - Definition of Ethics - Engineering ethics -	3

	Engineering as a profession - Qualities of professional - Professional institutions - Code of ethics - Major ethical issues - Ethical judgment - Engineering and management decision - Value based ethics	
1	Problems to find EST, EFT, LST, LFT using MS Project and Excel .	6
2	Preparation of Key Plan, Job Layout using BIM tool like Revit/Sketch up/AutoCAD.	6
3	Problems on PERT network – TE, TL and slack using MS Project and Excel.	6
4	Problems to find Standard deviation and Variance using MS Project and Excel.	6
5	Writing M- book using MS Excel.	6
6	Prepare comparative statements in selecting tender using MS Excel.	6
7	Calculate man hours for construction activity and link with scheduling.	6
8	Site visit and prepare safety checklist for construction activity.	6
9	MS project – CPM.	6
10	MS project – PERT Analysis	6
Total Hours		75

Suggested student activities:

- ✓ **Site visits:** Organize visits to construction sites where students can observe safety practices.
- ✓ **Guests lecturers:** Invite professionals from the construction industry, including project managers, safety officers, and engineers, to speak to the class. They can share their experiences, insights, and best practices in construction management and safety

Text Books:

1. K.K.Chikkara, Construction Project Management, McGraw Hill Education, 26 October 2010
2. Kumar Neeraj Jha, Construction Project Management, 2nd Edition, Pearson Education India, 1 January 2015.

3. S.K.Bhattacharjee, Safety Managementin Construction (Principles and Practices, 1st edition , Khanna Publishers, 2011

Web resources

1. Significance and objectives of Construction management : https://www.youtube.com/watch?v=olvs23_VaT0&list=PLm_MSClsnwm8ZfOLmf8XJqE3rVe8 BByzl&index=2.
2. Network Terminology: https://www.youtube.com/watch?v=K6VvMVTh4iU&list=PLm_MSClsnwm8ZfOLmf8XJqE3rVe 8BByzl&index=9
3. Common causes of accidents on construction sites : https://www.youtube.com/watch?v=ZdeetmkhpKs&list=PLm_MSClsnwm8ZfOLmf8XJqE3rVe8 BByzl&index=21
4. Concept of Quality Control & Inspection: https://www.youtube.com/watch?v=nM_dS4tobQs&list=PLm_MSClsnwm8ZfOLmf8XJqE3rVe 8BByzl&index=22
5. Need for Legislation and Importance of Labour Laws and Principles: https://www.youtube.com/watch?v=WK8hSg_653I&list=PLm_MSClsnwm8ZfOLmf8XJqE3rVe8 BByzl&index=23
6. Construction site safety rules: https://www.youtube.com/watch?v=YLH-Ih8omjI
7. Professional Ethics: https://www.youtube.com/watch?v=5LiRgVVqsg0

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students)

S.No	List of the Equipments	Quantity Required
1	Computers	30 Nos.
2	Laser Printers	3 Nos.
3	CAD Software	30 Users
4	Suitable software for Electronic Spread Sheet	30 Users
5	Suitable Project Management Software	30 Users

1G235540	ENVIRONMENTAL ENGINEERING	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

Diploma holders in Civil Engineering are expected to supervise construction of water supply and waste water treatment works. They are also responsible for waste disposal activities. This subject aims at imparting skills for preparing water supply and waste water engineering drawings to develop competencies for reading the drawings, and their execution in their field.

In addition, Civil Engineering diploma holders must have the knowledge of different types of environmental aspects due to development activities so that they may help in maintaining the ecological balance and control pollution. They should also be aware of the environmental laws for effectively combating environmental pollution.

OBJECTIVES:

The objectives of the course is to enable the students to

- Know the procedure of estimating water requirements for a water supply scheme.
- Select suitable sources of water supply and pipe materials.
- Determine the quality of water, testing procedures and standards for drinking water.
- Understand the methods of purification of water.
- Understand the systems of distribution for a water supply scheme.
- Understand the basic facts of sanitary engineering, the methods of collection and conveyance of sewage.
- Understand the primary and secondary treatment of sewage and disposal.
- Know the methods of disposal of sludge and solid wastes.
- Identify the various types of pollution and their prevention.
- Create awareness about environmental impact assessment.
- Understand the Cutting, threading and joining of G.I. Pipes/cutting and pasting of PVC pipes using solvents.

- Make suction and delivery pipe connections to a centrifugal pump (making indents, drawing a neat sketch of the connection with details).

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Describe the process in water supply scheme, types of pipes, pipe joints, laying & testing of pipes for the conveyance of water supply, physical, chemical & biological test on the water samples, standards of drinking water.
CO-2	Analyze the process of primary, secondary & tertiary treatment of water and their transmission along with disinfection, softening of water.
CO-3	Plan and design the water distribution networks, Layouts of different Distribution networks suitable for appropriate location, Systems of Water Supply.
CO-4	Plan and design the sewerage systems, Characterization of Sewage, select the appropriate appurtenances in the sewerage systems.
CO-5	Describe the process of Primary Treatment of Sewage such as Screening, Grit Chamber, Skimming Tank, Sedimentation, and Coagulation of Sewage.

Pre-Requisites: Knowledge of basic Science

CO-POs Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**
CO1	3	2	1	3	3	2	2	1	3
CO2	3	2	1	3	3	2	2	1	2
CO3	3	2	3	3	3	2	2	1	2
CO4	3	2	3	3	3	2	2	1	2
CO5	3	2	1	3	3	2	2	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome - and employability-based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G235540	**ENVIRONMENTAL ENGINEERING**	**L**	**T**	**P**	**C**
		1	**0**	**4**	**3**
PRACTICUM	**END TERM PATTERN**	**PRACTICAL**			
UNIT-I	**QUANTITY AND QUALITY OF WATER**				
	Water Supply-Flow Chart of a Water Supply Scheme - Need for Protected- Water Supply - Types of Demand-Per Capita Demand - Sources of Water– Surface Sources–Underground Water Sources - Intakes - Types of Intakes - Pipes for Conveyance of Water - Cast Iron, G.I., Cement Concrete, R.C.C., Hume and PVC Pipes - Pipe Joints - Laying and Testing of Pipe Lines. Impurities in Water - Testing of Water - Collection of Water Sample - Physical, Chemical, Bacteriological Tests - Standards of Drinking Water - Water Borne Diseases and their Causes.				3 4

	Practical exercises: 1. Estimation of pH, TDS and Hardness of water sample. 2. Estimation of Sulphate content from the collected water samples from sources. 3. Determine the dissolved oxygen in the given sample of water. 4. Determine the chloride content in the given sample of water by silver nitrate titration method.	4 4 4
UNIT-II	**TREATMENT OF WATER**	
	Objective of water treatment - Flow Diagram of a Treatment Plant-functions of units - Sedimentation–Types of Sedimentation Tank–principal of Coagulation–flocculation-Usual Coagulants–feeding of coagulants - mixing devices - Jar test-Mineral water – requirements – Treatment process- Reverse osmosis. **Practical exercises:** 5. Determine the optimum dose of coagulant in a given raw water sample by jar test. 6. Prepare a report along with photo copies of a field visit to water treatment plant. (Not for Exam)	3 4 12
UNIT-III	**DISTRIBUTION SYSTEM**	
	Distribution System - Gravity System, Pumping System, Combined System - Systems of Water Supply - Continuous and Intermittent Supply of Water- Layouts of Distribution-Dead End, Grid Iron, Radial and Circular Systems. **Practical exercises:** 7. Study of various pipe fitting used in water supply (with actual models displayed onboard). (Not for Exam)	3 4
UNIT-IV	**SANITARY ENGINEERING**	

	Sanitation - Systems of Sanitation - Variation in Rate of Flow of Sewage - Estimation of storm water - Minimum Size of Sewer–Shapes of Sewer (names only) – Materials used for Sewer-Joints in Sewer Line-Ventilation of Sewers-Cleaning of Sewers. Sewer Appurtenances Manhole-Lamp Hole- Catch Basin-Street-Inlet-Grease and Oil Trap - Flushing Tanks Drainage Arrangements in Buildings - Sanitary Fittings - Sewage Pumps Necessity - Types of Sewage Pumps (names only). **Practical exercises:** 8. Study of various sanitary wares. (Not for Exam). 9. Making a bathroom connection from an existing water supply main (making indents, drawing a neat sketch of the connection with details). 10. Making suction and delivery pipe connections to a centrifugal pump (making indents, drawing a neat sketch of the connection with details).	3 4 4 4
UNIT-V	**PRIMARY TREATMENT OF SEWAGE**	
	Introduction-Flow Diagram of Sewage Treatment plant –Screens – Grit Chamber – Skimming Tank – plain sedimentation tank-Primary clarifiers - Secondary clarifiers – coagulation of sewage. **Practical exercises:** 11. Prepare a report along with photo copies of a field visit to sewage treatment plant. (Not for Exam)	3 12
Total Hours		75

Suggested student activities:

- Case study on the quality standards of drinking water in your locality.
- Choose any one study area and estimate the quantity of water required to meet the demand.
- Design and build a physical model of a water treatment plant.

- Group discussion about the distribution network and various layouts of distribution.
- Identify the suitable appurtenances for the appropriate location in the water distribution network system.
- Demonstrate and discussion on the process of coagulation and flocculation.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.

Text Books:

1. A.K. Jain, Environmental Engineering, 1st Edition, Khanna Publishers, 2022.
2. G.S. Birdie and J.S.Birdie, Water Supply and Sanitary Engineering, 9th Edition, Dhanpat Rai Publishers, 2014.
3. S.K. Husain, Textbook of Water Supply and Sanitary Engineering, 3rd Edition, CBS Publishers, 2018.

Web-based/Online Resources:

1. https://archive.nptel.ac.in/courses/105/105/105105201/
2. https://youtube.com/playlist?list=PL1BFC82F3A63B4172&si=wJVMJip1kcMrhm9s

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students)

S.No	List of the Equipments	Quantity Required
1	Spectrophotometer	1No.
2	Jar Test Apparatus	1No.
3	Turbidity Meter	1No.
4	Dissolved Oxygen Meter	1No.
5	Drying Oven	1No.
6	Analytical Balance	1No.
7	Dessicator	1No.
8	Dishtongs	1No.
9	Evaporating Dish	1No.
10	Filter Membrane	1No.
11	Vacuum Pump	1No.

12	Crucible	1No.
13	Whatt Man Filter Paper	Required Nos.
14	Wash Bottle	2 Nos.
15	Pipette, Burette, Funnel, Conical Flask, Beaker, Bunsen Burner, Stand, Wire Gauge, Filter Paper	As Required
16	Pipe Fitting used in Water Supply	As Required
17	Sanitary Ware Specials	As Required
18	Specials of Bathroom Connections	As Required
19	pH Tester	1 No.
20	TDS testing device	1 No.
21	Necessary reagents and Chemicals	As Required
22	Necessary Sample Preparation Utilities	As Required
23	Centrifugal Pump (0.5 HP)	1 No.

1G235640	INNOVATION AND STARTUP	L	T	P	C
PRACTICUM		1	0	2	2

Introduction:

The integration of Innovation and Start-ups concept within the syllabus is testament to the forward thinking nature of educational institutions. By introducing this concept, students are provided with a solid foundation upon which they can build their skills in Innovation and Start-ups. This course can bridge the gap between theory and practice. It allows students to apply the knowledge they have acquired in a real world context, thereby enhancing their understanding and retention of the above concept. This experimental learning approach not only fosters a deeper level of engagement but also trains student with practical skills necessary to navigate the complexities of the business world. This also empowers students to become an Innovator or Entrepreneur. With necessary tools and knowledge, educational institutions are preparing the next generation of entrepreneurs to tackle the challenges and opportunities that lie ahead. This syllabus will explore the different facets of innovation, including its importance, types and strategies for fostering a culture of innovation within organizations

Course Objectives:

The objective of this course is to enable the students

- To understand the concept of Innovation and Start-ups.
- To acquire knowledge of Prototype development, IPR, Patents and Copyrights.
- To have practical experience in preparing Business plan for Start-ups.
- To visit the existing nearby industry to prepare a project report about the present challenges of that industry.
- To know the different funding supports available from Government and Non-Government schemes for Start-ups.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Differentiate between Innovation and Start-ups
CO-2	Explain the importance of IPR, Patents and Copyrights.
CO-3	Describe the methodology to be adopted for preparing the Business Plan
CO-4	Gain practical experience by Industrial training and visiting the nearby industry
CO-5	Explore and identify various funding facilities available from Government and Non-Government Schemes for Start-ups

Pre-Requisites: There are no specific prerequisites for this course, although a basic understanding of business and technology concepts would be beneficial.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	-	-	1	-	2	3	3	1	3
CO2	-	-	1	-	2	3	3	1	3
CO3	-	-	1	-	2	3	3	1	3
CO4	-	-	1	-	2	3	3	1	3
CO5	-	-	1	-	2	3	3	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G235640	INNOVATION & STARTUP	L	T	P	C
Practicum		1	0	2	2
	END TERM PATTERN	Project			
UNIT- 1	INTRODUCTION TO INNOVATION				
	An Introduction to Innovation and Creativity- Innovation in current Environment - Types of Innovation - Challenges of Innovation - Steps of Innovation Management - Divergent v/s Convergent thinking - Design thinking and Entrepreneurship.				6
UNIT- 2	INCUBATION CLUBS, IPR, PATENTS AND COPYRIGHTS				
	Idea Generation - Incubation Clubs - Prototype Development - Marketing of Innovation - Management of Innovation - Creation of IPR -Types of IPR - Patents and Copyrights - Patents in India - Technological and Non-Technological Innovation Process.				6
UNIT- 3	GOVERNMENT AND NON-GOVERNMENT FUNDING SCHEMES FOR START-UPS				
	An introduction to Start-up - Start-ups in India - Procedure for registration of Start-ups - Business Model- Business Plan - Case Studies - Opportunities and Challenges - Funding supports from Government Schemes -MUDRA, TANSEED, NEEDS, PMEGP, UYEGP – Non-Government Schemes - CSR Fund - Angel Investors - Venture Capitalist.				6
UNIT- 4					
	All the students have to select a minimum of 2 topics from the list given below. They are expected to collect the resources with the help of faculty assigned to them to prepare PPTs for presentation 1. Idea Generation. 2. Innovation Management. 3. Product Development. 4. Business Model Innovation.				9

	5. Organizational Culture and Change Management. 6. Leadership and Innovation. 7. Barriers to Innovation. 8. Innovation Marketing. 9. E-Commerce success stories (any one). 10. Role of Start-ups in Higher Education. 11. Professional Networking in Building Brands. 12. How to start a start-up in India.	
UNIT- 5	**EXPOSURE TO INDUSTRY**	
	All the students should visit and study the nearby industries, incubation centres, start-ups etc., and select any one to prepare a project report which covers the Name of the Industry/Organization, Introduction of the Industry, Type of the Industry, Scope of the Industry, Plant Layout and Location, Details of Plant and Machineries, Process flow chart, Manufacturing Methods, Process of Manufacturing, Product Manufacturing, Quality Control, Marketing, Product selling - Conclusion.	18
Total Hours		45

1G235773	INDUSTRIAL TRAINING	Summer	C
INTERNSHIP		Vacation	2

Introduction:

Industrial training is a crucial component of the diploma engineering curriculum, designed to bridge the gap between theoretical knowledge and practical application. Typically conducted during vacation periods, this two-week training program provides students with hands-on experience in their respective engineering fields. The primary objectives are to enhance practical skills, familiarize students with industry standards, and prepare them for future employment. Two-week industrial training during vacation periods is an invaluable part of diploma engineering education. It not only equips students with practical skills but also provides a comprehensive understanding of the industry, preparing them for successful engineering careers.

Course Objectives:

The objective of this course is to enable the students

- Practical Exposure: Students gain direct exposure to real-world engineering practices, tools, and technologies.
- Skill Enhancement: The training helps in developing technical and soft skills that are essential for professional growth.
- Industry Insight: Students learn about the working environment, operational procedures, and challenges faced by industries.
- Professional Networking: The training offers opportunities to interact with industry professionals, which can be beneficial for career prospects.
- Application of Knowledge: It allows students to apply classroom knowledge to solve practical problems, enhancing their understanding and retention of engineering concepts.

Structure of the Training Program

- Orientation: Introduction to the company, its operations, and safety protocols.
- Project Assignment: Students are assigned specific projects or tasks relevant to their field of

study.

- Supervision and Mentorship: Industry professionals guide and mentor students throughout the training.
- Skill Development Workshops: Sessions on technical skills, software tools, and industry best practices.
- Assessment and Feedback: Performance evaluations and constructive feedback to help students improve.

Benefits for Students

- Enhanced Employability: Practical experience makes students more attractive to potential employers.
- Confidence Building: Working in a real-world setting boosts confidence and professional demeanor.
- Clarified Career Goals: Exposure to various roles and responsibilities helps students define their career paths.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Demonstrate proficiency in using industrial machinery, tools, and software.
CO-2	Able to identify, analyze, and solve engineering problems using industry-standard methods and practices.
CO-3	Gain a comprehensive understanding of industrial manufacturing processes, quality control, and safety practices.
CO-4	Exhibit improved communication, teamwork, and professional behavior in an industrial setting.
CO-5	Apply theoretical concepts learned in their coursework to practical engineering tasks and projects.

Duties Responsibilities of the Faculty Mentor:

One faculty mentor should be assigned for every 30 students by the HOD / Principal. Faculty

mentors shall play a crucial role in overseeing and guiding students during their industrial training program in Diploma engineering.

Pre-Training Responsibilities:

1. **Orientation and Preparation:**
    - Conduct orientation sessions to familiarize students with the objectives, expectations, and guidelines of the industrial training program.
    - Assist students in understanding the importance of industrial training in their academic and professional development.
2. **Placement Coordination:**
    - Collaborate with the placement cell or industry liaison office to secure suitable training placements for students that align with their academic specialization and career interests.
    - Facilitate communication between the institution and host organizations to ensure smooth coordination of training arrangements.

3. Training Plan Development:

- Help students develop a detailed training plan outlining learning objectives, tasks, and expected outcomes for the training period.
- Guide students in setting SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals for their training experience.

During Training Responsibilities:

Monitoring and Support:

- Regularly monitor the progress of students during their industrial training. Maintain communication with both students and industry supervisors to track performance and address any issues that may arise.
- Provide ongoing support and guidance to students, offering advice on technical challenges, professional conduct, and workplace etiquette.

Technical Guidance:

- Offer technical guidance and mentorship related to the specific engineering

discipline or specialization of the students. Help them apply theoretical knowledge to practical situations encountered in the industry.

- Assist students in overcoming obstacles or challenges encountered during their training. Encourage them to develop problem-solving skills and resilience in real-world engineering scenarios.
- Provide constructive feedback on students' performance based on reports, assessments, and observations gathered from industry supervisors.
- Evaluate students' achievements in relation to their training objectives and competencies developed during the program.

Problem-Solving Assistance:

- Assist students in overcoming obstacles or challenges encountered during their training. Encourage them to develop problem-solving skills and resilience in real-world engineering scenarios.

Feedback Responsibilities:

- Provide constructive feedback on students' performance based on reports, assessments, and observations gathered from industry supervisors.
- Evaluate students' achievements in relation to their training objectives and competencies developed during the program.

Post-Training Responsibilities:

Reflection and Debriefing:

- Conduct debriefing sessions with students to reflect on their training experiences, discuss lessons learned, and identify areas for further improvement.
- Help students articulate their learning outcomes and how these experiences contribute to their professional growth.

Documentation and Reporting:

- Ensure comprehensive documentation of students' training activities, achievements, and

feedback received from industry supervisors.

- Prepare reports summarizing students' performance and submit these to relevant departments or committees for review and assessment.

Career Counseling:

- Provide career guidance and counseling to students based on their industrial training experiences. Assist them in leveraging these experiences for future job applications or further academic pursuits.

Continuous Improvement:

- Collaborate with industry partners to continuously improve the quality and relevance of the industrial training program.
- Incorporate feedback from students and industry supervisors to enhance the effectiveness of future training placements.

By fulfilling these duties and responsibilities, faculty mentors contribute significantly to the overall educational experience and professional development of Diploma engineering students during their industrial training program.

Instructions to the students

Before Starting Industrial Training:

1. **Orientation and Preparation:**
    - Attend orientation sessions conducted by the institution or faculty mentors to understand the objectives, expectations, and guidelines of the industrial training program.
    - Familiarize yourself with the specific policies, procedures, and safety regulations of the host organization where you will be undergoing training.
2. **Setting Goals:**
    - Set clear and specific goals for your industrial training period. Define what skills, knowledge, and experiences you aim to gain during this time.

- Discuss your goals with your faculty mentor and seek their guidance in developing a training plan that aligns with your career aspirations.

3. **Professional Attire and Conduct:**

    - Dress appropriately and professionally according to the standards of the industry and host organization.
    - Maintain a positive attitude, demonstrate punctuality, and adhere to workplace etiquette and norms.

During Industrial Training:

4. Learning and Engagement:

- Actively engage in all assigned tasks and projects. Seek opportunities to learn new skills and technologies relevant to your field of study.
- Take initiative in asking questions, seeking clarification, and participating in discussions with supervisors and colleagues.

5. **Adaptability and Flexibility:**

- Adapt to the work environment and demonstrate flexibility in handling various responsibilities and challenges that arise during your training.
- Be open to different roles and tasks assigned to you, as this will broaden your experience and skill set.

6. Professionalism and Communication:

- Communicate effectively with supervisors, colleagues, and clients as required. Practice clear and concise verbal and written communication.
- Demonstrate professionalism in all interactions, respecting confidentiality, and adhering to company policies and procedures.

7. Safety and Compliance:

- Prioritize safety at all times. Familiarize yourself with safety protocols, procedures, and emergency exits in the workplace.
- Follow all safety guidelines and regulations to ensure your well-being and that of others around you.

After Completing Industrial Training:

8. **Reflection and Documentation:**
    - Reflect on your training experience. Evaluate what you have learned, the challenges you faced, and how you have grown professionally.
    - Maintain a journal or log documenting your daily activities, achievements, and lessons learned during the training period.
9. **Feedback and Evaluation:**
    - Seek feedback from your industry supervisor and faculty mentor on your performance and areas for improvement.
    - Use constructive feedback to enhance your skills and competencies for future career opportunities.
10. **Career Planning:**
    - Use your industrial training experience to inform your career planning and decision-making process.
    - Discuss your career goals and aspirations with your faculty mentor or career counselor for guidance on next steps after completing your diploma.

By following these instructions, Diploma engineering students can make the most of their industrial training experience, gain valuable insights into their chosen field, and prepare themselves effectively for future professional endeavors.

Attendance Certification:

- Every student has to get their attendance certified by the industrial supervisor in the prescribed form supplied to them. Students have also to put their signature on the form and submit it to the institution faculty mentor.

Training Reports:

- The students have to prepare reports: The report in the form of a diary to be submitted to the concerned faculty mentor of the institution. This will be reviewed while awarding internal assessment.

Industrial Training Diary:

- Students are required to maintain the record of day-to-day work done. Such a record is called Industrial training Diary. Students have to write this report regularly. All days for the week should be accounted for clearly giving attendance particulars (Presence, absence, Leave, Holidays etc.). The concern of the Industrial supervisor is to periodically check these progress reports.

  In addition to the diary, students are required to submit a comprehensive report on training with details of the organization where the training was undergone after attestation by the supervisors. The comprehensive report should incorporate study of plant / product / process / construction along with intensive in-depth study on any one of the topics such as processes, methods, tooling, construction and equipment, highlighting aspects of quality, productivity and system. The comprehensive report should be completed in the last week of Industrial training. Any data, drawings etc. should be incorporated with the consent of the Organization.

VI TERM

1G236111	ADVANCED ENGINEERING MATHEMATICS	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Mathematics is essential for engineering students to understand core engineering subjects. It provides the framework for engineers to solve problems in engineering domains. This course is designed to bridge the gap between diploma mathematics and B.E/B.Tech mathematics in matrix algebra, differential calculus, vector calculus, differential equations, and Laplace transforms

OBJECTIVES:

The objective of this course is to enable the student to

- Understand the concepts of eigen-values and eigen-vectors of matrices.
- Learn the notation of partial differentiation and determine the extremities of functions of two variables.
- Acquire knowledge in vector calculus which is significantly used to solve engineering problems.
- Formulate and solve differential equations.
- Understand Laplace transformation and its engineering applications.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Find eigen values and corresponding eigenvectors of a square matrix.
CO-2	Apply the knowledge of partial differentiation to evaluate Jacobian and extremities of two variable functions.
CO-3	Evaluate the gradient of a scalar field and the divergence and curl of vector fields.
CO-4	Solve ordinary differential equations using various techniques
CO-5	Use Laplace transforms to solve first-order ordinary differential equations.

Pre-Requisites: Knowledge of basic Surveying

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	1	1	1	3	1	2
CO2	3	3	2	1	1	1	3	1	2
CO3	3	3	2	1	1	1	3	1	2
CO4	3	3	2	1	1	1	3	1	2
CO5	3	3	2	1	1	1	3	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236111	ADVANCED ENGINEERING MATHEMATICS	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	EIGENVALUES AND EIGENVECTORS				
	Characteristic equation – Eigen-values of 2×2 and 3×3 real matrices – Eigen-vectors of 2×2 real matrices – Properties of eigen-values (excluding proof) – Cayley-Hamilton theorem (excluding proof) – Simple problems.				7
UNIT- 2	FUNCTIONS OF SEVERAL VARIABLES				
	Partial derivatives of two variable and three variable functions (up to second order) – Homogeneous functions and Euler's theorem (excluding proof) – Jacobian matrix and determinant – Maxima and minima of functions of two variables – Simple problems.				7
UNIT- 3	VECTOR CALCULUS				
	Scalar field and Vector field – Vector differential operator – Gradient of a scalar field – Directional derivative – Divergence and curl of a vector field (excluding properties) – Solenoidal and irrotational vector fields – Simple problems				7
UNIT- 4	DIFFERENTIAL EQUATIONS				
	Differential equation – Formation – Order and degree – Solution of a differential equation – Equations of first order and first degree – Variable separable method – Leibnitz's Linear equations – Second order equations of the form $(aD2+bD+c)y=enx$ where a,b,c and n are constants and the auxiliary equation $am2+bm+c=0$ has only real roots) – Complementary function – Particular integral – General solution – Simple problems.				7
UNIT- 5	LAPLACE TRANSFORMS				
	Definition of Laplace transform – Laplace transforms of standard functions - Linearity and change of scale property (excluding proofs) – First shifting property – Laplace transforms of derivatives – Properties (excluding proofs) –				7

	Inverse Laplace transforms – Properties (excluding proofs) – Solving first order ordinary differential equation using Laplace transforms – Simple problems	
Revision + Test		10
Total Hours		45

Suggested student activities:

1. Demonstrate the applications of eigen-values in stability analysis, decouple of three-phase systems and vibration analysis.
2. Demonstrate maxima and minima of two variable functions using GeoGebra graphing calculator.
3. Demonstrate solenoidal vector field and irrotational vector field using engineering
4. Demonstrate the applications of differential equations in solving engineering problems
5. Presentation /Seminars by students.
6. Quizzes.

Text Books:

1. John Bird, Higher Engineering Mathematics, Routledge, 9th Edition, 2021.
2. Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
3. Arumugam, S., Thangapandi Isaac, A., & Somasundaram, A., Differential Equations and Applications, Yes Dee Publishing Pvt. Ltd., 2020.
4. Duraipandian, P., & Kayalal Pachaiyappa, Vector Analysis, S Chand and Company Limited, 2014.
5. Narayanan, S., & Manicavachagom Pillai T.K., Calculus Volume I and II, .Viswanathan Publishers Pvt. Ltd., 2007.

Web resources:

1. https://www.khanacademy.org/math/
2. https://www.mathportal.org/
3. https://openstax.org/subjects/math/
4. https://www.mathhelp.com/
5. https://www.geogebra.org

1G236112	ENTREPRENEURSHIP	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspirations of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promote concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs relevant to social prosperity and thereby ensuring good means of living for every individual, providing jobs and developing the Indian economy.

OBJECTIVES:

The objective of this course is to enable the student to

- Acquire entrepreneurial spirit and resourcefulness.
- Familiarize Acquire knowledge about the business idea and product selection.
- Analyze the banking and financial institutions.
- Understand the pricing policy and cost analysis.
- Get knowledge about the business plan preparation

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Explain the process of entrepreneurship
CO-2	Analyse the importance of generation of ideas and product selection
CO-3	Familiarization of various financial and non financial schemes
CO-4	Acquire various cost components to arrive pricing of the product
CO-5	Learn the preparation of project feasibility report

Pre-Requisites: Knowledge of basics of Engineering and Industrial engineering

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	-	-	-	-	3	1	3	1	3
CO2	-	-	-	-	3	3	3	1	3
CO3	-	-	-	1	-	3	2	1	3
CO4	-	1	3	3	2	3	2	1	3
CO5	-	2	3	3	3	3	3	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236112	ENTREPRENEURSHIP	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	ENTREPRENEURSHIP – INTRODUCTION AND PROCESS				
	Concept of entrepreneurship - Importance, Myths about Entrepreneurship, Pros and Cons of Entrepreneurship, Process of Entrepreneurship, , Competencies and characteristics of an entrepreneur -, Ethical Entrepreneurship, Entrepreneurial Values and Attitudes, Creativity, Innovation and entrepreneurship- Entrepreneurs - as problem solvers, Mindset of an employee and an entrepreneur, - Risk Taking-Concepts				7
UNIT- 2	BUSINESS IDEA				
	Types of Business: Manufacturing, Trading and Services, Stakeholders: sellers, vendors and consumers and Competitors, E- commerce Business Models, business idea generation -Types of Resources - Human, Capital and Entrepreneurial tools and resources, etc.,- setting business goals- Patent, copyright and Intellectual property rights, Customer Relations and Vendor Management, -Business Ideas vs. Business Opportunities, Opportunity – SWOT ANALYSIS of a business idea - Business Failure – causes and remedies.- Types of business risks,				7
UNIT- 3	BANKING				
	Size and capital based classification of business enterprises- Role of financial institutions, Role of Government policy, Entrepreneurial support systems, Incentive schemes for state government, and Incentive schemes for Central governments.				7
UNIT- 4	PRICING AND COST ANALYSIS				
	Types of Costs - Variable - Fixed- Operational Costs - Break Even Analysis - for single product or service, -financial Business Case Study, Understand				7

	the meaning and concept of the term Cash Inflow and Cash Outflow- Pricing- Calculate Per Unit Cost of a single product, , Understand the importance and preparation of Income Statement, Prepare a Cash Flow Projection- Factors affecting pricing.- GST.	
UNIT- 5	**BUSINESS PLAN PREPARATION**	
	Feasibility Report – Technical analysis, financial analysis- Market Research - Concept, Importance and Process- tools for market research- Market Sensing and Testing, Marketing and Sales strategy, Digital marketing, Branding - Business name, logo, tag line, Promotion strategy, Business Plan Preparation, -Concept and Importance, , Execution of Business Plan.	7
Revision + Test		**10**
Total Hours		**45**

Suggested student activities:

1. Students can explore app development or web design. They'll learn about technology, user experience, and marketing.
2. Hosting events, workshops, or conferences allows students to practice project management, networking, and marketing skills.
3. Encourage students to address social or environmental issues through innovative business solutions. This fosters empathy and creativity.
4. Part of entrepreneurship clubs or organizations provides networking opportunities, mentorship, and exposure to real-world challenges.
5. Competitions like business plan contests or pitch events allow students to showcase their ideas and receive feedback.
6. Students can create and sell handmade crafts, artwork, or other products. This teaches them about production, pricing, and customer relations.

7. Students can provide consulting services in areas they're knowledgeable about, such as social media marketing or financial planning.
8. Encourage students to create and manage their own small business or offer freelance services. This hands-on experience helps them understand various aspects of entrepreneurship

Text Books:

1. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications, Agra., 2019.
2. H.Nandan, Fundamentals of Entrepreneurship, Prentice Hall India Learning Private Limited, Third Edition, 2013.
3. R.K. Singal, Entrepreneurship Development & Management, S K Kataria and Sons, 2013.

Web resources:

1. https://ocw.mit.edu/courses/15-390-new-enterprises-spring-2013/resources/lecture-1/
2. https://onlinecourses.nptel.ac.in/noc20_ge08/preview.

1G236113	PROJECT MANAGEMENT	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Project management is the systematic application of knowledge, skills, tools, and techniques to project activities to meet specific project requirements. It involves planning, organizing, and managing resources to achieve project goals within defined scope, time, and budget constraints. Project management encompasses several key processes and phases, including initiation, planning, and execution, monitoring and controlling, and closing. It is essential across various industries to ensure projects are completed successfully, efficiently, and effectively, aligning with organizational objectives and stakeholder expectations. Project managers play a crucial role in leading teams, managing risks, ensuring quality, and communicating with stakeholders to drive project success.

OBJECTIVES:

The objective of this course is to enable the student to

- To understand the concept, characteristics and elements of projects.
- To understand the stages in Project Life Cycle.
- To appreciate the need for Project Portfolio Management System.
- To know the considerations in choosing appropriate project management structure.
- To understand the components of techno-economic feasibility studies.
- To know about the detailed project report
- To learn about project constraints.
- To understand the techniques of evaluation.
- To get insight into the Social Cost Benefit Analysis Method.
- To know how to construct project networks using PERT and CPM.
- To learn how to crash project networks.
- To understand the meaning of project appraisal.
- To understand the meaning of project audits.
- To know the qualities of an effective project manager.

- To understand the stages in the Team Development model.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Explain the principles of Project Management
CO-2	Create and manage project schedules.
CO-3	Create structure and manage the project commitments.
CO-4	Acquire to Gain enterprise support.
CO-5	Prepare a Detailed Project Report (DPR).

Pre-Requisites: Basics Knowledge

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	-	3	1	3	2
CO2	3	-	-	-	1	3	1	3	2
CO3	3	-	-	1	1	3	1	3	2
CO4	3	-	-	-	1	3	1	3	2
CO5	3	-	-	-	1	3	1	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236113	PROJECT MANAGEMENT	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	PROJECT MANAGEMENT – AN OVERVIEW, PROJECT PORTFOLIO MANAGEMENT SYSTEM AND STRUCTURE, STEPS IN DEFINING PROJECT AND PROJECT DELAYS				
	Project – Classification – Importance of Project Management – An Integrated Approach – Project Portfolio Management System – The Need – Choosing the appropriate Project Management Structure: Organizational considerations and project considerations – steps in defining the project – project Rollup – Process breakdown structure – Responsibility Matrices – External causes of delay and internal constraints.				7
UNIT- 2	VARIOUS STAGES AND COMPONENTS OF PROJECT FEASIBILITY STUDIES, PHASES OF A PROJECT, STAGES IN PROJECT LIFE CYCLE AND PROJECT CONSTRAINTS				
	Project feasibility studies - Opportunity studies, General opportunity studies, specific opportunity studies, pre-feasibility studies, functional studies or support studies, feasibility study – components of project feasibility studies – Managing Project resources flow – project planning to project completion: Pre-investment phase, Investment Phase and operational phase – Project Life Cycle – Project constraints				7
UNIT- 3	PROJECT EVALUATION UNDER CERTAINTY AND UNCERTAINTY, PROJECT EVALUATION, COMMERCIAL AND SOCIAL COST BENEFIT ANALYSIS				
	Project Evaluation under certainty - Net Present Value (Problems - Case Study), Benefit Cost Ratio, Internal Rate of Return, Urgency, Payback Period, ARR – Project Evaluation under uncertainty – Methodology for project evaluation – Commercial vs. National Profitability – Social Cost Benefit Analysis, Commercial or National Profitability, social or national profitability.				7
UNIT- 4	DEVELOPING PROJECT NETWORK USING PERT AND CPM, PROJECT APPRAISAL				

	AND CONTROL PROCESS.	
	Developing a Project Plan - Developing the Project Network – Constructing a Project Network (Problems) – PERT – CPM – Crashing of Project Network (Problems - Case Study) – Resource Leveling and Resource Allocation – how to avoid cost and time overruns – Steps in Project Appraisal Process – Project Control Process – Control Issues – Project Audits – the Project Audit Process – project closure – team, team member and project manager evaluations.	7
UNIT- 5	**PROJECT MANAGING VERSUS LEADING OF PROJECT, QUALITIES OF PROJECT MANAGER AND MANAGING PROJECT TEAMS, TEAM BUILDING MODELS AND PERFORMANCE TEAMS AND TEAM PITFALLS.**	
	Managing versus leading a project - managing project stakeholders – social network building (Including management by wandering around) – qualities of an effective project manager – managing project teams – Five Stage Team Development Model – Situational factors affecting team development – project team pitfalls.	7
Revision + Test		**10**
Total Hours		**45**

Suggested student activities:

1. **Project Simulation and Role-Playing:**

Activity: Participate in simulated project scenarios where students take on different roles within a project team (e.g., project manager, team member, stakeholder).

Purpose: This helps students understand the dynamics of project management, including leadership, communication, and team collaboration.

2. **Case Study Analysis:**

Activity: Analyze real-world case studies of successful and failed projects.

Purpose: This activity enables students to apply theoretical knowledge to practical situations, identify best practices, and learn from the challenges and solutions implemented in real projects.

3. **Project Plan Development:**

Activity: Develop a comprehensive project plan for a hypothetical or real project, including scope, schedule, budget, risk management, and quality management plans.

Purpose: This allows students to practice creating detailed and structured project plans, honing their skills in planning and organizing project activities.

4. **Group Project:**

Activity: Work in teams to manage a project from initiation to closure, simulating a real project environment.

Purpose: Group projects help students learn how to work collaboratively, manage group dynamics, and apply project management tools and techniques in a team setting.

5. **Project Management Software Training:**

Activity: Gain hands-on experience with project management software such as Microsoft Project, Asana, or Trello.

Purpose: This activity equips students with practical skills in using technology to plan, track, and manage project tasks and resources efficiently.

Text Books:

1. Clifford F. Gray and Erik W. Larson, Project Management – The Managerial Process, Tata Mcgraw Hill.
2. Dragan Z. Milosevic, Project Management Toolbox: Tools And Techniques For The Practicing Project Manager,
3. Gopalakrishnan, P/ Ramamoorthy, V E, Textbook Of Project Management, Macmillan India. Ltd.

4. Harold Kerzner, Project Management: A Systems Approach To Planning, Scheduling, And Controlling, Eighth Edition, John Wiley & Sons
5. Jason Charvat, Project Management Methodologies: Selecting, Implementing, And Supporting Methodologies And Processes For Projects, John Wiley & Sons
6. Kevin Forsberg, Ph.D, Hal Mooz, Visualizing Project Management: A Model For Business And Technical Success, Second Edition, Pmp And Howard Cotterman, John Wiley & Sons.

Web resources:

1. https://youtu.be/pc9nvBsXsuM
2. NPTEL Courses
3. https://youtu.be/PqQqTAu_FiM

1G236114	FINANCE FUNDAMENTALS	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

This course gives a deep insight into the finance fundamentals such as money management and the process of acquiring needed funds. It also encompasses the oversight, creation, and study of money, banking, credit, investments, assets, liabilities that make up financial systems and improves overall financial literacy.

OBJECTIVES:

The objective of this course is to enable the student to

- Identify different ways to save money for future
- Understand various techniques to raise capital
- Get acquainted with the essential terminologies used in finance language
- Get exposed to different types of budgeting
- Instill the concept of costing and its impact on profitability

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Manage financial resources effectively to achieve personal goals
CO-2	Explain the procedure for Business Funding
CO-3	Exhibit financial literacy through the usage of different terminologies appropriate to the context
CO-4	Differentiate the types of budgeting and allocate the resources
CO-5	Apply the idea of marginal costing in decision making

Pre-Requisites: Basics Knowledge of mathematics.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	-	-	1	-	2	1	2
CO2	3	-	-	-	1	-	2	1	2
CO3	3	-	-	-	1	-	2	1	2
CO4	3	-	-	-	1	-	2	1	3
CO5	3	-	-	-	1	-	2	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

1. Engage and Motivate: Instructors should actively engage students to boost their learning confidence.
2. Real-World Relevance: Incorporate relatable, real-life examples and applications to help students understand and appreciate course concepts.
3. Interactive Learning: Utilize demonstrations and plan interactive student activities for an engaging learning experience.
4. Application-Based Learning: Employ a theory-demonstrate-practice- activity strategy throughout the course to ensure outcome-driven learning and employability.
5. Simulation and Real-World Practice: Conduct demonstrations and hands-on activities in a simulated environment, transitioning to real- world scenarios when possible.

1G236114	FINANCE FUNDAMENTALS	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	PERSONAL FINANCE				
	Personal Finance – Meaning, Objectives and advantages – Individual Perspective – Family Perspective – Time Value of Money – Personal Savings: Meaning, Different modes of Saving – Bank Deposit, Online Investments, Insurance, Stocks, Gold, Real Estate – Returns Vs Risk – Financial Discipline – Setting Alerts for commitments (With Real time Examples).				7
UNIT- 2	BUSINESS FUNDING				
	Sources: Personal Savings – Borrowings - Venture Capital – Venture Capital Process – Commercial Banks – Government Grants and Scheme.				7
UNIT- 3	FINANCE LANGUAGE				
	Capital – Drawing – Income – Expenditure – Revenue Vs Capital Items – Assets – Fixed Assets – Current Assets – Fictitious Assets – Liabilities – Long-term Liabilities – Current Liabilities – Internal Liabilities – External Liabilities – Shareholders fund: Equity Share capital, Preference Share Capital, Reserve & Surplus – Borrowings: Debentures, Bank Loan, Other Loan – Depreciation – Reserve Vs Provision.				7
UNIT- 4	BUDGETING				
	Budgetary Control – Meaning – Preparation of various budgets – Purchase budget – Sales Budget – Production budget – Cash Budget – Flexible budgets. (With Problems)				7
UNIT- 5	MARGINAL COSTING				
	Marginal Costing – Meaning – Marginal Costing Vs Absorption Costing – Concepts of Variable Cost, Fixed Cost and Contribution – PV Ratio – Break				7

	Even Point – Margin of Safety – Key Factor – Application of Marginal Costing in decision making – Make or Buy – Shutdown or Continue – Exploring New Markets (With Problems)	
Revision + Test		**10**
Total Hours		**45**

Suggested student activities:

1. **Financial Statement Analysis:**

Activity: Analyze and interpret financial statements, including balance sheets, income statements, and cash flow statements of different companies.

Purpose: This activity helps students understand the financial health and performance of organizations, developing skills in financial analysis and critical thinking.

2. **Investment Portfolio Management:**

Activity: Create and manage a simulated investment portfolio, making decisions on asset allocation, stock selection, and diversification.

Purpose: This allows students to apply theoretical concepts in a practical setting, learning how to evaluate investment opportunities and manage financial risk.

3. **Case Study Analysis:**

Activity: Examine real-world case studies involving financial decisions made by companies, such as capital budgeting, mergers and acquisitions, and financial restructuring.

Purpose: Case studies provide insights into the application of finance principles in business scenarios, enhancing problem-solving and decision-making skills.

4. **Classroom Discussions and Debates:**

Activity: Participate in discussions and debates on current financial issues, market trends, and economic policies.

Purpose: Engaging in discussions helps students stay informed about the latest developments in finance, develop their communication skills, and form well-rounded opinions on financial matters.

Text Books:

1. Banking Theory, Law & Practice - Dr.L.Natarajan, Margham Publications.
2. Corporate Accounting by T.S.Reddy and Dr.A.Murthy, Margham Publications.
3. Management Accounting by T.S.Reddy and Dr.Y.Hariprasd Reddy, Margham Publications.
4. Cost Accounting by T.S.Reddy and Dr.Y.Hariprasd Reddy, Margham Publications.

1G236115	ADVANCED ENVIRONMENTAL ENGINEERING	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Diploma holders in Civil Engineering are expected to be responsible for Water Quality Assessment, Pollution and Polluting Agents, Treatment of Sludge, Waste Management etc..Apart from basics of Environmental Engineering, some of the advanced topics dealing with the Environmental Engineering are discussed in this subject.

OBJECTIVES:

The objectives of the course is to enable the students to

- Know the procedure of process of filtration and disinfection of water in water supply scheme.
- Select suitable method of treatment of water from various sources.
- Know the pipe appurtenances required for water supply scheme.
- Understand the purpose of water management.
- Understand the various secondary treatment of sewage.
- Know the methods of disposal of sludge and solid wastes.
- Identify the various types of pollution and their prevention.
- Create awareness about environmental impact assessment.

Courses Outcomes:

On successful completion of this course, the student will be able to

After successful completion of this course the students should be able to	
CO-1	Explain the process of filtration, disinfection and softening of water.
CO-2	Describe the procedure in waste water survey, various pipe appurtenances, management and conservation of water.
CO-3	Explain the various secondary treatment technologies and miscellaneous treatment for waste water such as chlorination, imhoff tank, oxidation pond etc.

CO-4	Identify the various types of pollution and their prevention, methods of solid waste management.
CO-5	Create awareness about Environmental Impact Assessment.

Pre-Requisites: Knowledge of Basic Environmental Engineering.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	1	3	1	2	2	1
CO2	3	2	1	1	3	1	2	2	1
CO3	3	2	1	1	3	1	2	2	1
CO4	3	2	1	1	3	1	2	2	1
CO5	3	2	2	1	3	2	2	2	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real - world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory - demonstrate - practice - activity strategy may be used to ensure that learning is outcome - and employability - based.
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where they could be the source of error, if any.

1G236115	ADVANCED ENVIRONMENTAL ENGINEERING	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	THEORY			
UNIT- 1	FILTRATION, DISINFECTION AND SOFTENING OF WATER				
	1.1 FILTRATION OF WATER: Theory of filtration - filter sand - Types - Slow Sand Filter - Rapid Sand Filter - comparison of slow sand and rapid sand filter - Pressure Filter. **1.2 DISINFECTION OF WATER** Necessity of Disinfection - Types of disinfection - Minor methods of Disinfection - Chlorination - Action of chlorine - Application of chlorine - Forms of Chlorination. **1.2 WATER SOFTENING:** Water Softening - Necessity of Water Softening - Hardness - Types of Hardness - Effects of Hardness - Removal of Hardness (names only) - Miscellaneous Water treatment (names only) - Mineral water - Requirements - Treatment Process - Reverse of Osmosis (RO).				9
UNIT- 2	WATER WASTE SURVEYS, PIPE APPURTENANCES AND WATER MANAGEMENT				
	2.1 WATER WASTE SURVEYS: Wastage of water - Water waste surveys - Permissible wastage of water - Preventive measures - Water waste test - Maintenance of distribution system. **2.2 PIPE APPURTENANCES:** Necessity - Air values - Bib cocks - Fire hydrants - Reflux valves - Scour valves - Sluice valves - Stop cocks - water meters. **2.3 WATER MANAGEMENT:** Introduction of water management - Measures for reshaping local water				9

	balance - Uses and resources.	
UNIT- 3	**SECONDARY TREATMENT, MISCELLANEOUS METHODS AND SLUDGE DISPOSAL**	
	3.1 SECONDARY TREATMENT OF SEWAGE: Filters - Types - Contact beds - Intermittent sand filters - Trickling Filters - Activated Sludge Process (ASP) - Advantages and Disadvantage of ASP - Comparison of ASP versus Trickling filters. **3.2 MISCELLANEOUS METHODS OF SEWAGE TREATMENT:** General - Cesspool - Chlorination of sewage - Imhoff tanks - Oxidation ponds - Septic tanks - Soak pit - Dispersion Trenches - Waste from fertilizer factories. **3.3 SLUDGE DISPOSAL:** Methods of sludge disposal - Disposal on land - Distribution by pipe line - Drying on drying beds - Dumping into the sea - Heat - drying - Incineration - Lagooning or Ponding - Digestion followed by drying - Sludge digestion tanks.	9
UNIT- 4	**ENVIRONMENTAL POLLUTION AND SOLID WASTE MANAGEMENT**	
	4.1 ENVIRONMENTAL POLLUTION: Environment - Definition - Water pollution - Sources of water pollution - Effects of water pollution - Control of water pollution - soil pollution - Sources of soil pollution - Effects of soil pollution - Control of soil pollution - Noise pollution- Sources of noise pollution - Effects of noise pollution - Control of noise pollution - Air pollution - Sources of air pollution - Effects of air pollution on human beings, plants, animals, materials - air pollution control equipment - Control devices for particulate contaminants - Environmental degradation - Ozone layer depletion. **4.2 SOLID WASTE MANAGEMENT:**	9

	Solid Waste Disposal - Necessity - Method of Solid Waste Disposal - dumping, sanitary landfill, composting - Energy from waste.	
UNIT- 5	**ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL POISONING**	
	5.1 ENVIRONMENTAL IMPACT ASSESSMENT : Environmental impact assessment(EIA) – Methodology of EIA- Organizing the job - Performing the assessment - Preparation of Environmental Impact Statement(EIS) - review of EIS - Environmental risk assessment - limitation of EIA. **5.2 ENVIRONMENTAL POISONING:** Cadium poisoning - Sources and Effects - Mercury poisoning - Sources and Effects - Trace metal poisoning - Definition - cation of metals - Sources and Effects.	9
Total Hours		45

Suggested student activities:

- Prepare Models of rapid sand filtration process
- Compare various disinfection methods and identify the suitable disinfection method for the water from various sources.
- Identify the suitable appurtenances for the appropriate location in the water distribution network system.
- Demonstrate the process of Trickling Filters and Activated Sludge Process (ASP).
- Collect the details about the air pollution/noise pollution in the various industries and prepare the report.
- Visit any one solid waste disposal site and prepare the activities involved in the disposal.
- Case study about Environmental Impact Assessment for any one of the project.

Text Books:

1. A.K. Chatterjee, Water Supply, Waste Disposal and Environmental Engineering, 8th Edition, Khanne Publishers, 2006.
2. 2. M.P. Poonia, S.C. Sharma, Santhosh kumar, Environmental Engineering, 2nd Edition, Khanna Publishers, 2023.
3. 3. S.C.Rangwala,Water Supply and Sanitary Engineering,29th Edition, Charotar Publishing House, 2016.

Web resources:

1. https://nptel.ac.in/courses/105107207
2. https://archive.nptel.ac.in/courses/124/107/124107160/

1G236116	ADVANCED CONCRETE TECHNOLOGY	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Concrete is the material choice where strength, durability, impermeability, fire resistance and abrasion resistance are necessary. A deep understanding of concrete technology requires fundamental concepts, material characteristics and related laboratory experiments on concrete and its ingredients. It incorporates the latest Indian standard specifications and codes regulating concrete construction. The properties of concrete and it constituent materials and the role of various admixtures are the factors in modifying these properties to suit specific requirements.

The behaviour of concrete with respect to long-term drying shrinkage, plastic shrinkage, and special concrete like FRC Polymer concrete is some of the areas in order to have better understanding of the complex behaviour of concrete. In addition to this, it explores the methods to repair and rehabilitation of structures already constructed

OBJECTIVES:

The objective of this course is to enable the student to

- Understanding the theoretical concept of Concrete material which includes Cement and admixtures.
- Build durability to resist cracks, weathering and chemical attack.
- Comprehend the properties of Fresh Concrete in special Environments
- Know various types of special concretes & its application.
- Understand repair materials and their applications

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Understand the process of Hydration of cement &compounds
CO-2	Apply relevant admixtures for concreting
CO-3	Understand the knowledge of durability, impermeability and corrosion.

CO-4	Understand the concept of underwater construction, hot and cold weather concreting
CO-5	Describe the concept of various special concretes

Pre-Requisites: Knowledge of basic Surveying

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	3	-	2	3	3	3	1
CO2	3	-	2	2	-	-	3	3	1
CO3	3	2	3	2	2	3	2	3	1
CO4	3	2	2	2	-	2	2	3	1
CO5	3	-	3	-	-	3	2	3	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236116	ADVANCED CONCRETE TECHNOLOGY	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	CEMENT CHEMISTRY				
	Chemical composition-Bogue's Compounds-Oxide composition &Compound Composition-Hydration of cement-Heat of hydration-Heat evolution pattern & peaks-Calcium silicate hydrates-Calcium Hydroxide-Calcium Aluminate Hydrate-Interfacial Transition zone-Water requirement for hydration-Composition of cement paste at different stages of hydration.				9
UNIT- 2	ADMIXTURES AND ITS CLASSIFICATION				
	2.1 Admixtures: Definition-Purposes-classification. **2.2 Chemical Admixtures:** Plasticizers-basic products-Action of plasticizers, Super plasticizers-classification, -effect of super plasticizers-compatibility of plasticizer with cement- Marsh cone Test-Retarders-applications-retarding materials-retarding plasticizers, Accelerators-applications-accelerating plasticizers-Air-entraining admixture-advantages-air entraining agents-effect of air entrainment on properties of concrete. **2.3** Mineral admixtures-Pozzolana materials-Advantages-Fly ash-effect of fly ash on fresh concrete and hardened concrete, Ground granulated blast furnace slag (GGBS)-performance of GGBS in fresh and hardened concrete. Silica fumes- available forms-influence on fresh and hardened concrete.				9
UNIT- 3	DURABILITY, PERMEABILITY AND CORROSION				
	3.1 Durability and Permeability Durability-Definition and significance- Cracking-Types and causes of				9

	cracks in concrete-Factors contributing to cracks in concrete-Plastic shrinkage cracks-Bleeding-Drying Shrinkage-Sulphate attack-Freezing and Thawing-Methods of controlling sulphate attack-Carbonation-Rate of carbonation-Alkali-silica reaction. Permeability-permeability of cement paste and concrete-causes for higher permeability. **3.2 Corrosion** Corrosion of reinforcement-Factors influencing corrosion-Damages caused by corrosion-Preventive measures.	
UNIT- 4	**CONCRETE STRUCTURES IN SPECIAL ENVIRONMENTS**	
	4.1 Underwater Construction Methods-Tremie and grouting method-Precautions required during underwater concreting. **4.2 Cold Weather concreting** Effect of cold weather on Concrete-Precautions to be Taken while Concreting in Cold Weather Conditions. **4.3 Hot Weather Concreting** Effect of hot weather on concrete-Precautions to be taken while Concreting in Hot Weather Conditions.	9
UNIT- 5	**SPECIAL CONCRETE**	
	5.1 Light weight concrete Ingredients-Natural aggregate-Artificial aggregate-Factors influencing the strength and density of light weight concrete-Properties of light weight concrete **5.2 Fibre reinforced concrete** Fibers used-Factors effecting properties-volume of fibers-aspectratio-orientation-work ability and compaction of concrete-size of coarse aggregates-applications **5.3 Polymer concrete:**	9

	List of polymers – type of polymer concrete-Polymer impregnated concrete – Properties and applications. **5.4 Self Compacting concrete:** Requirements for SCC- Advantages – Tests methods (names only).	
Total hours		45

Suggested student activities:

1. Study on Natural fibres and artificial fibres and prepare a report
2. Conduct market analysis on chemical admixtures and compare.
3. Compare the special concrete with conventional concrete and prepare report
4. Conduct Marsh cone Test to infer compatibility of super plasticizers and cement
5. List the cracks in concrete in a building and remedies.

Text Books:

1. M.S.Shetty, Concrete Technology (Theory and Practice),8th Edition, S.Chand& Company Ltd, 2018.
2. A.R.Santhakumar, Concrete Technology ,2nd Edition, Oxford University Press,2018
3. A.M.Neville,&J.J.Brooks, Concrete Technology,2nd Edition, Pearson Education, 2019

Web resources:

1. https://www.youtube.com/watch?v=SdWh05agJtg
2. https://www.youtube.com/watch?v=dgjZEI9PXCs

3.https://www.youtube.com/watch?v=rJSxTY6u9NU&list=PLyqSpQzTE6M82k6diJ8LXu58vSMAiM-WP

1G236117	ADVANCED TRANSPORTATION ENGINEERING	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Advanced Transportation Engineering is a specialized field that delves into the intricate aspects of transportation systems. It aims to provide an overview about the highway with respect to planning, design, construction and maintenance as per IRC standards, specifications and methods. The key topics in this subject include Pavement Analysis and Design, Traffic Engineering, Mass transit system and bridge engineering.

OBJECTIVES:

The objective of this course is to enable the student to

- Introduce the students with the practice of transportation engineering which focuses on highway, traffic and bridge engineering.
- Get Exposure to pavement evaluation in transportation engineering.
- Introduce recent advancements in the field of mass transit and road safety.
- Acquire knowledge in traffic engineering and management.
- Get adequate knowledge in various bridge structures.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Understand the properties and use of various materials and construction.
CO-2	Attain knowledge in evaluation and maintenance of pavements.
CO-3	Attain basic understanding on traffic engineering design, operation and management.
CO-4	Understand basics of mass transit and its policies and road safety.
CO-5	Learn the various types of bridges and its components used for transportation.

Pre-Requisites: Knowledge of basic highway and traffic engineering.

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	2	2	1	3	3	1	2
CO2	3	2	3	2	1	3	2	1	2
CO3	3	3	3	3	1	3	3	1	2
CO4	3	2	2	2	1	3	3	1	2
CO5	3	3	3	2	1	2	2	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236117	**ADVANCED TRANSPORTATION ENGINEERING**	**L**	**T**	**P**	**C**
THEORY		**3**	**0**	**0**	**3**
UNIT- 1	**PAVEMENT MATERIAL AND CONSTRUCTION**				
	Aggregates- requirements, properties and testing of aggregates-Sub grade- significance and functions , Evaluation of soil strength-CBR and plate load test, preparation of sub grade-Bitumen and Tar -Tests on bitumen-Penetration test, Viscosity test, Ductility test, Softening point test, Specific gravity test, Flash and Fire point test-Bituminous emulsions and Cutback.				9
UNIT- 2	**PAVEMENT EVALUATION AND MAINTENANACE**				
	Pavement evaluation –Causes of distress in rigid and flexible pavements – Evaluation based on surface appearance: cracks, patches and pot holes,undulations , raveling , roughness, skid resistance-Structural evaluation by Deflection measurements – Pavement Serviceability Index-Pavement maintenance (IRC Recommendations only).				9
UNIT- 3	**TRAFFIC ENGINEERING**				
	Conventional and modern methods of traffic survey – Volume, Capacity and Density-Headway concepts and applications- speed and delay-origin				9

	and destination-Level of Services(LoS)-Parking facilities(on street, off street)-At grade intersection(rotary, channelization, traffic signal control)-Grade separated intersection and its types -Traffic sign and its types-Road Arboriculture.	
UNIT- 4	**MASS TRANSIT SYSTEM AND ROAD SAFETY SYSTEM**	
	Various modes of mass transit and its Role - Urban transport system-NUTP and JNNURM - Unified Transport Authorities (UMTA and CUMTA)-Intelligent Transportation System(role in Traffic management and its advantages)- Applications of Iot in Transportation-Causes of accidents(human,vehicle,road factors)-Black spot-Black route-Road safety audit (elements and its need).	9
UNIT- 5	**BRIDGE ENGINEERING**	
	Bridge : Definition-Components of Bridge-Selection of type of bridge-scour- afflux-economic span-waterway-Factors governing the ideal site for bridge- Functions of foundation-Types of bridge foundations-Coffer dam and its types-classification of bridges(based on purpose and materials)-abutments- piers-wing walls-Continuous bridge, Cantilever bridge, Arch bridge, Suspension bridge.	9
Total Hours		**45**

Suggested student activities

- Presentation/Seminars by students on any recent technological developments in Highway Engineering.
- Periodic class quizzes conducted on a weekly/fortnightly based on the course.
- Prepare Models of Traffic signs, pavements, road intersections, bridges etc.
- Visit nearby road construction activities, traffic signals, Bridges.

Text Books:

1. S.K.Khanna and C.E.G Justo, “Highway Engineering”,10th edition,Nem Chand and Bros

Publisher,Roorkee,2017.

2. Rangwala, “Highway Engineering” ,11th Edition, Charotar Publishing House Pvt. Ltd.,2017.
3. L R Kadiyali,“Transportation Engineering”, 1st edition,Charotar Publishing House Pvt. Ltd.,2019.

Web resources:

1. Pavement Materials: https://youtu.be/3oNa9Z94Hiw?si=KaE7Cu7w6SvwVdek
2. Pavement Design: https://youtu.be/5DGYmSXXStg?si=umVV7FDl6D2YtI01
3. https://youtu.be/oju-XCy-MJU?si=43SHkPRIgr0wh4sd
4. Traffic Engineering: https://youtu.be/4ej1XkAvzhc?si=uMzVhFt7rpseA9Wu
5. Mass Transit System: https://youtu.be/O9OR-IpX32I?si=Sn7uw3bF_o89BPKM
6. Bridge Engineering: https://youtu.be/RB2k5hSYO3U?si=7B0sA6N36OOjDh8T

1G236118	ADVANCED SURVEYING	L	T	P	C
THEORY		3	0	0	3

INTRODUCTION:

Advanced surveying techniques encompass a diverse array of methods and technologies employed to accurately measure, map, and analyze the Earth's surface and its features. These techniques often go beyond traditional surveying methods, incorporating cutting-edge technologies and sophisticated methodologies to achieve precise and comprehensive results. One facet of advanced surveying involves the utilization of satellite-based positioning systems such as GPS (Global Positioning System), GNSS (Global Navigation Satellite System), and GIS (Geographic Information System). These systems enable surveyors to determine precise coordinates of points on the Earth's surface, facilitating accurate mapping, navigation, and geospatial analysis. Overall, advanced surveying plays a pivotal role in various fields including urban planning, civil engineering, environmental management, disaster response, and natural resource exploration. By harnessing the power of advanced technologies and methodologies, surveyors can generate precise geospatial data essential for informed decision-making, sustainable development, and effective resource management.

OBJECTIVES:

The objective of this course is to enable the student to

- Introduction to Engineering Survey Understanding the basic terms & Principles of Surveys.
- Gain Knowledge about Modern surveying Instruments.
- Students can able to Understand the Hydrographic And Astronomical Surveying
- Students can able to understand the Knowledge of Remote Sensing.
- Students can able to understand the Knowledge of Photogrammetry.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Introduction to Engineering Survey Understanding the basic terms & Principles of Surveys.
CO-2	Gain Knowledge about Modern surveying Instruments.
CO-3	To Understand the Hydrographic And Astronomical Surveying
CO-4	To understand the Knowledge of Remote Sensing.
CO-5	To understand the Knowledge of Photogrammatery.

Pre-Requisites: Knowledge of basic Surveying

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	-	3	-	2	3	3	3	2
CO2	3	-	2	2	-	-	3	3	2
CO3	3	2	3	2	2	3	2	3	2
CO4	3	2	2	2	-	2	2	3	2
CO5	3	-	3	-	-	3	2	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

1G236118	ADVANCED SURVEYING	L	T	P	C
THEORY		3	0	0	3
	END TERM PATTERN	Theory			
UNIT- 1	ENGINEERING SURVEYS				
	1.1 Reconnaissance, preliminary and location surveys for engineering projects - Lay out - Setting out works - Route Surveys for highways, railways and waterways 1.2 Horizontal and vertical curves - Simple curves - Setting with chain and tapes, Tangential angles by theodolite, double theodolite - Setting out by offsets and angles - Vertical curves - Mine Surveying - instruments - Tunnels - Correlation of underground and surface surveys – Shafts.				9
UNIT- 2	MODERN SURVEYING INSTRUMENTS				
	2.1 Electronic Theodolites - component parts -set up- working principles – temporary adjustments - Total stations - uses-component parts - EDM, Electronic field book - Advantages – Parts and accessories - working principle – Observables – Errors - COGO functions – Field procedure and applications. 2.2 GPS: Advantages - System components– receiver components and antenna – Planning and data acquisition – Data processing - Errors in GPS – Field procedure and applications. Geographical information systems (GIS) - map definitions, map projections data entry importance, use and application of GIS in Civil Engineering.				9
UNIT- 3	HYDROGRAPHIC AND ASTRONOMICAL SURVEYING				
	3.1 Hydrographic Surveying - Tides - MSL - Sounding methods - Location of soundings and methods - Three point problem (Lehmann's Method,Bessels Method, Mechanical Method) - Strength of fix - Sextants and station pointer - River surveys - Measurement of current and discharge - Celestial sphere. 3.2 Astronomical terms and definitions - Motion of sun and stars - Apparent altitude and corrections - Celestial co-ordinate systems - Different time systems - use of Nautical almanac - Star constellations.				9

UNIT- 4	**INTRODUCTION TO REMOTE SENSING**	
	4.1 Remote sensing - Introduction and applications in Civil Engineering– components of RS – History of Remote Sensing – Merits and demerits of data collation between conventional and remote sensing methods. 4.2 Electromagnetic Spectrum-Standard atmospheric profile –interaction of radiation with atmosphere – Scattering, absorption and refraction -Spectral Signature concepts – Typical spectral reflectance curves for vegetation, soil and water –Classification of remote sensors.	9
UNIT- 5	**INTRODUCTION TO PHOTOGRAMMETRY**	
	5.1 Principles - Stereoscopic depth perception – aerial photo-aerial camera -Scale – overlaps – stereoscopy – concepts – viewing and measuring system – principle of floating mark 5.2 Methods of parallax measurement – vertical photographs – geometry, scale, parallax equations, Planimetric mapping – Tilted photograph – Geometry, Coordinate system, Scale, Planimetric mapping.	9
Total Missing		**45**

Suggested student activities

- Collect the information on survey instruments available in the market with specifications.
- Watch educational videos on various advanced surveying methods to understand the concepts.

Text Books:

1. Dr. B. C. Punmia, Ashok K. Jain and Arun K Jain, Surveying Vol. I & II, 6th Edition, Lakshmi Publications Pvt Ltd, New Delhi, Sixteenth Edition, 2016.
2. K. R. Arora, Surveying Vol I & II, 12th Edition ,Standard Book house, 2013.
3. C. Venkatramaiah, Textbook of Surveying, 2nd Edition, Universities Press, 2011.

Web resources:

1. Setting out of simple curve - https://www.youtube.com/watch?v=am3MYbQApz8

2. EDM - https://www.youtube.com/watch?v=HImugNxfDhU
3. Hydrographic Surveying - https://www.youtube.com/watch?v=ZkZbVOdaXHs
4. GIS - https://www.youtube.com/watch?v=rEzgU6Ds_5c
5. Remote Sensing And GIS - https://www.youtube.com/watch?v=Cy2Oy9iJTbY
6. Types Of Photogrammetry - https://www.youtube.com/watch?v=VliVvNrV_vU

1G236241	ARTIFICIAL INTELLIGENCE AND MACHINE	L	T	P	C
PRACTICUM	LANGUAGE IN CONSTRUCTION MANAGEMENT	1	0	4	3

INTRODUCTION:

This course explores the transformative impact of Artificial Intelligence (AI) and Machine Learning (ML) on construction management. It aims to equip students with the knowledge and skills needed to leverage AI and ML technologies to optimize construction processes, improve project outcomes, and enhance decision-making. Through a combination of theoretical understanding and practical application, students will learn how to implement these advanced technologies in real-world construction scenarios. The course aims to bridge the gap between advanced technology and practical construction management, preparing students to lead the future of the construction industry with cutting-edge AI and ML capabilities

OBJECTIVES:

The objective of this course is to enable the student to

- Understand the fundamental concepts of AI and ML.
- Explore the applications of AI and ML in the construction industry.
- Analyze the benefits and challenges of integrating AI and ML in construction management.
- Develop practical skills in using AI and ML tools for construction project planning, scheduling, and risk management.
- Evaluate case studies of AI and ML implementations in construction

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Demonstrate an understanding of AI and ML principles and their relevance to construction management.
CO-2	Apply AI and ML techniques to solve complex problems in construction
CO-3	Analyze and interpret data to make informed decisions in construction management.
CO-4	Develop AI-driven solutions to enhance efficiency, safety, and quality in construction.

CO-5	Critically assess the impact of AI and ML on the construction industry and anticipate future trends.

Pre-Requisites: NIL

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	2	1	-	3	1	2
CO2	3	2	1	2	1	-	3	1	2
CO3	3	2	1	2	1	-	3	1	2
CO4	3	2	1	2	1	-	3	1	2
CO5	3	2	1	2	1	-	3	1	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- Lecture
- Presentation
- Demonstration
- Discussion

1G236241	ARTIFICIAL INTELLIGENCE AND MACHINE LANGUAGE IN CONSTRUCTION MANAGEMENT	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT- 1	**PYTHON PROGRAMMING**	
	Variables, Data types, Control flow statements: if, looping statements (for and while); Functions; Creation, manipulation, and common operations: Lists, Tuples, Dictionaries and Sets: Fundamental Python Libraries for Data Scientists: Numpy, ScikitLearn, Pandas, Matplotlib	5
UNIT- 2	**MACHINE LEARNING**	
	Introduction to Machine Learning: ML Types, Regression: Linear Regression; Classification: K-Nearest Neighbour (KNN), and Decision Tree - Unsupervised algorithm: K-Means algorithm; Dimensionality Reduction – Principal Component Analysis (PCA) Algorithm	5
UNIT- 3	**ARTIFICIAL INTELLIGENCE**	
	Multi-Layer Perceptron, Artificial Neural Network, Introduction to generative AI, Prompt Engineering - Introduction to AI in Civil Engineering, Use of AI in Smart Construction Equipment.	5
	PRACTICAL EXERCISES	
	1. Sample programs using conditional and looping statements.	6
	2. Sample Programs for List, Array, Dictionary and Set	6
	3. Data Manipulation with Pandas; Sample programs to pre-process and visualize data.	6
	4. ML - Estimation of the cost of a construction project using linear regression	6
	5. ML - Prediction of Labour requirement for a project using KNN.	6
	6. ML - Prediction of salaries of the employee in a construction site using decision tree	5
	7. ML - Concrete strength prediction using Random Forest Regression.	5
	8. ML – Using K Means clustering to improve construction project	5

	efficiency 9. ML - Perform univariate and multivariate time series forecasting 10. ML - Prediction of Material requirement for a project. 11. ML - Estimation of time overruns in a project using ANN	 5 5 5
	Total Hours	**75**

Suggested student activities:

1. Tracking worker movements and safety compliance using ML
2. Weather related delays using ML algorithm.
3. Minimising material cost and resource optimization in the Construction fields.
4. Develop AI systems to monitor safety compliance on construction sites.
5. Analyse historical data to predict risks using ML Algorithms.

Text Books:

1. Limao Zhang, YuePan, Xianguo Wu, Miroslaw J. Skibniewski, Artificial Intelligence in Construction Engineering and Management, Springer, 2024.
2. Vagelis Plevris, Afaq Ahmad, Nikos D. Lagaros, Artificial intelligence and Machine Learning Techniques for Civil Engineering, 1st Edition, IGI Global, 17th March 2023.
3. Jonathan S Walker, Machine Learning for Beginners, 1st edition , Jw Choices, 31st January 2023.

Web resources:

1. Suggested Journals : Journal of Computing in Civil Engineering (ASCE)
2. https://www.constructiondive.com/for live construction news updation
3. Learning Path: "AI and Machine Learning Foundations" from coursera.
4. AI tools – Copilot.ai,Bard.ai,Chatgpt.ai etc.

Equipment / Facilities required conducting the Practical Course. (Batch Strength: 30 Students)

Computers- 30

Software's used:

- Pycharm
- Anaconda python & Data set : Kaggle ,Github ,data.gov etc.

1G236242	STRUCTURAL DETAILING FOR RCC ELEMENTS	L	T	P	C
PRACTICUM		1	0	4	3

INTRODUCTION:

This is a core subject which covers broad elements of RCC detailing. This is an important subject that deals with the detailing of RCC structural elements. Diploma holders in Civil Engineering will be required to supervise the civil works with structural drawings. They may also be required to design and detail simple structural elements, make changes in detailing and drafting procedure depending upon the availability of materials (bars of different diameters). This subject thus deals with elementary detailing principles as per IS code of practice IS: 456 - 2000 by limit state method.

OBJECTIVES:

The objective of this course is to enable the student to

- Detailing and drafting of simple RCC elements like singly, doubly reinforced rectangular beams, and singly reinforced simply supported T-beams for flexure and shear.
- Detailing and drafting of One way/ Two way simply supported slabs.
- Design Axially loaded Columns and Footings.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Detailing and drafting of RCC elements like singly doubly reinforced rectangular beams, and singly reinforced Cantilevers, simply supported and Continuous beams for flexure and shear.
CO-2	Detailing and drafting of One way/ Two-way slabs.
CO-3	Detailing and drafting of Axially loaded Columns and Footings.

Pre-Requisites: Design of R.C.C Structures

CO-POs Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	3	2	-	2	-	3	3	2
CO2	3	3	2	-	2	-	3	3	2
CO3	3	3	2	-	2	-	3	3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation.

Instructional Strategy:

- This subject is introduced so that diploma holder in Civil Engineering may appreciate the concepts and principles of RCC structural elements of buildings and are able to apply the knowledge gained through the subjects of mechanics of materials and mechanics of structures. The detailing of simple structural elements like beams, slabs, column and footings will be demonstrate to the students to expose them in the field.

- Teacher should give simple exercises involving the applications of various concepts and principles being taught in the subject.

- Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve the tutorial problems independently and visit to local construction site to understand the behavior and uses of structural elements.

- Teacher may conduct weekly small quiz sessions to know the students' level of understanding.

Note:

1. Use of I.S Code 456-2000, I.S. 800-2007, Steel tables and Hand book approved by DOTE are permitted inside the examination hall.
2.

1G236242	STRUCTURAL DETAILING FOR RCC ELEMENTS	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			
UNIT- 1	DETAILING OF SINGLY REINFORCED SIMPLY SUPPORTED AND CANTILEVER BEAMS AS PER IS 456- 2000				
	Concept of Reinforced Cement Concrete (RCC)– Types of Reinforcement Materials-Suitability of steel as reinforcing material-Properties of mild steel, HYSD steel and TMT bars-Loading on structures as per IS:875 - Development of stress in reinforcement-Curtailment of reinforcements - Detailing and drafting Concept of simply supported singly and cantilever beams as per IS456 -2000.				2
	Practical exercises:				
	1. Detailing and Drafting of Singly Reinforced simply supported beam as per codal provisions. .				5
	2. Detailing and Drafting of Singly Reinforced cantilever beam as per codal provisions.				5
UNIT- 2	DETAILING OF DOUBLY REINFORCED SIMPLY SUPPORTED AND CANTILEVER BEAMS AS PER IS 456- 2000				
	Curtailment of reinforcements -Detailing and drafting Concept of simply supported and cantilever doubly reinforced beams as per IS456 -2000.				2
	Practical exercises:				
	3. Detailing and Drafting Doubly Reinforced simply supported beam as per codal provisions.				5
	4. Detailing and Drafting Doubly Reinforced Cantilever beam as per codal provisions.				5
UNIT- 3	DETAILING OF ONE WAY AND ONEWAY CONTINUOUS SLABS AS PER IS 456- 2000				

	Requirements governing slab reinforcements and detailing of slabs as per IS 456 – 2000 -Detailing and drafting of one way and one way continuous slabs **Practical exercises:** 5. Detailing and drafting of one-way slab as per codal provisions. 6. Detailing and drafting of one-way Continuous slab as per codal provisions.	2 5 5
UNIT- 4	**DETAILING OF TWO WAY AND TWO WAY CONTINUOUS SLABS AS PER IS 456- 2000**	
	Requirements governing slab reinforcements and detailing of slabs as per IS 456 – 2000 -Detailing and drafting of one way, two way slab (Corners are not held down and corners held down) - Tension and Torsion reinforcement requirements. **Practical exercises:** 7.Detailing and drafting of two-way slab as per codal provisions- Corners are not held down (All the Four edges discontinuous case) 8. Detailing and drafting of two-way slab as per codal provisions corners held down (All the Four edges discontinuous case) 9.Detailing and drafting of two-way Continuous slab as per codal provisions	2 5 5 5
UNIT- 5	**DETAILING OF COLUMNS AND FOOTING AS PER IS 456- 2000**	
	Requirements governing longitudinal and transverse reinforcement of column as per IS 456 - arrangement of transverse and longitudinal reinforcement as per IS 456 - detailing and drafting of axially loaded short columns for reinforcement distributed equally on two/four sides and footing as per IS code. **Practical exercises:** 10. Detailing and drafting of square column as per codal provisions. 11. Detailing and drafting of rectangular column as per codal provisions. 12. Detailing and drafting of isolated square footing as per codal provisions.	2 5 5 5

	13.Detailing and drafting of isolated rectangular footing as per codal provisions	5
Total Hours		**75**

Suggested student activities:

- Visits to nearby construction site and study about
- Foundation and Footings
- Column reinforcements
- Grade beam and lintel level beam reinforcement arrangements
- Reinforcement details for beams and slabs
- Study the bar bending details of structural drawings.
- Learning the reinforcement arrangements given in SP- 34 (Hand book on concrete reinforcement and detailing)

Text Books:

1. B.C.Punmia "Limit state Design of Reinforced concrete"revised edition, Lakshmi publications, Delhi, 2016
2. P.C.Varghese "Limit state design of reinforced concrete", 2nd edition PHI Learning Pvt. Ltd, 2008
3. 3. S.S.Bhavikatti "Design of RCC and structural elements", 1st edition, New age International Publications, 2016
4. IS 456 -2000, IS 875-1987, IS 800-2007.

Web resources:

1.https://nptel.ac.in/

2.https://ndl.iitkgp.ac.in

LIST OF EQUIPMENTS (for a batch of 30 students):

S.No.	List of Equipment's required	Quantity Required
1	Computers	30 Nos.
2	Laser printer	2 Nos
3	CAD software	30 User

1G236243	DESIGN AND DRAWING OF STEEL ELEMENTS	L	T	P	C
PRACTICUM		1	0	4	3

Introduction:

A steel structure, a metal structure is made of structural steel components connected to each other to carry loads and provide rigidity. The subject deals with the basic concepts and principles, their application in drafting and detailing tension members, compression members and connections.

Course Objectives:

- The objectives of the course is to enable the students to
- Express bout steel and its importance
- Know the importance of steel in construction.
- Know the use of steel code and steel tables
- Know the importance of steel code for the design
- Know the various types of steel
- Know the types of connections
- Apply the knowledge of connections
- Know the types of connections
- Assess the drafting and detailing of tension members
- Assess the drafting and detailing of compression members
- Assess the drafting and detailing of connections

Course Outcomes:

On successful completion of this course, the student will be able to

CO1: To understand the application of IS code of practice for the design of steel structural elements

CO2: To understand the detailing and drafting of Compression members.

CO3: To understand the detailing and drafting of Tension members.

CO4: To understand the detailing and drafting of Beams.

CO5: To understand the detailing and drafting of welded and bolted connections

Pre-requisites: Properties of Steel, Types and Shapes Steel Elements.

CO/PO Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	2	1	2	2	3	1
CO2	3	2	1	2	1	2	2	3	1
CO3	3	2	1	2	1	2	2	3	1
CO4	3	2	1	2	1	2	2	3	1
CO5	3	2	1	2	1	2	2	3	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy:

- To help the students to learn and appreciate the concepts in drafting and detailing the members and connections.
- Theory- demonstrates- practice – activity may be used to ensure that learning is outcome- and employability based.
- Visits to different construction activities have to be planned on all the topics.

1G236243	DESIGN AND DRAWING OF STEEL ELEMENTS	L	T	P	C
PRACTICUM		1	0	4	3
	END TERM PATTERN	PRACTICAL			

UNIT -I	SIMPLE CONNECTION-BOLTED AND WELDED CONNECTION	
	Introduction -Bolted connection-types of bolts-Types of bolted joints-lap and butt joint-main plate, cover plate, packing plate, tack bolts-Patterns of bolted joints-chain, Staggered, diamond-IS 800 2007 Specifications for bolted joints-Diameter of bolts, pitch,Gauge, edge distance, end distance Welded connection-Types of weld-fillet weld, butt weld or groove, plug weld, slot weld, Spot weld-IS 800 2007 Specifications for welded joint-size, effective throat thickness, Effective length, overlap-intermittent weld.	**3**
	Practical exercises:	
	1. Detailing and drafting of double cover butt joint with packing plate and bolt arranged in diamond pattern.	**4**
	2. Detailing and drafting of end connection of ISA tie member with gusset plate by fillet weld.	**4**
	3. Detailing and drafting of end connection of Channeltie member with gusset plate by slot weld and plug weld	**4**
UNIT -II	**TENSION MEMBERS**	
	Tension members-types of tension members-Net sectional area- Types of failure-yielding failure; rupture failure and block shear failure-Lug angle-Splice.	**3**
	Practical exercises:	
	4. Draw the block shear failure of angle tie member connected to gusset plate by a) Single bolted connection b) Double bolted connection	**4**
	5. Detailing and drafting of Channel tension member connected to gusset plate using lug angle by bolted connection.	**4**

	6. Detailing and drafting of tension member consisting of two angles placed back-to-back connected to gusset plate using lug angle by bolted connection	**4**
UNIT -III	**COMPRESSION MEMBERS**	
	Introduction-Compression members- effective length-slenderness ratio-Design of simple compression member-Built-up column-Lacing-Batten-IS 800 2007 provision for built-up column-Splice	**3**
	Practical exercises:	
	7. Detailing and drafting of built-up column of two channels face-to-face connected by single lacing	**4**
	8. Detailing and drafting of built-up column of two channels back-to-back connected by double lacing.	**4**
	Detailing and drafting of built-up column of two channels face-to-face connected by battens.	**4**
UNIT -IV	**BEAMS**	
	Beams-Laterally supported and laterally unsupported beams-Design of simple steel beam-Plate girder	**3**
	Practical exercises:	
	9. Detailing and drafting of laterally unsupported beam	**4**
	10. Detailing and drafting of laterally supported beam	**4**
	11. Detailing and drafting of plate girder	**4**
UNIT -V	**ROOF TRUSS**	
	Truss-Components of truss-Types of truss-Pratt truss, Warren truss, Fink truss, King post truss, Queen post truss, Howe truss, North light roof truss	**3**
	12. Detailing and drafting of Pratt truss	**4**
	13. Detailing and drafting of Fink truss	**4**
	14. Detailing and drafting of North light roof truss	**4**
TOTAL HOURS		**75**

Suggested Students Activities:

- Seminar on the different types of steel, joints and application.
- Periodic quizzes based on the topic.
- Industrial visit to know about the real- world application.

TEXT BOOKS

1. Duggal S.K., Design of Steel Structures, Tata McGraw Hill, Publishing Co. Ltd., New Delhi, 2010
2. Bhavikatti S.S, Design of Steel Structures, Ik International Publishing House, New Delhi, 2017.
3. Jack C. McCormac and Stephen F Csernak, Structural Steel Design, Pearson Education Limited, 2013

Web-based/Online Resources:

1. Nptel-Design of steel structures. https://archive.nptel.ac.in/courses/105/105/105105162**/**
2. http://ecoursesonline.iasri.res.in/course/view.php?id=64

List of Equipments:

S.NO.	List of Equipments required	Quantity Required
1	Computers	30 Nos.
2	Laser printer	2 Nos.
3	CAD software	30 Users

1G236351	INTERNSHIP	Periods	C
PROJECT		540	12

Introduction

Internships in educational institutions are designed to provide students with practical experience in their field of study and to bridge the gap between academic knowledge and professional practice.

Objectives

After completing Internship, Interns will be able to,

1. Apply the theoretical knowledge and skill during performance of the tasks assigned in internship.
2. Demonstrate soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship.
3. Document the Use case on the assigned Task.
4. Enable interns to apply theoretical knowledge gained in the classroom to real-world practical applications.
5. Provide hands-on experience in the industrial practices.
6. Develop essential skills such as communication, organization, teamwork, and problem-solving.
7. Enhance specific skills related to the intern’s area of focus.
8. Offer a realistic understanding of the daily operations and responsibilities.
9. Provide opportunities to work under the guidance of experienced supervisors and administrators.
10. Allow interns to explore different career paths.
11. Help interns make informed decisions about their future career goals based on first hand experience.

12. Facilitate the establishment of professional relationships with supervisor, administrators, and other professionals in the field.
13. Provide access to a network of contacts that can be beneficial for future job opportunities and professional growth.
14. Foster personal growth by challenging interns to step out of their comfort zones and take on new responsibilities.
15. Build confidence and self-efficacy through successful completion of internship tasks and projects.
16. Give insight into the policies, regulations, and administrative practices.
17. Allow interns to observe and understand the implementation of standards and policies in practice.
18. Provide opportunities for constructive feedback from supervisors and mentors, aiding in the intern's professional development.
19. Enable self-assessment and reflection on strengths, areas for improvement, and career aspirations.
20. Encourage sensitivity to the needs and backgrounds of different groups, promoting inclusive and equitable industrial practices.

Courses Outcomes:

	After successful completion of this course the students should be able to
CO-1	Demonstrate improved skills.
CO-2	Exhibit increased professional behaviour.
CO-3	Apply theoretical knowledge and principles in real-world practices.
CO-4	Develop and utilize assessment tools to evaluate the learning and practices.
CO-5	Engage in reflective practice to continually improve their learning and professional growth.

Facilitating the Interns by an Internship Provider:

- Orient intern in the new workplace. Give interns an overview of the organization, Explain the intern's duties and introduce him or her to co-workers.
- Develop an internship job description with clear deliverables and timeline.
- Allow the interns in meetings and provide information, resources, and opportunities for professional development.
- The interns have never done this kind of work before, they want to know that their work is measuring up to organizational expectations, hence provide professional guidance and mentoring to the intern.
- Daily progress report of Intern is to be evaluated by industry supervisor. Examine what the intern has produced and make suggestions. Weekly supervision meetings can help to monitor the intern's work.

Duties Responsibilities of the Faculty Mentor

- To facilitate the placement of students for the internship.
- To liaison between the college and the internship provider.
- To assist the Industrial Training Supervisor during assessment

Instructions to the Interns

- Students shall report to the internship provider on the 1st day as per the internship schedule.
- Intern is expected to learn about the organization, its structure, product range, market performance, working philosophy etc.
- The interns shall work on live projects assigned by the internship provider.
- The Intern shall record all the activities in the daily log book and get the signature of the

concerned training supervisor.

- Intern shall have 100% attendance during internship programme. In case of unavoidable circumstances students may avail leave with prior permission from the concerned training supervisor of the respective internship provider. However, the maximum leave permitted during internship shall be as per company norms where they are working and intern shall report the leave sanctioned details to their college faculty mentor.
- The interns shall abide all the Rules and Regulations of internship provider
- Intern shall follow all the safety Regulations of internship provider.
- On completion of the internship, the intern shall report to the college and submit the internship certificate mentioning duration of internship, evaluation of interns by internship provider, Student's Diary and Comprehensive Training Report.

Attendance Certification

Every month students have to get their attendance certified by the industrial supervisor in the prescribed form supplied to them. Students have also to put their signature on the form and submit it to the institution supervisor. Regularity in attendance and submission of report will be duly considered while awarding the Internal Assessment mark.

Training Reports:

The students have to prepare two types of reports: Weekly report in the form of diary to be submitted to the concerned staff in-charge of the institution. This will be reviewed while awarding Internal.

Industrial Training Diary:

Students are required to maintain the record of day-to-day work done. Such a record is called Industrial training Diary. Students have to write this report regularly. All days for the week should be accounted for clearly giving attendance particulars (Presence, absence, Leave, Holidays etc.). The concern of the Industrial supervisor is to periodically check these progress reports.

Comprehensive Training Report:

In addition to the diary, students are required to submit a comprehensive report on training with details of the organisation where the training was undergone after attestation by the supervisors. The comprehensive report should incorporate study of plant/product/process/construction along with intensive in-depth study on any one of the topics such as processes, methods, tooling, construction and equipment, highlighting aspects of quality, productivity and system. The comprehensive report should be completed in the last week of Industrial training.

Any data, drawings etc. should be incorporated with the consent of the Organisation.

1G236352	FELLOWSHIP	Periods	C
PROJECT		540	12

Introduction

The Fellowship in the Diploma in Engineering program is designed to provide aspiring engineers with a comprehensive educational experience that combines theoretical knowledge with practical skills. This fellowship aims to cultivate a new generation of proficient and innovative engineers who are equipped to meet the challenges of a rapidly evolving technological landscape.

Participants in this fellowship will benefit from a robust curriculum that covers core engineering principles, advanced technical training, and hands-on projects. The program emphasizes interdisciplinary learning, encouraging fellows to explore various branches of engineering, from mechanical and civil to electrical, electronics & communication and computer engineering. This approach ensures that graduates possess a versatile skill set, ready to adapt to diverse career opportunities in the engineering sector.

In addition to academics, the fellowship offers numerous opportunities for professional development. Fellows will engage with industry experts through seminars, workshops, and internships, gaining valuable insights into real-world applications of their studies. Collaborative projects and research initiatives foster a culture of innovation, critical thinking, and problem-solving, essential attributes for any successful engineer.

By offering this fellowship, participants become part of a vibrant community of learners and professionals dedicated to advancing the field of engineering. The program is committed to supporting the growth and development of each fellow, providing them with the tools and resources needed to excel both academically and professionally.

The Fellowship in the Diploma in Engineering is more than just an educational endeavor; it is a transformative journey that equips aspiring engineers with the knowledge, skills, and experiences necessary to make significant contributions to society and the engineering profession.

Objectives

After completing students will be able to,

- Provide fellows with a solid foundation in core engineering principles and advanced technical knowledge across various engineering disciplines
- . Equip fellows with hands-on experience through laboratory work, projects, and internships, ensuring they can apply theoretical knowledge to real-world scenarios.
- Promote interdisciplinary understanding by encouraging exploration and integration of different engineering fields, fostering versatility and adaptability in fellows.
- Encourage innovation and creativity through research projects and collaborative initiatives, enabling fellows to develop new solutions to engineering challenges.
- Facilitate professional growth through workshops, seminars, and interactions with industry experts, preparing fellows for successful careers in engineering.
- Develop critical thinking and problem-solving skills, essential for tackling complex engineering problems and making informed decisions.
- Strengthen connections between academia and industry by providing opportunities for internships, industry visits, and guest lectures from professionals.
- Foster leadership qualities and teamwork skills through group projects and collaborative activities, preparing fellows for leadership roles in their future careers.
- Instill a sense of ethical responsibility and awareness of the social impact of engineering practices, encouraging fellows to contribute positively to society.
- Promote a culture of lifelong learning, encouraging fellows to continually update their knowledge and skills in response to technological advancements and industry trends.
- Prepare fellows to work in a global engineering environment by exposing them to international best practices, standards, and cross-cultural experiences.

Courses Outcomes:

After successful completion of this course the students should be able to	
CO-1	Demonstrate a strong understanding of core engineering principles and possess the technical skills necessary to design, analyze, and implement engineering solutions across various disciplines.

CO-2	Apply theoretical knowledge to practical scenarios, effectively solving engineering problems through hands-on projects, laboratory work, and internships.
CO-3	Exhibit the ability to conduct research, develop innovative solutions, and contribute to advancements in engineering through critical thinking and creative approaches to complex challenges.
CO-4	Understand and adhere to professional and ethical standards in engineering practice, demonstrating responsibility, integrity, and a commitment to sustainable and socially responsible engineering.
CO-5	Enhance strong communication skills, both written and verbal, and be capable of working effectively in teams, demonstrating leadership and collaborative abilities in diverse and multidisciplinary environments.

Important points to consider selecting the fellowship project.

Selecting the right fellowship project is crucial for maximizing the educational and professional benefits of a Diploma in engineering program.

- **Relevance to Future Plans**: Choose a project that aligns with your long-term career aspirations and interests. This alignment will ensure that the skills and knowledge you gain will be directly applicable to your desired career path.
- **Industry Relevance**: Consider the current and future relevance of the project within the industry. Opt for projects that address contemporary challenges or emerging trends in engineering.
- **Access to Facilities**: Ensure that the necessary facilities, equipment, and materials are available to successfully complete the project. Lack of resources can hinder the progress and quality of your work.
- **Mentorship and Guidance**: Select a project that offers strong mentorship and support from experienced faculty members or industry professionals. Effective guidance is crucial for navigating complex problems and achieving project objectives.

- **Project Scope**: Assess the scope of the project to ensure it is neither too broad nor too narrow. A well-defined project scope helps in setting clear objectives and achievable milestones.
- **Feasibility**: Evaluate the feasibility of completing the project within the given timeframe and with the available resources. Consider potential challenges and ensure you have a realistic plan to address them.
- **Technical Skills**: Choose a project that allows you to develop and enhance important technical skills relevant to your field of study. Practical experience in using specific tools, technologies, or methodologies can be highly beneficial.
- **Soft Skills**: Consider projects that also offer opportunities to develop soft skills such as teamwork, communication, problem-solving, and project management.
- **Innovative Thinking**: Select a project that encourages creativity and innovative problem-solving. Projects that push the boundaries of traditional engineering approaches can be particularly rewarding.
- **Societal Impact**: Consider the potential impact of your project on society or the engineering community. Projects that address significant challenges or contribute to social good can be highly fulfilling and make a meaningful difference.

Guidelines to select Fellowship

- Ensure the program is accredited by a recognized accrediting body and has a strong reputation for quality education in engineering.
- Ensure it covers core engineering principles that align with your interests and career goals.
- Investigate the qualifications and experience of the faculty mentor. Look for programs with faculty who have strong academic backgrounds, industry experience, and active involvement in research.

- Check if the program provides adequate hands-on training opportunities, such as laboratory work, workshops, and access to modern engineering facilities and equipment.
- Assess the program's connections with industry. Strong partnerships with companies can lead to valuable internship opportunities, industry projects, and exposure to real-world engineering challenges.
- Explore the availability of research opportunities. Participation in research projects can enhance your learning experience and open doors to innovative career paths.
- Look for programs that offer professional development resources, such as workshops, seminars, and networking events with industry professionals and alumni.
- Ensure the program provides robust support services, including academic advising, career counseling, mentorship programs, and assistance with job placement after graduation.
- Consider the cost of the program and available financial aid options, such as scholarships, grants, and fellowships. Evaluate the return on investment in terms of career prospects and potential earnings.

Research the success of the program's alumni. High employment rates and successful careers of past graduates can indicate the program's effectiveness in preparing students for the engineering field.

Duties Responsibilities of the Faculty Mentor

Each student should have a faculty mentor for the Institute.

- Get the approval from the Chairman Board of Examinations with the recommendations of the HOD/Principal for the topics.
- Provide comprehensive academic advising to help fellows select appropriate specializations, and research projects that align with their interests and career goals.
- Guide fellows through their research projects, offering expertise and feedback to ensure rigorous methodology, innovative approaches, and meaningful contributions to the field.

- Assist fellows in developing technical and professional skills through hands-on projects, laboratory work, and practical applications of theoretical knowledge.
- Offer career advice and support, helping fellows explore potential career paths, prepare for job searches, and connect with industry professionals and opportunities.
- Provide personal mentorship, fostering a supportive relationship that encourages growth, resilience, and a positive academic experience.
- Facilitate connections between fellows and industry professionals, alumni, and other relevant networks to enhance their professional opportunities and industry exposure.
- Ensure fellows have access to necessary resources, including research materials, lab equipment, software, and academic literature.
- Regularly monitor and evaluate the progress of fellows, providing constructive feedback and guidance to help them stay on track and achieve their goals.
- Instill and uphold high ethical and professional standards, encouraging fellows to practice integrity and responsibility in their work.
- Assist with administrative tasks related to the fellowship program, such as preparing progress reports, writing recommendation letters, and facilitating grant applications.
- Organize and participate in workshops, seminars, and other educational events that enhance the learning experience and professional development of fellows.
- Address any issues or conflicts that arise, providing mediation and support to ensure a positive and productive academic environment.

Instructions to the Fellowship Scholar

- Regularly meet with your faculty mentor for guidance on academic progress, research projects, and career planning. Be proactive in seeking advice and support from your mentor.
- Develop strong organizational skills. Use planners, calendars, and task management tools to

keep track of assignments, project deadlines, and study schedules. Prioritize tasks to manage your time efficiently.

- Take advantage of opportunities to participate in research projects and hands-on activities. These experiences are crucial for applying your theoretical knowledge and gaining practical skills.
- Focus on improving essential professional skills such as communication, teamwork, problem-solving, and leadership. Participate in workshops and seminars that enhance these competencies.
- Actively seek networking opportunities through industry events, seminars, and meetings. Establish connections with peers, alumni, and professionals in your field to build a strong professional network.
- Seek internships, co-op programs, or part-time jobs related to your field of study. Real-world experience is invaluable for understanding industry practices and enhancing your employability.
- Uphold high ethical standards in all your academic and professional activities. Practice integrity, honesty, and responsibility. Adhere to the ethical guidelines and standards set by your institution and the engineering profession.
- Adopt a mindset of lifelong learning. Stay updated with the latest developments and trends in engineering by reading industry journals, attending conferences, and taking additional courses.

Documents to be submitted by the student to offer fellowship.

- **Completed Application Form**: This is typically the standard form provided by the institution or fellowship program that includes personal information, educational background, and other relevant details.
- **Detailed CV/Resume**: A comprehensive document outlining your educational background,

knowledge experience, and interest in research experience, publications, presentations, awards, and other relevant achievements if any.

- **Personal Statement**: A document explaining your motivation for applying to the fellowship, your career goals, how the fellowship aligns with those goals, and what you intend to achieve through the program.
- **Recommendation Letters**: Letters from faculty mentor, employer, or professionals who can attest to your academic abilities, professional skills, and suitability for the fellowship.
- **Proposal/Description**: A detailed proposal or description of the fellowship project or study you plan to undertake during the fellowship. This should include objectives, methodology, expected outcomes, and significance of the project.
- **Enrollment Verification**: Documentation verifying your current acceptance status in the academic institution or industry where the fellowship will be conducted.
- **Funding Information**: Details about any other sources of funding or financial aid you are receiving, if applicable. Some fellowships may also require a budget proposal for the intended use of the fellowship funds.
- **Samples of Work**: Copies of the relevant work that demonstrates your capabilities and accomplishments in your field.
- **Endorsement Letter**: A letter from your current academic institution endorsing your application for the fellowship, if required.
- **Ethical Approval Documents**: If your research involves human subjects or animals, you may need to submit proof of ethical approval from the relevant ethics committee.
- **Additional Documents**: Any other documents requested by the fellowship program required by the institution.

Attendance Certification

Every month students have to get their attendance certified by the supervisor in the prescribed form supplied to them. Students have also to put their signature on the form and submit it to the faculty mentor. Regularity in attendance and submission of report will be duly considered while awarding the Internal Assessment mark.

S.No.	Topics	Description
1	Alignment with Objectives	Assess how well the project aligns with the stated objectives and requirements. Determine if the student has addressed the key aspects outlined in the project guidelines.
2	Depth of Research:	Evaluate the depth and thoroughness of the literature review. Assess the student's ability to identify and address gaps in existing research.
3	Clarity of Objectives:	Check if the student has clearly defined and articulated the objectives of the project. Ensure that the objectives are specific, measurable, achievable, relevant, and time-bound (SMART).
4	Methodology and Data Collection:	Evaluate the appropriateness and justification of the research methodology. Assess the methods used for data collection and their relevance to the research questions.
5	Analysis and Interpretation:	Examine the quality of data analysis techniques used. Assess the student's ability to interpret results and draw meaningful conclusions.
6	Project Management:	Evaluate the project management aspects, including adherence to timelines and milestones .Assess the student's ability to plan and execute the project effectively.
7	Documentation and Reporting:	Check the quality of documentation, including code, experimental details, and any other relevant materials. Evaluate the clarity, structure, and coherence of the final report.
8	Originality and Creativity:	Assess the level of originality and creativity demonstrated in the project. Determine if the student has brought a unique

		perspective or solution to the research problem.
9	Critical Thinking:	Evaluate the student's critical thinking skills in analyzing information and forming conclusions. Assess the ability to evaluate alternative solutions and make informed decisions.
10	Problem-Solving Skills:	Evaluate the student's ability to identify and solve problems encountered during the project. Assess adaptability and resilience in the face of challenges.

1G236374	In –House Project	Periods	C
PROJECT		540	12

Introduction:

Every student must do one major project in the Final year of their program. Students can do their major project in Industry or R&D Lab or in-house or a combination of any two for the partial fulfillment for the award of Diploma in Engineering.

For the project works, the Department will constitute a three-member faculty committee to monitor the progress of the project and conduct reviews regularly.

If the projects are done in-house, the students must obtain the bonafide certificate for project work from the Project supervisor and Head of the Department, at the end of the term. Students who have not obtained the bonafide certificate are not permitted to appear for the Project Viva Voce examination.

For the projects carried out in Industry, the students must submit a separate certificate from Industry apart from the regular bonafide certificate mentioned above. For Industry related projects there must be one internal faculty advisor / Supervisor from Industry (External), this is in addition to the regular faculty supervision.

The final examination for project work will be evaluated based on the final report submitted by the project group **of not exceeding four students,** and the viva voce by an external examiner.

Objectives:

- Academic project work plays a crucial role in the education of Diploma in engineering students, as it helps them apply theoretical knowledge to practical situations and prepares them for real-world engineering challenges.
- **Integration of Knowledge:** Consolidate and integrate theoretical knowledge acquired in coursework to solve practical engineering problems.
- **Skill Development:** Enhance technical skills related to the specific field of engineering through hands-on experience and application.
- **Problem-Solving Abilities:** Develop critical thinking and problem-solving abilities by

addressing complex engineering issues within a defined scope.

- **Project Management**: Gain experience in project planning, execution, and management, including setting objectives, timelines, and resource allocation.
- **Teamwork and Collaboration**: Foster teamwork and collaboration by working in multidisciplinary teams to achieve project goals and objectives.
- **Research Skills**: Acquire research skills by conducting literature reviews, gathering relevant data, and applying research methodologies to investigate engineering problems.
- **Innovation and Creativity**: Encourage innovation and creativity in proposing and developing engineering solutions that may be novel or improve upon existing methods.
- **Communication Skills**: Improve communication skills, both oral and written, by presenting project findings, writing technical reports, and effectively conveying ideas to stakeholders.
- **Ethical Considerations**: Consider ethical implications related to engineering practices, including safety, environmental impact, and societal concerns.
- **Professional Development**: Prepare for future professional roles by demonstrating professionalism, initiative, and responsibility throughout the project lifecycle.

Course outcome:

After successful completion of this course the students should be able to	
CO-1	Demonstrate the ability to apply theoretical concepts and principles learned in coursework to solve practical engineering problems encountered during the project.
CO-2	Develop and enhance technical skills specific to the field of engineering relevant to the project, such as design, analysis, simulation, construction, testing, and implementation.
CO-3	Apply critical thinking and problem-solving skills to identify, analyze, and propose solutions to engineering challenges encountered throughout the project lifecycle.
CO-4	Acquire project management skills by effectively planning, organizing, and executing project tasks within defined timelines and resource constraints.
CO-5	Improve communication skills through the preparation and delivery of project reports, presentations, and documentation that effectively convey technical information to stakeholders.

Important points to consider to select the In-house project.

- Selecting a project work in Diploma Engineering is a significant decision that can greatly influence your learning experience and future career prospects.
- Choose a project that aligns with your career aspirations and interests within the field of engineering. Consider how the project can contribute to your professional development and future opportunities.
- Ensure the project aligns with your coursework and specialization within the Diploma program. It should complement and build upon the knowledge and skills you have acquired in your studies.
- Evaluate the scope of the project to ensure it is manageable within the given timeframe, resources, and constraints. Avoid projects that are overly ambitious or impractical to complete effectively.
- Assess the availability of resources needed to conduct the project, such as equipment, materials, laboratory facilities, and access to relevant software or tools. Lack of resources can hinder project progress.
- Select a project that genuinely interests and motivates you. A project that captures your curiosity and passion will keep you engaged and committed throughout the project duration.
- Consider the availability and expertise of faculty advisors or industry mentors who can provide guidance and support throughout the project. Effective mentorship is crucial for success.
- Clearly define the learning objectives and expected outcomes of the project. Ensure that the project will help you achieve specific learning goals related to technical skills, problem-solving, and professional development.

- Look for opportunities to propose innovative solutions or explore new methodologies within your project. Projects that encourage creativity can set you apart and enhance your learning experience.
- Consider ethical implications related to the project, such as safety protocols, environmental impact, and compliance with ethical guidelines in research and engineering practices.
- Evaluate whether the project offers opportunities for collaboration with peers, experts from other disciplines, or industry partners. Interdisciplinary projects can broaden your perspective and enhance your teamwork skills.
- Consider the potential impact of your project on society or the engineering community. Projects that address significant challenges or contribute to social good can be highly fulfilling and make a meaningful difference.
- By carefully considering these points, Diploma Engineering students can make informed decisions when selecting project work that not only enhances their academic learning but also prepares them for successful careers in engineering.

Duties Responsibilities of the internal faculty advisor.

Each group should have an internal faculty advisor assigned by the HOD/Principal.

- The in-house project should be approved by the project monitoring committee constituted by the Chairman Board of Examinations.
- The in-house project should be selected in the fifth term itself. Each in-house project shall have a maximum of four students in the project group.
- Provide comprehensive academic advising to help in the selection of appropriate in-house project that align with their interests and career goals.
- Offer expertise and feedback to ensure rigorous methodology, innovative approaches, and meaningful contributions to the field.
- Assist in developing technical and professional skills through hands-on projects, laboratory work, and practical applications of theoretical knowledge.

- Provide personal mentorship, fostering a supportive relationship that encourages growth, resilience, and a positive academic experience.
- Facilitate connections between students and industry professionals, alumni, and other relevant networks to enhance their professional opportunities and industry exposure.
- Ensure students have access to necessary resources, including research materials, lab equipment, software, and academic literature.
- Regularly monitor and evaluate the progress of the in-house project, providing constructive feedback and guidance to help them stay on track and achieve their goals.
- Instill and uphold high ethical and professional standards, encouraging students to practice integrity and responsibility in their work.
- Assist in preparing progress reports, writing recommendation letters, and facilitating grant applications.
- Organize and participate in workshops, seminars, and other educational events that enhance the learning experience and professional development .
- Address any issues or conflicts that arise, providing mediation and support to ensure a positive and productive academic environment.

Instructions to the students:

- Regularly meet with your internal faculty advisor for guidance on academic progress, research projects, and career planning. Be proactive in seeking advice and support from your faculty advisor.
- Use planners, calendars, and task management tools to keep track of assignments, project deadlines, and study schedules. Prioritize tasks to manage your time efficiently.
- Take advantage of opportunities to participate in in-house projects and hands-on activities. These experiences are crucial for applying your theoretical knowledge and gaining practical skills.
- Focus on improving essential professional skills such as communication, teamwork, problem-solving, and leadership. Participate in workshops and seminars that enhance these

competencies.

- Actively seek networking opportunities through industry events, seminars, and meetings. Establish connections with peers, alumni, and professionals in your field to build a strong professional network.
- Seek internships, co-op programs, or part-time jobs related to your field of study. Real-world experience is invaluable for understanding industry practices and enhancing your employability.
- Uphold high ethical standards in all your academic and professional activities. Practice integrity, honesty, and responsibility. Adhere to the ethical guidelines and standards set by your institution and the engineering profession.
- Adopt a mindset of lifelong learning. Stay updated with the latest developments and trends in engineering by reading industry journals, attending conferences, and taking additional courses.

Documents to be submitted by the student for an in-house project :

Submit a printed report of your in-house project work along with the fabrication model / analysis report for the End Term Examination.

Rubrics for In-House Project Work:

Sl.No.	Topics	Description
1	Objectives	Clearly defined and specific objectives outlined. Objectives align with the project's scope and purpose.
2	Literature Review	Thorough review of relevant literature. Identification of gaps and justification for the project's contribution.
3	Research Design and Methodology	Clear explanation of the research design. Appropriateness and justification of chosen research methods.

4	Project Management	Adherence to project timeline and milestones. Effective organization and planning evident in the project execution.
5	Documentation	Comprehensive documentation of project details. Clarity and completeness in recording methods, results, and challenges.
6	Presentation Skills	Clear and articulate communication of project findings. Effective use of visuals, if applicable.
7	Analysis and Interpretation	In-depth analysis of data. Clear interpretation of results in the context of research questions.
8	Problem-Solving	Demonstrated ability to identify and address challenges encountered during the project. Innovative solutions considered where applicable.
9	Professionalism and Compliance	Adherence to ethical standards in research. Compliance with project guidelines and requirements
10	Quality of Work	Overall quality and contribution of the project to the field. Demonstrated effort to produce high-quality work.

ASSESSMENT METHODOLOGY

1. COURSE TYPE THEORY END EXAM THEORY:

<table>
<tr><th>Assessment Method</th><th colspan="2">Assessment Marks</th><th>Converted Marks</th><th>Internal Marks</th><th>External Marks</th><th>Total Marks</th></tr>
<tr><td>Cycle Test– I(Unit –I&II) (2Hours)(Written Test)</td><td>60 Marks</td><td rowspan="2">Best of CT–I and CT–II</td><td rowspan="2">10Marks</td><td rowspan="7">40 Marks</td><td rowspan="8">60 Marks</td><td rowspan="8">100 Marks</td></tr>
<tr><td>Cycle Test – II (Unit – III &IV)(2 Hours)(Written Test)</td><td>60 Marks</td></tr>
<tr><td>Model Theory Examinations (All Units)(3 Hours)</td><td colspan="2">100Marks</td><td>10Marks</td></tr>
<tr><td>Assignment2Nos. (2Nos.x 10 Marks)</td><td colspan="2">20Marks</td><td>10Marks</td></tr>
<tr><td>MCQ</td><td colspan="2">10Marks</td><td>5Marks</td></tr>
<tr><td>Attendance</td><td colspan="2">5 Marks</td><td>5 Marks</td></tr>
<tr><td>ENDTHEORYEXAMINATIONS (3Hours)</td><td colspan="2">100Marks</td><td>60Marks</td><td></td></tr>
<tr><td colspan="6">TOTAL</td></tr>
</table>

Cycle Test Question Pattern

Part A – 6 Questions x 2 marks = 12 Marks
Part B – 6 Questions x 8 marks = 48 Marks
Total Marks = 60 Marks
In Each Unit Part –A (4 Questions answer any 3) and Part – B (4 Questions answer any 3)

End Theory Examination Question Pattern

Part A – 10Questions x 2 Marks = 20 Marks
Part B – 10 Questions x 8 Marks = 80 Marks
Total Marks = 100 Marks
In Each Unit Part –A (4 Questions answer any 2) and Part – B (4 Questions answer any 2)

Assignment:

- 2 Assignments covers all 5 Units 20 Marks converted to 10 Marks.

MCQ:

- Each Unit 10 Questions - 50 Questions 50 Marks converted to 5 Marks

3. COURSE TYPE PRACTICUM END EXAM THEORY:

<table>
<tr><th>Assessment Method</th><th colspan="2">Assessment Marks</th><th>Converted Marks</th><th>Internal Marks</th><th>External Marks</th><th>Total Marks</th></tr>
<tr><td>Cycle Test– I(Unit – I&II)(2Hours)(Written Test)</td><td>60 Marks</td><td rowspan="2">Best of CT–I And CT–II</td><td rowspan="2">10 Marks</td><td rowspan="7">40 Marks</td><td rowspan="8">60 Marks</td><td rowspan="9">100 Marks</td></tr>
<tr><td>Cycle Test – II (Unit – III &IV)(2 Hours)(Written Test)</td><td>60 Marks</td></tr>
<tr><td>Model Practical Examination (3Hours)</td><td colspan="2">100Marks</td><td>10 Marks</td></tr>
<tr><td>Model Theory Examinations(All Units)(3 Hours)</td><td colspan="2">100Marks</td><td>10Marks</td></tr>
<tr><td>Assignment -2 Nos.
2 x 10 Marks</td><td colspan="2">20Marks</td><td>5Marks</td></tr>
<tr><td>Attendance</td><td colspan="2">5Marks</td><td>5Marks</td></tr>
<tr><td>ENDTHEORYEXAMINATIONS (3Hours)</td><td colspan="2">100Marks</td><td>60Marks</td><td></td></tr>
<tr><td colspan="6">TOTAL</td></tr>
</table>

Cycle Test Question Pattern

Part A – 6 Questions x 2 marks = 12 Marks

Part B – 6 Questions x 8 marks = 48 Marks

Total Marks = 60 Marks

In Each Unit Part –A (4 Questions answer any 3) and Part – B (4 Questions answer any 3)

SCHEME OF EVALUATION:

Model Practical Examination:

PART	DESCRIPTION	MARKS
1	Aim /Apparatus required	10
2	Procedure/ Observation/Calculation	40
3	Result/Graph	15
4	Practical document(All practical's)	30
5	Viva Voce	05
	Total	**100**

Model and End Theory Examination Question Pattern

Part A – 10Questions x 2 Marks = 20 Marks

Part B – 10 Questions x 8 Marks = 80 Marks

Total Marks = 100 Marks

In Each Unit Part –A (4 Questions answer any 2) and Part – B (4 Questions answer any 2)

Assignment:

- 2 Assignments covers all 5 Units 20 Marks converted to 10 Marks

4. COURSE TYPE PRACTICAL END EXAM PRACTICAL:

<table>
<tr><th>Assessment Method</th><th colspan="2">Assessment Marks</th><th>Converted Marks</th><th>Internal Marks</th><th>External Marks</th><th>Total Marks</th></tr>
<tr><td>Cycle Test – I Practical Examinations PART A Exercises (2Hours)</td><td>50 Marks</td><td rowspan="2">Best of CT–I and CT–II</td><td rowspan="2">10 Marks</td><td rowspan="6">40 Marks</td><td rowspan="7">60 Marks</td><td rowspan="8">100 Marks</td></tr>
<tr><td>Cycle Test – II Practical Examinations PART B Exercises (2Hours)</td><td>50 Marks</td></tr>
<tr><td>Model Practical Examinations All Exercises (3Hours)</td><td colspan="2">100Marks</td><td>15 Marks</td></tr>
<tr><td>Practical Document submission (Each Exercise / Experiment Drawing plate should be evaluated to 10 Marks</td><td colspan="2">10Marks</td><td>10Marks</td></tr>
<tr><td>Attendance</td><td colspan="2">5Marks</td><td>5Marks</td></tr>
<tr><td>ENDPRACTICAL EXAMINATIONS(3Hours)</td><td colspan="2">100Marks</td><td>60Marks</td><td></td></tr>
<tr><td colspan="6">TOTAL</td></tr>
</table>

SCHEME OF EVALUATION:

Cycle Test I & II

PART	DESCRIPTION	MARKS
1	Aim and Procedure	10
2	Execution/Printout	30
3	Result	10
	Total	**50**

SCHEME OF EVALUATION:

Model Practical Examination and End Term Examination- Practical Exam

PART	DESCRIPTION	MARKS
1	Aim and Procedure	20
2	Execution/Printout	30
3	Result	10
4	Written Test	30
5	Viva Voce	10
	Total	**100**

Note:

1. For the written test 30 MCQ shall be asked from the theory portions.

2. The number of candidates for conducting practical examination shall not exceed 25 students per batch.

5. COURSE TYPE PRACTICUM END EXAM PRACTICAL

<table>
<tr><th>Assessment Method</th><th colspan="2">Assessment Marks</th><th>Converted Marks</th><th>Internal Marks</th><th>External Marks</th><th>Total Marks</th></tr>
<tr><td>Cycle Test – I Practical Examinations PART A Exercises (2Hours)</td><td>50 Marks</td><td rowspan="2">Best of CY–I and CY–II</td><td rowspan="2">10Marks</td><td rowspan="6">40 Marks</td><td rowspan="7">60 Marks</td><td rowspan="8">100 Marks</td></tr>
<tr><td>Cycle Test – I Practical Examinations PART B Exercises (2Hours)</td><td>50 Marks</td></tr>
<tr><td>Model Theory Examinations (3Hours)</td><td>100 Marks</td><td>15 Marks</td><td rowspan="2">15Marks</td></tr>
<tr><td>Model Practical Examinations (3Hours)</td><td>100 Marks</td><td>15 Marks</td></tr>
<tr><td>Practical Document/ Drawing Plate submission (Each Exercise / Experiment / Drawing plate should be evaluated to 10 Marks.</td><td colspan="2">10Marks</td><td>10 Marks</td></tr>
<tr><td>Attendance</td><td colspan="2">5Marks</td><td>5 Marks</td></tr>
<tr><td>ENDPRACTICAL EXAMINATIONS(3Hours)</td><td colspan="2">100Marks</td><td>60Marks</td><td></td></tr>
<tr><td colspan="6">TOTAL</td></tr>
</table>

SCHEME OF EVALUATION CYCLE TEST I & II	SCHEME OF EVALUATION Model Theory Examination

PART	DESCRIPTION	MARKS
1	Aim & Apparatus required	5
2	Procedure	10
3	Tabulation/Observation	20
4	Calculation	10
5	Result	5
	Total	**50**

Part A – 10 Questions x 2 Marks= 20 Marks
Part B – 10 Questions x 8 Marks = 80 Marks
Total Marks = 100 Marks
In Each Unit Part - A (4 Questions answer any 2)
Part - B (4 Questions answer any 2)

SCHEME OF EVALUATION:

Model Practical Examination and End Term Examination- Practical Exam

PART	DESCRIPTION	MARKS
1	Aim , Apparatus required & Procedure	10
2	Tabulation/Observation	20
3	Graph/Sketch/Calculation	20
4	Result	10
5	Written Test	30
6	Viva Voce	10
	Total	**100**

Note:

1. For the written test 30 MCQ shall be asked from the theory portions.

2. The number of candidates for conducting practical examination shall not exceed 25 students per batch.

6. COURSE TYPE PRACTICUM END EXAM PRACTICAL (Surveying Practices)- 1G233340

<table>
<tr><th>Assessment Method</th><th colspan="2">Assessment Marks</th><th>Converted Marks</th><th>Internal Marks</th><th>External Marks</th><th>Total Marks</th></tr>
<tr><td>Cycle Test – I Practical Examinations PART A Exercises (2Hours)</td><td>50 Marks</td><td rowspan="2">Best of CY–I and CY–II</td><td rowspan="2">10Marks</td><td rowspan="6">40 Marks</td><td rowspan="8">60 Marks</td><td rowspan="9">100 Marks</td></tr>
<tr><td>Cycle Test – I Practical Examinations PART B Exercises (2Hours)</td><td>50 Marks</td></tr>
<tr><td>Model Theory Examinations (3Hours)</td><td>100 Marks</td><td>15 Marks</td><td rowspan="2">15Marks</td></tr>
<tr><td>Model Practical Examinations (3Hours)</td><td>100 Marks</td><td>15 Marks</td></tr>
<tr><td>Practical Document/ Drawing Plate submission (Each Exercise / Experiment / Drawing plate should be evaluated to 10 Marks.</td><td colspan="2">10Marks</td><td rowspan="2">10 Marks</td></tr>
<tr><td>Boot Camp Report Submission</td><td colspan="2">10Marks</td></tr>
<tr><td>Attendance</td><td colspan="2">5Marks</td><td>5 Marks</td><td></td></tr>
<tr><td>ENDPRACTICAL EXAMINATIONS(3Hours)</td><td colspan="2">100Marks</td><td>60Marks</td><td></td></tr>
<tr><td colspan="6">TOTAL</td></tr>
</table>

SCHEME OF EVALUATION CYCLE TEST I & II			SCHEME OF EVALUATION Model Theory Examination
PART	**DESCRIPTION**	**MARKS**	Part A – 10 Questions x 2 Marks= 20 Marks Part B – 10 Questions x 8 Marks = 80 Marks **Total Marks = 100 Marks** In Each Unit Part - A (4 Questions answer any 2) Part - B (4 Questions answer any 2)
1	Aim & Apparatus required	5	
2	Procedure	10	
3	Tabulation/Observation	20	
4	Calculation	10	
5	Result	5	
	Total	**50**	

SCHEME OF EVALUATION:

Model Practical Examination and End Term Examination- Practical Exam

PART	DESCRIPTION	MARKS
1	Aim , Apparatus required & Procedure	10
2	Tabulation/Observation	20
3	Graph/Sketch/Calculation	20
4	Result	10
5	Written Test	30
6	Viva Voce	10
	Total	**100**

Note:

1. For the written test 30 MCQ shall be asked from the theory portions.

2. The number of candidates for conducting practical examination shall not exceed 25 students per batch.

BOOT CAMP: (Outside the Campus) Duration: 5 days

The objective of the survey camp is to enable the students to get practical training in the field work. Groups of not more than six members in a group will carry out each exercise in Survey camp. The camp must involve work on a large area of not less than 30 acres outside the campus. At

the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plotting.

10 marks to be allotted for Survey file for the works carried out by the students in survey camp:

i. L.S and C.S for a road / canal alignment

ii. Radial Tachometric contouring

iii. Curve setting by deflection angle

iv. Theodolite / Tacheometric traverse (Balancing the traverse by Bowditch rule)

v. Total Station (Closed Traverse) – Plotting & Finding the area of the given field.

7. COURSE TYPE PRACTICUM END EXAM PRACTICAL
(Building Planning & drawing - 1G233440)

Assessment Method	Assessment Marks		Converted Marks	Internal Marks	External Marks	Total Marks
Cycle Test – I Practical Examinations PART A Exercises (2Hours)	50Marks	Best of CY–I And CY–II	10Marks	**40 Marks**	**60 Marks**	**100 Marks**
Cycle Test – I Practical Examinations PART B Exercises (2Hours)	50Marks					
Model Theory Examinations (3Hours)	100 Marks	15 Marks	15Marks			
Model Practical Examinations (3Hours)	100Marks	15 Marks				
Practical Document/ Drawing Plate submission (Each Exercise / Experiment / Drawing plate should be evaluated to 10 Marks.	10Marks		10 Marks			
Attendance	5Marks		5 Marks			
ENDPRACTICAL EXAMINATIONS(3Hours)	100Marks		60Marks			
TOTAL						

SCHEME OF EVALUATION
CYCLE TEST I & II

PART	DESCRIPTION	MARKS
1	Aim & Procedure	10
2	Execution	30
3.	Result	10
	Total	50

SCHEME OF EVALUATION
Model Theory Examination

Part A – 30 x 1 Marks = 30 Marks(MCQ)
Part B – 10 x 7 Marks = 70 Marks
Total Marks = 100 Marks
In Part - B (10 Questions answer any 7)

SCHEME OF EVALUATION:

Model Practical Examination and End Term Examination- Practical Exam

PART	DESCRIPTION	MARKS
1	Aim & Procedure	10
2	Execution	30
3	Printout	10
4	Result	10
5	Written Test	30
6	Viva Voce	10
	Total	100

Note:

1. For the written test 30 MCQ shall be asked from the theory portions.

2. The number of candidates for conducting practical examination shall not exceed 25 students per batch.

8. COURSE TYPE PRACTICUM END EXAM PRACTICAL
(Material testing lab – 1G233640)

Assessment Method	Assessment Marks		Converted Marks	Internal Marks	External Marks	Total Marks
Cycle Test – I Practical Examinations PART A Exercises (2Hours)	50Marks	Best of CY–I And CY–II	10Marks	**40 Marks**	**60 Marks**	**100 Marks**
Cycle Test – I Practical Examinations PART B Exercises (2Hours)	50Marks					
Model Theory Examinations (3Hours)	100 Marks	15 Marks	15Marks			
Model Practical Examinations (3Hours)	100Marks	15 Marks				
Practical Document/ Drawing Plate submission (Each Exercise / Experiment / Drawing plate should be evaluated to 10 Marks.	10Marks		10 Marks			
Attendance	5Marks		5 Marks			
ENDPRACTICAL EXAMINATIONS(3Hours)	100Marks		60Marks			
TOTAL						

SCHEME OF EVALUATION
CYCLE TEST I & II

PART	DESCRIPTION	MARKS
1	Aim & Apparatus Required	05
2	Procedure	10
3	Tabulation/Observation/Calculation	30
3.	Result	5
	Total	**50**

SCHEME OF EVALUATION
Model Theory Examination

Part A – 30 x 1 Marks = 30 Marks(MCQ)
Part B – 10 x 7 Marks = 70 Marks
Total Marks = 100 Marks
In Part - B (10 Questions answer any 7)

SCHEME OF EVALUATION:

Model Practical Examination and End Term Examination- Practical Exam

PART	DESCRIPTION	MARKS
1	Aim ,Apparatus Required & Procedure	10
2	Tabulation/Observation	20
3	Calculation	10
4	Graph/Sketch	10
5	Result	10
6	Written Test	30
7	Viva Voce	10
	Total	100

Note:

1. For the written test 30 MCQ shall be asked from the theory portions.

2. The number of candidates for conducting practical examination shall not exceed 25 students per batch.

9. COURSE TYPE PRACTICUM END EXAM PROJECT

(INNOVATION AND STARTUP -1G2356400)

	CONTINOUS ASSESSMENT (40 Marks)			End term Examination (60 marks)
	CA 1	**CA 2**	**CA3**	
Mode	**Class Assessment (Unit I,II & III)**	**Seminar Presentations (Unit IV)**	**Submission of industry visit project report (Unit V)**	**Practical Examination (Project)**
Duration	2 Hours	-	-	3 Hours
Exam Marks	50	20	30	100
Converted to	10	10	20	60
Marks	10	10	20	60

Continuous Assessment – 40Marks:

S.No.	Description	Marks
CA 1	**Class Assessment (50 marks) - Unit – I,II & III** Written Examination - Theory Questions 10 questions out of 15 questions (10 x 3 marks :30 marks) 4 questions out of 6 questions (4 x 5 marks : 20 marks)	10 Marks
CA 2	**Seminar Presentations (20 marks- each topic carries 10 marks) - Unit IV** Students should present any two topics with PPTs	10 Marks
CA 3	Submission of Industry Visit Project Report - **(30 marks) - Unit V**	20 Marks
	Total	40 Marks

End Term Examination - Project Exam:

Students should be assessed for 100 Marks both by the internal examiner and external examiner appointed by the Chairman Board of Examinations.

Detailed Allocation of Marks:

S.No.	Description	Marks
Part A	Written Examination – Unit – I,II & III Theory Questions 1. 10 Questions out of 15 questions (10 x 3 marks = 30marks) 2. 3 questions either or pattern (3 x 5 marks = 15 marks)	45
Part B	1. Presentation of Industry Visit Project Report.	25
	2. Interaction and Evaluation	30
	Total	**100**

10. COURSE TYPE INTERNSHIP END EXAM PROJECT

(INDUSTRIAL TRAINING -1G235773)

Students should be assessed for 50 Marks by industry supervisor and polytechnic faculty mentor for the Internal Assessment. The total 50 marks scored shall be converted to 40 marks for the Internal Assessment.

Sl. No.	Description	Marks
A	Punctuality and regularity. (Attendance)	10
B	Level / proficiency of practical skills acquired. Initiative in learning / working at site	10
C	Ability to solve practical problems. Sense of responsibility	10
D	Self expression / communication skills. Interpersonal skills / Human Relation.	10
E	Report and Presentation.	10
	Total Marks	**50**

End Term Examination - Project Exam:

Students should be assessed for 100 Marks both by the internal examiner and external examiner appointed by the Chairman Board of Examinations after the completion of industrial training. The marks scored will be converted to 60 marks for the End **Term Examination.**

Sl. No.	Description	Marks
A	Daily Activity Report and Attendance certificate.	20
B	Comprehensive report on Internship, Relevant Internship Certificate from the concerned department.	30
C	Presentation by the student at the end of the Internship.	30
D	Viva Voce	20
	Total	**100**

11. COURSE TYPE INTERNSHIP END EXAM PROJECT

(INTERNSHIP – 1G236351)

Scheme of Evaluation

Internal Assessment

Students should be assessed for 50 Marks by industry supervisor and polytechnic faculty mentor during 3rd Month and 5th Month. The total marks (50 + 50) scored shall be converted to 40 marks for the Internal Assessment.

S.No.	Description	Marks
A	Punctuality and regularity. (Attendance)	10
B	Level / proficiency of practical skills acquired. Initiative in learning / working at site	10
C	Ability to solve practical problems. Sense of responsibility	10
D	Self expression / communication skills. Interpersonal skills / Human Relation.	10
E	Report and Presentation.	10
	TOTAL	**50**

End Term Examination - Project Exam :

Students should be assessed for 100 Marks both by the internal examiner and external examiner appointed by the Chairman Board of Examinations after the completion of internship period (June - May). The marks scored will be converted to 60 marks for the End Term Examination.

S.No.	Description	Marks
A	Daily Activity Report.	20
B	Comprehensive report on Internship, Relevant Internship Certificate from the concerned department.	30
C	Presentation by the student at the end of the Internship.	30
D	Viva Voce	20
	TOTAL	**100**

12. COURSE TYPE INTERNSHIP END EXAM PROJECT

(FELLOWSHIP – 1G236352)

Scheme of Evaluation:

Internal Assessment:

As per the rubrics each topic should be considered for the Review 1 and Review 2. Equal weightage should be given for all the topics. It should be assessed by a faculty mentor and the industrial professional or research guide.

Review 1 shall be conducted after 8th week and Review 2 shall be conducted after 14th week in the term. Average marks scored in the reviews shall be considered for the internal assessment of 40 Marks.

Part	Description	Marks
A	Assessment as per the rubrics	30
B	Attendance	10
Total		**40**

END TERM EXAMINATION - Project Exam

Students should be assessed for 100 Marks both by the internal examiner and external examiner appointed by the Chairman Board of Examinations after the completion of fellowship. The marks scored will be converted to 60 marks for the End Term Examination.

Part	Description	Marks
A	Daily Activity Report	20
B	mprehensive report to the fellowship work	30
C	esentation by the student	30
D	va Voce	20
Total		**100**

13. COURSE TYPE INTERNSHIP END EXAM PROJECT

(IN- HOUSE PROJECT – 1G236374)

SCHEME OF EVALUATION:

Internal Assessment:

The mark allocation for Internal and End Term Viva Voce are as below.

Internal Mark Split (40 Marks)*		
Review 1 **(10 Marks)**	**Review 2** **(15 Marks)**	**Review 3** **(15 marks)**
Committee: 5 Marks. Supervisor: 5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks	Committee: 7.5 Marks Supervisor: 7.5 Marks

Note: * The rubrics should be followed for the evaluation of the internal marks during reviews.

END TERM EXAMINATION - Project Exam

The performance of each student in the project group would be evaluated in a viva voce examination conducted by a committee consisting of an external examiner and the Department project supervisor and an internal examiner.

End Term (100)*			
Record (20 Marks)	Presentation (20 Marks)	Viva Voce (20 Marks)	Model / Analysis Report (40 Marks)
External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 10 Internal: 5 Supervisor: 5	External: 20 Internal: 10 Supervisor: 10

 # The marks scored will be converted to 60 Marks.

Students who are unable to complete the project work at the end of the term can apply for an extension to the Head of the Department, with the recommendation from the project guide for a period of a maximum of two months. For those students who extend the project work for two months, Viva Voce will be carried out and results will be declared separately. If the project report is not submitted even beyond the extended time, then students are not eligible to appear for Project Viva Voce Examination.

MODEL QUESTION PAPER

SESHASAYEE INSTITUTEOF TECHNOLOGY

(Autonomous)

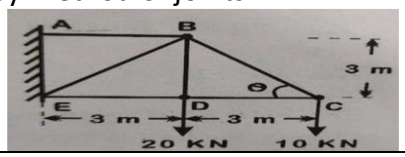
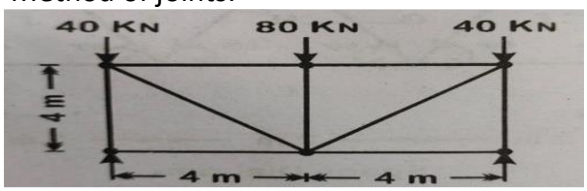
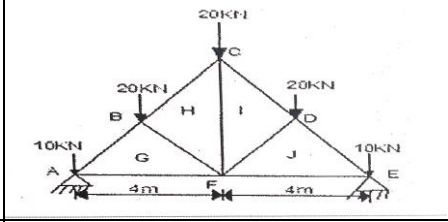
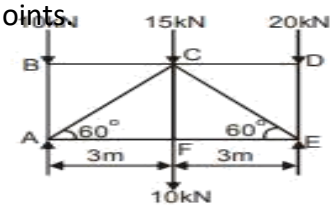
TRICHY-10

Year: II Term : III	**Model Examination**		**Duration: 3Hrs**
Date:	**SESSION:**		**Max.marks:100**
Programme	**CIVIL ENGINEERING**		
Course Code	**1G233110**	**Course Name**	**MECHANICS OF MATERIALS**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What is tensile force and compressive force?	**1**	**U**
2.	Write any four mechanical properties of materials.	**1**	**U**
3.	Define the following terms Longitudinal strain and Lateral strain,	**1**	**R**
4.	What are the elastic constants	**1**	**U**
Answer any 2 questions from 5,6, 7,8			
5.	Define a beam and what are the types of beams based on support conditions?	**2**	**R**
6.	What are the types of loads?	**2**	**U**
7.	Define: Shear force.	**2**	**R**
8.	What will be the maximum shear force and bending moment values when a cantilever beam of length L subjected to a point load W at free end?	**2**	**R**
Answer any 2 questions from 9,10,11,12			
9.	What are the important geometrical properties of sections?	**3**	**U**
10.	Define symmetry and anti-symmetry sections.	**3**	**R**
11.	Define the term moment of Inertia.	**3**	**R**
12.	Write parallel axis theorem	**3**	**R**
Answer any 2 questions from 13,14,15,16			
13.	Define bending stress.	**4**	**R**
14.	What are the assumptions of Simple Bending or Pure bending?	**4**	**U**
15.	Sketch bending stress diagram for simply supported beam	**4**	**A**
16.	Write the strength equation	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Define frame. State the classifications of frame	**5**	**R**
18.	Define deficient frame and redundant frame	**5**	**R**
19.	State statically indeterminate frames.	**5**	**R**
20.	What are zero force members?	**5**	**R**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each**	**Unit**	**Bloom's**

question 2) Each question carries 8 Marks			Level
21.a)	A rod 1m long and 20mm x 20mm in cross section is subjected to a pull of 98kN.If the Modulus of elasticity of the material is 0.2 x 10^6 N/mm^2. Determine the elongation of the bar.	1	An
b)	A Rectangular wooden column of length 3m and 300mm x 200mm carries an axial load of 300 KN. The column is found to be shortened 1.5 mm under the load. Find the stress, strain and Young's modulus.	1	A
c)	A bar of 300mm long, 50mm wide and 30mm thick is subjected to an axial compression of 90KN in the length direction. Calculate the final dimensions and change in volume of the bar. Take E = 6x10^5N/mm^2 and1/m = 0.25	1	An
d)	A stepped bar of 1.5m long is composed of two segments, The first segment is 20mm square in cross section and 1m long and the second segment is 40mm square in cross section for the remaining length, Determine the elongation of the bar when it is subjected to a tensile force of 100KN, Take E = 200 KN/mm^2	1	An
22.a)	A cantilever beam of 5m length is loaded with point loads of 2kN, 3kN and 5kN at a distance of 2m, 4m and 5m from fixed end. Construct SFD and BMD.	2	An
b)	A simply supported beam of span 6m is loaded with udl of 10kN/m throughout the span. Construct the SFD & BMD. Also locate the magnitude of maximum BMD.	2	An
c)	A simply supported beam of 6m span its carries an UDL of 10 Kn/m throughout the span and its carries a two point load of 20KN each at 2m distances Draw the SFD and BMD .	2	An
d)	Construct the S.F and B.M diagram for the cantilever beam of length 4m loaded with uniformly distributed load of 3Kn/m throughout the span. Find the support reaction also.		
23. a)	i) State parallel and perpendicular axes theorems. ii) Find the centre of gravity of the T section of size 120mmx130mmx30mm overall size	3	R R
b)	Find the centre of gravity and moment of inertia of an inverted T section with flange 50mmx10mm and web 60mmx10mm.	3	E
c)	Find the centre of gravity and moment of inertia of an I section of size 200mmx200mmx25mm(overall)	3	E
d)	A steel beam of an I section has the following details 1) Top flange – 120mm x 20mm 2) Bottom flange = 200mm x 40mm 3) Web = 180mm x 20mm .Determine the moment of inertia about XX axis and YY axis.		
24. a)	A simply supported beam of 6m span carries a point load of 40kN at its centre. Its cross-section is a rectangle of section 300mmx400mm. Determine (i)Maximum bending stress, (ii) bending stress at 40mm above the N.A	4	An

b)	A Simply supported timber beam is 6m long. It carries an UDL of 15 kN/m over the entire span and a point load of 10kN at mid span. The stress in beam is not to exceed 8N/mm^2. Design a suitable section by assuming depth as twice the width.	4	An
c)	A rectangular beam 60mm wide and 150mm deep is simply supported over a span of 6m, if the beam is subjected to central point load of 12KN, Find the maximum bending stress induced in the beam section	4	An
d)	A rectangular beam of size 60 x 100mm is subjected to a central point load of 10kN. Of supported beam of span 5m.Find the maximum bending stress.		
25. a)	Determine the magnitude and nature of forces in the members of truss shown in figure by Method of joints. 	5	An
b)	Determine the magnitude and nature of forces in the members of truss shown in figure by Method of joints. 	5	An
c)	Determine the magnitude and nature of forces in the members of truss shown in figure by Method of joints. 	5	An
d)	Determine the magnitude and nature of forces in the members of truss shown in figure by Method of joints. 		

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	MAX. MARK	% Of Marks Based On Cos
Remembrance (R)	3,4,6,8,9,10,13,14, 15,18a(i),(ii)	26	17.33	CO1	20	20%
Understand (U)	1,2,5,7,11	10	6.66	CO2	20	20%
Apply(App)	12,16(b)	10	6.66	CO3	20	20%
Analyze(A)	16-(a),(c),17-(a),(b),(c),19-(a),(b),(c), 20-(a),(b), (c)	88	5866	CO4	20	20%
Evaluate(E)	18(b),(c)	16	10.66	CO5	20	20%
Create (C)	-	-	-	-	-	-
					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY

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TRICHY-10

Year: II Term : III		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G233210**	**Course Name**	**CONSTRUCTION MATERIALS**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	List any five Eco - Friendly Construction materials.	**1**	**U**
2.	Define Energy efficient building.	**1**	**R**
3.	What is meant by freezing and thawing?	**1**	**U**
4.	Define recycling of aggregates	**1**	**R**
Answer any 2 questions from 5,6, 7,8			
5.	Write the composition of good brick earth.	**2**	**R**
6.	Write the constituents of Fly - ash Brick.	**2**	**R**
7.	Write any four characteristics of ceramic products.	**2**	**U**
8.	Write the thickness range of glass used in construction	**2**	**R**
Answer any 2 questions from 9,10,11,12			
9.	What is meant by hydration of cement?	**3**	**U**
10.	What is meant by GGBS?	**3**	**U**
11.	List out the sources of Lime.	**3**	**U**
12.	Write any three applications of Asphalt	**3**	**U**
Answer any 2 questions from 13,14,15,16			
13.	What is meant by seasoning of Timber?	**4**	**U**
14.	Distinguish Grouting and Guniting.	**4**	**U**
15.	Write any two Non - Destructive test on concrete	**4**	**U**
16.	Write short notes on Damp proof course.	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	What are the characteristics of Ideal Paint?	**5**	**R**
18.	What are the market forms of steel sections?	**5**	**R**
19.	Write down the types of roofing materials.	**5**	**U**
20.	Write down the types of cladding.	**5**	**R**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question**	**Unit**	**Bloom's Level**

	2) Each question carries8 Marks		
21.a)	Explain any four properties of Construction Materials.	**1**	**U**
b)	Write about the effects of presence of Sulphates and Chlorides in water.	**1**	**R**
c)	Write in detail about the classification of aggregates.	**1**	**U**
d)	Explain the factors affecting the durability of concrete.	**1**	**U**
22.a)	Write down the Constituents, Properties, Characteristics and uses of- Solid blocks and Hollow Blocks.	**2**	**R**
b)	Write the Properties, Characteristics and uses of Ceramic tiles.	**2**	**R**
c)	Explain about the Constituents and Classification of Glass used in Construction.	**2**	**R**
d)	Write the properties. characteristics and uses of tiles	**2**	**R**
23. a)	Explain in detail about the formation of Bogus Compounds.	**3**	**R**
b)	Write notes on Pozzolanic materials.	**3**	**R**
c)	Explain the types of Lime used in construction.	**3**	**U**
d)	Write short notes on sources and uses of lime	**3**	**U**
24. a)	Explain in detail about the methods of seasoning of Timber.	**4**	**U**
b)	Explain the factors affecting durability of concrete.	**4**	**U**
c)	Write short notes on Pest control and Termite proof in Building.	**4**	**R**
d)	Write the characteristics of ideal paint.	**4**	**A**
25. a)	Write any four plastic products used in construction and write its application.	**5**	**U**
b)	Write short notes on any two roofing materials.	**5**	**U**
c)	What is the importance of Façade design in Architecture? Explain.	**5**	**R**
d)	Write the characteristics of plastic products used in construction.	**5**	**A**

Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks based on BTL	CO	Max. Mark	% of Marks based on COs
Remembrance (R)	2,4,5,13,14,16(b),17,18(a,b)19(c),20(c)	74	4933 %	CO1	20	20%
Understand (U)	1,3,6,7,8,9,10,11,12,15,16(a),c,18(c),19(a,b) 20(a,b)	76	50.67 %	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					**100**	**100%**

Faculty In-charge	**Course Coordinator**	**HOD**

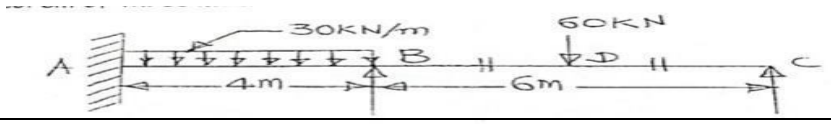
SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

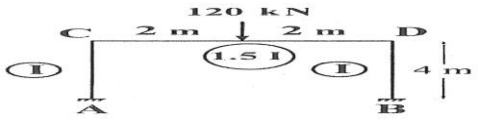
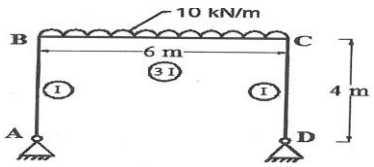
Year: II Term : IV	**Model Examination**		**Duration: 3Hrs**
Date:	**SESSION:**		**Max.marks:100**
Programme	**CIVIL ENGINEERING**		
Course Code	**1G234110**	**Course Name**	**MECHANICS OF STRUCTURES**

	PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3**	**Unit**	**Bloom's Level**
1.	What is elastic curve? Draw elastic curve of any one type of beam.	1	U
2.	Define slope and deflection beam.	1	U
3.	State Mohr's Theorem-I	1	R
4.	Define Flexural rigidity and stiffness of beam.	1	R
Answer any 2 questions from 4,5, 6			
5.	Define fixed beam?	2	R
6.	Define hogging bending moment.	2	U
7.	Define free BMD	2	R
8.	What is point of contra flexure.	2	R
Answer any 2 questions from 7,8,9			
9.	Define continuous beam. What are advantages of continuous beam?	3	U
10.	What is the degree of indeterminacy of a two span continuous beams with one end fixed and the other end hinged?	3	R
11	What are the general methods of analysis of indeterminate structures?	3	R
12.	State the application of Clapeyron's theorem of three moments for continuous beam with supp	3	R
Answer any 2 questions from 10,11,12			
13.	Define distribution factor and distribution moment.	4	R
14.	What is the carry over factor when the far end is (i) Hinged (ii)Fixed	4	U

15.	Define portal frame.	4	A
16	What do you mean by sway and non sway frames.	4	R
Answer any 2 questions from 13,14,15			
17.	What are the types of columns?	5	R
18.	Distinguish between axially loaded columns and eccentrically loaded columns.	5	R
19.	Sketch the deflected shape of a long column with one end fixed and other end hinged and mark the effective length.	5	R
20.	Define short column and long column.	5	R

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries8 Marks**		**Unit**	**Bloom's Level**
21.a)	A Cantilever beam of 1m long is of rectangular section of width 40 mm and depth 60mm.Calculate the maximum udl that can be allowed over the entire length of the beam without exceeding a deflection of 3.5 mm at the free end. Also calculate the maximum slope at the free end. Take E=7X10^{4}N/mm^2.	**1**	**An**
b)	A simply supported beam of 6m span is subjected to two point loads of 30kN each at one third points. Calculate the maximum slope and deflection at the centre of beam. Take EI = 4X10^{13}Nm^2	**1**	**A**
c)	A fixed beam of 8m span carries a central concentrated point load of 50 kN. Find the fixed end moments, Maximum positive moments , point of contra flexure and Draw the SFD	**1**	**An**
d)	A rectangular beam of size 300X400 mm and 6 m span. is simply supported at its ends. It carries a central point load of 20kN. Calculate the maximum slope and deflection, If E =1.5x10^{5}N/mm^2**.**	**1**	**An**

22.a)	. A fixed beam of span 6m is subjected to a point load of 50kN at 2m from left support. Determine the fixed end moments. Draw the SFD and BMD	**2**	**An**
b)	A fixed beam of span 8m carries an udl of 15kN/m over the entire span. Calculate the fixed end moments. Draw SFD and BMD. Also mark the point of contra flexure. Use moment area method.	**2**	**An**
c)	A fixed beam of 6m span carries a central point load of 20kN in addition to uniformly distributed load of 10 kN/m over the entire beam. Find the fixed end moments, Maximum positive moments, point of contra flexure and Draw the SFD and BMD.	**2**	**An**
d)	A fixed beam of 6m span carries a central point load of 20kN in addition to uniformly distributed load of 10 kN/m over the entire beam. Find the fixed end moments, Maximum positive moments , point of contra flexure and Draw the SFD and BMD.	**2**	**An**
23. a)	**.** A continuous beam ABC is simply at A and C such that B=6m and BC=5m.The span AB carries an UDL of 20kN/m and the span BC carries a point load of 50kN at its mid span. Find the support moments by theorem of three moments .Draw the BMD.	**3**	**R**
b)	Analyze the continuous beam shown in figure by the Clapeyro's theorem draw the BMD 	**3**	**E**
c)	A two span beam ABC of length 9m is fixed at A and simply supported at C. The span AB is 6m long carries a point load 40kN at 2m from A. The span BC is 3m long carries an udl of 20kN/m. Find the support moments using theorem of three moments method and Draw SFD and BMD.	**3**	**E**
d)	A continuous beam ABC 10m long rests on three simple supports A,B and C at the same level. Point loads 30kN is placed at the mid span of AB and BC.	**3**	**An**

	The spans AB and BC are equal. Determine the support moments and draw the BMD by using theorem of three moments.		
24. a)	Analyse the portal frame in figure by moment distribution method. Draw the BMD 	**4**	**An**
b)	**A s**ymmetrical portal frame of 4 meter span and 5 meter height carries a vertical udl of 20kN/m on the beam portion and two inward horizontal point loads of 30kN each acting one on each column at their middle height. The column and beam are uniform size. The bottom ends of columns are fixed. Draw the BM diagram for the frame using moment distribution method	**4**	**An**
c)	A portal frame ABCD shown in figure is loaded with central point load of 20 KN At an E on the horizontal member BC. If EI is constant throughout the frame, calculate the bending moments in the frame by moment distribution method and plot the BMD 	**4**	**An**
d)	A portal frame ABCD shown in figure is loaded with central point load of 20 KN At an E on the horizontal member BC. If EI is constant throughout the frame, calculate the bending moments in the frame by moment distribution method and plot the BMD	**4**	**An**
25. a)	A steel bar of rectangular cross-section 30mmx60mm is to be used as a column with pinned ends. What is the shortest length for which Euler's equation can be applied. Assume E = $2.0X10^5$ N/mm^2, and stress at proportional limit = 210 N/mm^2 .Also Calculate the buckling load and compressive stress if the length is 1.5m.	**5**	**An**

b)	A hollow C.I. column whose inside diameter is 160 mm has a wall thickness of 20mm.It is 4.5m long and fixed at both ends. Calculate the (i)Slenderness ratio (ii)safe load by Rankine's formula using a factor of safety of 4 and (iii)Ratio of Euler's and Rankine's critical loads. Take E = $2.1X10^5$ N/mm^2,σc= 550 N/mm^2 and a = 1/1600.	**5**	**An**
c)	**.** A steel column consists of 2 channels ISMC 300 placed back to back with clear distance of 120mm between their backs. Each channel has the following geometrical properties	**5**	**An**
d)	A circular column 200mm diameter hinged at both ends is 4 m long .i.Find the Euler's safe load on the column with a factor of safety of 3.ii.Calculate the limiting slenderness ratio and shortest length of column for which Euler's formula can be used. Take E = 15 kN/mm^2, σy= 50 N/mm^2	**5**	**An**

Competence level under revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% of Marks based on BTL**	**CO**	**MAX. MARK**	**% of Marks based on COs**
Remembrance (R)	3,4,6,8,9,10,13,14,15,18a(i),(ii)	26	17.33	CO1	20	20%
Understand (U)	1,2,5,7,11	10	6.66	CO2	20	20%
Apply(App)	12,16(b)	10	6.66	CO3	20	20%
Analyze(A)	16-(a),(c),17-(a),(b),(c),19-(a),(b),(c), 20-(a),(b), (c)	88	5866	CO4	20	20%
Evaluate(E)	18(b),(c)	16	10.66	CO5	20	20%
Create (C)	-	-	-	-	-	-
					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY

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TRICHY-10

Year: II Term : IV		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G234210**	**Course Name**	**TRANSPORTATION ENGINEERING**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What are the modes of transportation?	**1**	**U**
2.	Define right of way.	**1**	**R**
3.	Define super elevation.	**1**	**U**
4.	Define road gradient.	**1**	**U**
Answer any 2 questions from 5, 6, 7, 8.			
5.	What are the methods of construction of cement concrete roads?	**2**	**R**
6.	Define highway alignment.	**2**	**R**
7.	Name any two excavating equipments in road construction.	**2**	**U**
8.	Define bituminous surface dressing	**2**	**R**
Answer any 2 questions from 9,10,11,12.			
9.	What is meant by gauge of the rail?	**3**	**U**
10.	What is meant by coning of wheels?	**3**	**U**
11.	Define sleeper density.	**3**	**U**
12	Write any two functions of sleepers.	**3**	**U**
Answer any 2 questions from 13,14,15,16.			
13.	Name the various types of yards.	**4**	**U**
14.	Define level crossing.	**4**	**U**
15.	Write any two principles of interlocking.	**4**	**U**
16	Write any two objects of signalling	**4**	**R**
Answer any 2 questions from 17,18,19,20			

17.	Define harbor.	**5**	**R**
18.	What are the classifications of airports?	**5**	**R**
19.	What are the objectives of airport planning?	**5**	**U**
20.	Define port.	**5**	**R**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries 8 Marks**		**Unit**	**Bloom's Level**
21.a)	Explain the requirements of ideal roads.	**1**	**U**
b)	Write about the classifications of highways.	**1**	**R**
c)	Explain about the sight distances.	**1**	**U**
d)	Explain the various types of vertical curves.	**1**	**R**
22.a)	Explain about the principles for ideal highway alignment.	**2**	**R**
b)	Explain the construction of Bituminous roads with neat sketch.	**2**	**R**
c)	What are the advantages and disadvantages of Bituminous roads.	**2**	**R**
23. a)	Explain about the types of rail sections	**3**	**R**
b)	What are the functions and requirements of good ballast?	**3**	**R**
c)	Explain about the types of sleepers	**3**	**U**
d)	Explain about different types of rail joints.	**3**	**U**
24.a)	Explain about the various types of stations	**4**	**U**
b)	Explain about right hand turnouts with neat sketch.	**4**	**U**
c)	Explain the types of signaling.	**4**	**R**
d)	Explain the types of yards.	**4**	**R**
25. a)	Explain the wind rose diagram with neat sketch	**5**	**U**
b)	What are various correction factors for runway as per ICAO?	**5**	**U**
c)	What are the classifications of harbor?	**5**	**R**
d)	Write a short note on spring, fenders and dolphins.	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	MAX. MARK	% Of Marks Based On Cos
Remembrance (R)	2,4,5,13,14,16(b),17,18(a,b) 19(c),20(c)	74	49.33%	CO1	20	20%
Understand (U)	1,3,6,7,8,9,10,11,12,15,16(a),c ,18(c),19(a,b) 20(a,b)	76	50.67%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY

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TRICHY-10

Year: II Term : IV		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G234330**	**Course Name**	**SOIL MECHNAICS AND FOUNDATION ENGINEERING**

	PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4.**	**Unit**	**Bloom's Level**
1.	Differentiate cohesive soil and Cohesion less soil.	**1**	**U**
2.	Define void ratio.	**1**	**R**
3.	Define specific gravity.	**1**	**U**
4.	Define density index.	**1**	**U**
Answer any 2 questions from 5, 6,7,8.			
5.	Define effective stress.	**2**	**R**
6.	Define permeability.	**2**	**R**
7.	Define seepage velocity.	**2**	**U**
8.	Define shear strength of soil.	**2**	**R**
Answer any 2 questions from 9,10,11,12.			
9.	List out different types of rollers used in compaction.	**3**	**U**
10.	Define shear strength of soil.	**3**	**U**
11.	Define consolidation.	**3**	**U**
12.	Define compaction.	**3**	**U**
Answer any 2 questions from 13,14,15,16.			
13.	What are the assumption of Terzaghi's theory	**4**	**U**
14.	Define bearing capacity of soil	**4**	**U**
15.	Define negative skin friction	**4**	**U**
16.	Define net safe bearing capacity of soil.	**4**	**U**
Answer any 2 questions from 17,18,19,20.			

17.	Define area ratio.	**5**	**R**
18.	List out various materials used in soil stabilization.	**5**	**R**
19.	Define recovery ratio of samples.	**5**	**U**
20.	List out various materials used in soil stabilization?	**5**	**R**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries 8 Marks**		**Unit**	**Bloom's Level**
21.a)	Write short notes on origin of soil.	**1**	**U**
b)	A compacted sample of soil with a bulk unit weight of 19.62kN/m^3 has a water content of 15 percent. Calculate its dry density and degree of saturation? Assume G = 2.65	**1**	**R**
c)	Explain Indian Standard soil classification system for classifying coarse grained soil	**1**	**U**
d)	Explain three phase diagram of soil.		
22.a)	Explain with neat sketch, the determination of Coefficient of permeability using Constant head method	**2**	**R**
b)	What is Quick sand condition? List the conditions for the Occurrence of quicksand condition?	**2**	**R**
c)	Explain the factors that affect shear strength of soil?	**2**	**R**
d)	Explain in detail about significance of effective stress?		
23. a)	Explain the factors that affect Consolidation of soil?	**3**	**R**
b)	Explain in detail about various field methods of compaction?	**3**	**R**
c)	Explain CBR test?	**3**	**U**
d)	Write short notes on ramming and vibration used in compaction.		
24. a)	Explain various types of foundation.	**4**	**U**
b)	Write short notes on isolated and raft foundation.	**4**	**U**

c)	Explain the factors that affect bearing capacity of soil.	**4**	**R**
d)	Explain effect of water table on bearing capacity.		
25. a)	Explain various types of samplers?	**5**	**U**
b)	Write short notes on geo-materials in soil stabilization?	**5**	**U**
c)	Explain in detail about different methods of soil stabilization?	**5**	**R**
d)	Explain deep mixing and grouting method of soil stabilization.		

Competence level under revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% of Marks based on BTL**	**CO**	**MAX. MARK**	**% of Marks based on COs**
Remembrance (R)	2,4,5,13,14,16(b),17,18(a,b) 19(c),20(c)	74	49.33%	CO1	20	20%
Understand (U)	1,3,6,7,8,9,10,11,12,15,16(a),c,18(c),19(a,b) 20(a,b)	76	50.67%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY

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TRICHY-10

Year: II Term : IV		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G2350110**	**Course Name**	**Design of RCC Structures (Limit State Method)**

	PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4.**	**Unit**	**Bloom's Level**
1.	Define Dead load and live load.	**1**	**U**
2.	What are the different types of loads on the structures as per IS: 875 –1987?	**1**	**A**
3.	Write the partial safety factors for steel and concrete.	**1**	**R**
4.	Differentiate under reinforced and over reinforced Sections.	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Specify the code provisions regarding the minimum and Maximum reinforcement for beams.	**2**	**A**
6.	Write the maximum size of tread and rise for a staircase.	**2**	**R**
7.	Write any two types of shear reinforcement.	**2**	**U**
8.	How will you calculate effective span of a staircase.	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	Define T-beam.	**3**	**U**
10.	What is the code provision for effective width of flange?	**3**	**R**
11.	What is the critical bending moment?	**3**	**U**
12.	Define a continuous beam	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Define one-way slab and two way slab.	**4**	**R**
14.	State minimum concentrated load to be considered at the end of cantilever slab for design.	**4**	**A**
15.	What is meant by effective span?	**4**	**U**

16.	Explain how torsion reinforcement is provided for a two-way slab	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Define long column.	**5**	**U**
18.	Write down the effective length for any two end conditions for column.	**5**	**R**
19.	What are basic requirements of footing?	**5**	**R**
20.	Write the types of R.C footing	**5**	**R**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries 8 Marks**		**Unit**	**Bloom's Level**
21.a)	What are the assumptions in limit state of collapse in flexure?	**1**	**U**
b)	Find the moment of resistance of a beam 250mm wide and 500mm deep overall is reinforced with 2 Nos. of 12mm dia. Bars in compression zone and 4 Nos. 20mm bars in tension zone, each at an effective cover of 40mm. Concrete grade M20 and steel Fe415 are used.	**1**	**App**
c)	A cantilever beam of rectangular section 250 mm wide and 500 mm overall depth has to carry an udl of 24kN/m (inclusive of self-weight) over an effective span of 3.4metre. Design the reinforcement for flexure by limit state method. Use M20 grade concrete and Fe415 grade steel.	**1**	**An**
d)	Write the different types and grades of cement and steel.	**1**	**R**
22.a)	Briefly explain the critical shear in beams.	**2**	**R**
b)	A reinforced concrete beam of 250 mm wide and 400 mm effective depth is subjected to a Factored shear force of 140 kN at the supports. The tensile reinforcement at the support is 0.5%. Design the shear reinforcement. Use M20 grade concrete and Fe 415 steel.	**2**	**An**
c)	Waist slab is supported by a landing beam at its ends. Horizontal distance between beams is 3.0m and vertical distance between landings is 1.5m. The	**2**	**An**

	tread is 260mm and rise is 150mm, the live load is 3 kN/m^2 and floor finish is 0.8 kN/m^2. Design the waist slab using M20 and Fe415. Design constant for balanced section: Qu = 2.76.		
d)	List the different types of stairs used in a building. Draw a neat sketch of any one type.	**2**	**An**
23. a)	What are the general requirements for a T-beam?	**3**	**R**
b)	A T-beam, which is cast monolithically with 150mm thick slab, has a flange width of 180mm, rib width of 300mm and rib depth of 350mm. The section is reinforced with 4 Nos. of 20mm bars in single row at a clear cover of 30mm. Determine the position of neutral axis and type of the section. Take fck = 20 N/mm^2 and fy = 415 N/$mm^{2.}$	**3**	**An**
c)	The support section of a continuous rectangular beam is subjected to a shear force of 150 KN. The effective size of the section is 300 mm x 510 mm. The beam has 3 number of 20 mm dia Fe 500 grade bars at support as tension reinforcement. Design the shear reinforcement for the Support section using Fe 500 grade steel by LSM. Concrete used is of grade M20.	**3**	**An**
d)	How the effective spans are determined for a continuous beam?	**3**	**R**
24. a)	Write the strength and stiffness requirements of slabs.	**4**	**R**
b)	Write the design procedures for one way slab.	**4**	**U**
c)	Design a R.C slab simply supported on masonry walls 3.8m apart with 300mm thick walls. It carries an imposed load (not fixed) of 5kN/m2 and a floor finish load of 0.5kN/m2. Use M20 grade concrete and Fe 415 steel.	**4**	**An**
d)	Design a one-way floor slab with a clear span of 3.6m simply supported on 230mm thick masonry walls to support a live load of 3kN/m^2 and a floor finish of 1kN/m^2. Use M20 grade concrete and Fe 415 grade steel.	**4**	**An**
25. a)	Write the procedure for arrangement of transverse reinforcement for R.C.C columns.	**5**	**U**

b)	What are the basic requirements of footing and write the types of R.C footing.	**5**	**U**
c)	Design a square footing of uniform thickness for a RC Column carrying an axial load of 1800 KN. Size of column is 400 mm x 400 mm Safe being capacity of soil is 150 KN/m2 Use M20 grade concrete and Fe 415 grade steel. Check for shear not required.	**5**	**An**
d)	Design a rectangular R.C footing of uniform thickness for a R.C. Column of 300mm x 400mm size, carrying an axial load of 1100 kN, using M20 grade concrete and Fe 415 grade steel reinforcement. The safe bearing capacity is 150 kN/m^2.	**5**	**An**

Competence level under revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% of Marks based on BTL**	**CO**	**Max. Mark**	**% of Marks based on Cos**
Remembrance (R)	3,5,8,10,14,15,16a,19(a, b),20a	44	29.33%	CO1	20	20%
Understand (U)	1,6,7,9,12,13,17a,18a,20b	36	24%	CO2	20	20%
Apply(App)	2,4,11	6	4%	CO3	20	20%
Analyze(A)	16(b,c),17(b,c),18(b,c),19c,20c	64	42.67%	CO4	20	20%
Evaluate(E)	-	-	-	CO5	20	20%
Create (C)	-	-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G235211**	**Course Name**	**Mechanical ,Electrical and Plumbing Services**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	Write short notes on MEP.	**1**	**R**
2.	List any four software's used for MEP	**1**	**R**
3.	What are the MEP services?	**1**	**R**
4.	What is meant by ductwork and fixture?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	What is meant by HVAC System?	**2**	**R**
6.	Explain briefly the HVAC codes.	**2**	**U**
7.	Write the importance of HVAC system	**2**	**U**
8.	Define duct.	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	Explain electrical system in MEP.	**3**	**U**
10.	Explain lighting and power system.	**3**	**U**
11.	What is meant by receptacle?	**3**	**R**
12.	List the software's used for Electrical system	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Explain plumbing system in MEP	**4**	**U**
14.	Write the purpose of IPC.	**4**	**R**
15.	Define faucets.	**4**	**R**
16	What is meant by dry & wet riser systems	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Explain briefly the Head load calculation.	**5**	**U**
18.	What is meant by external heat load?	**5**	**R**

19.	What is meant by panel schedules?	**5**	**R**
20.	Write the formula for Temperature differential.	**4**	**U**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries8 Marks**		**Unit**	**Bloom's Level**
21.a)	Explain MEP and its importance.	**1**	**U**
b)	Write in detail about the types of buildings in detail.	**1**	**R**
c)	Explain any five building components.	**1**	**U**
d)	Explain briefly about the software used for MEP	**1**	**U**
22.a)	Describe HVAC and its importance	**2**	**U**
b)	Explain the duct designing methods.	**2**	**U**
c)	Explain various software used for HVAC and its purpose	**2**	**U**
d)	Explain the pipe sizing methods	**2**	**R**
23. a)	Explain the various electrical fixture types.	**3**	**U**
b)	Explain sensors and its types.	**3**	**U**
c)	Explain in detail about earthing and lightening protection system.	**3**	**U**
d)	Explain Fire protection and Alarm System	**3**	**U**
24. a)	Explain the internal and external water supply system	**4**	**U**
b)	Write in detail about fire fighting system.	**4**	**R**
c)	Explain about storm water drainage system.	**4**	**U**
d)	Explain about sanitary drainage system	**4**	**R**
25. a)	Calculate the heat load for the given area. Design Data for Heat Load calculation: Internal Heat Dissipation: 1200 watts Reception: 3m x 1.5m Working Area: 3m x 5m Meeting Hall: 3m x 3m Maximum outside Temperature: 44^{o}C Desired Internal Temperature: 35^{o}C	**5**	**An**

b)	Explain the procedure for calculate velocity pressure calculation.	**5**	**U**
c)	Explain the procedure for pipe sizing.	**5**	**U**
d)	Explain the Panel schedules for a building.	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% Of Marks Based On BTL**	**CO**	**Max. Mark**	**% Of Marks Based On Cos**
Remembrance (R)	1,2,3,4,9,11,12,14,15, 16(b),19(b)	34	22.67	CO1	20	20%
Understand (U)	5,6,7,8,10,13,16(a),(c), 17,(a), (b),(c),18,(a),(b),(c),19 (a)(c), 20,(b).(c)	108	72.00	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	20(a)	8	5.33	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL		150	100		100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G235212**	**Course Name**	**Irrigation And Water Resources Engineering**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What do you mean by Irrigation?	**1**	**R**
2.	What are the ill-effects of Irrigation?	**1**	**R**
3.	Write about uncontrolled flooding	**1**	**R**
4.	What is contour farming	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Write about soil moisture content.	**2**	**R**
6.	Write about Permanent wilting point.	**2**	**U**
7.	What is Delta?	**2**	**U**
8.	Expand GCA and CCA	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	Draw the Hydrological cycle.	**3**	**U**
10.	What are the zones of ground water?	**3**	**U**
11.	List the types of rain gauges.	**3**	**R**
12.	Define Specific Capacity	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Classify Dams.	**4**	**U**
14.	Write about Gravity Dams	**4**	**R**
15.	Differentiate Weir and Barrage	**4**	**R**
16	Write about canal head regulator	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Write about canal lining.	**5**	**U**
18.	List the types of CD works.	**5**	**R**
19.	Write about Canal escapes.	**5**	**R**
20.	Classify Canals	**5**	**U**

PART-B(5X16=80marks) **Note : 1)Answer all the questions by choosing any 2 subdivision from each question** **2) Each question carries8 Marks**		**Unit**	**Bloom's Level**
21.a)	Explain about the benefits of Irrigation.	**1**	**U**
b)	Explain about the various methods of applying water to the crop.	**1**	**R**
c)	Write short notes on i) Border Strip Method (3) ii) Furrow method (3) and Draw simple sketches (2)	**1**	**U**
d)	Write short notes on i) Permanent Wilting Point (4) ii) Ultimate Wilting Point (3).	**1**	**U**
22.a)	Explain about Soil-Water Plant relationship	**2**	**U**
b)	Explain the factors affecting the duty	**2**	**U**
c)	A Discharge of 150 lit/sec was delivered from canal and 110 Lit /sec reached the field. In 8 hr, 2.2 Ha area was irrigated. • Runoff Loss in the field = 445m^3 • Depth of water Penetration varies Linearly from 1.5m at the head End of the field to 1.1m at the tail end. • Effective Root Zone Depth = 1.5m Available moisture holding capacity of soil is 200mm per m depth of soil. • Note that irrigation was started at a moisture extracted level of 50%. Then Find a) Ns b) Nd. Assume suitable data, if necessary	**2**	**U**
d)	Find the delta in meters for sugarcane when its duty is 730 hectares / cumec on the field and the base period of crop being 110 days.	**2**	**R**
23. a)	Describe the applications of hydrology in Engineering.	**3**	**U**
b)	Explain Recuperation test.	**3**	**U**
c)	Explain about Rain Gauge and its types.	**3**	**U**
d)	Explain about Pumping test	**3**	**U**
24. a)	Compare Earthen and Gravity Dams	**4**	**U**
b)	Explain the various types of failures in gravity dam	**4**	**R**
c)	List the barrage components and explain their functions.	**4**	**U**

d)	Explain about Diversion Head Works	**4**	**R**
25. a)	Compare Kennedy's silt theory and Lacey's regime theory.	**5**	**An**
b)	Explain about types and advantages of canal lining.	**5**	**U**
c)	Explain about Cross regulator and Distributary Head Regulator.	**5**	**U**
d)	List of the procedure for the design of most economical rectangular canal section	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% Of Marks Based On BTL**	**CO**	**Max. Mark**	**% Of Marks Based On Cos**
Remembrance (R)	3,4,5,9,11,13,14,15,16 (c)), 17(b),19(c),	40	26.67	CO1	20	20%
Understand (U)	1,2,6,8,16(a),(b),17(a), 18(a), (b),(c),19(b),20,(b),(c)	80	53.33	CO2	20	20%
Apply(App)	10,17(c)	10	6.67	CO3	20	20%
Analyze(A)	7,12,19(a),20(a)	20	13.33	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL		150	100		100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G233210**	**Course Name**	**DEFECTS IN BUILDING AND REMEDIES**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What do you mean by the term crack?	**1**	**R**
2.	What are the various classifications of cracks?	**1**	**R**
3.	Define: Micro cracks.	**1**	**R**
4.	What is maintenance of structures?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Define: Defect	**2**	**R**
6.	Why cover thickness survey is to be done?	**2**	**U**
7.	Name the non-destructive test carried out in RCC Structures.	**2**	**U**
8.	Write any two precautions to be taken during core sampling.	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What is deflection of RCC structures?	**3**	**U**
10.	What do you mean by Inspection of RCC Structure?	**3**	**U**
11.	What are the reasons for leakage of water in water tank?	**3**	**R**
12.	What is carbonation test?	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Define: Repair.	**4**	**U**
14.	What is patch repairing?	**4**	**R**
15.	Name the different repairing materials.	**4**	**R**
16	What are the uses of epoxy resin?	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	What do you mean by crack injection repair?	**5**	**U**
18.	Define: Stitching	**5**	**R**
19.	Name the various methods of strengthening of RCC structure.	**5**	**R**
20.	Define: Rehabilitation	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	What are the reasons for cracking?	**1**	**U**
b)	Explain briefly about plastic settlement crack and drying settlement cracks.	**1**	**R**
c)	What are the objectives of maintenance of structures?	**1**	**U**
d)	Explain about safety of building.	**1**	**U**
22.a)	Explain the different typical defects found by visual inspection with a help of a neat sketches.	**2**	**U**
b)	Explain with a neat sketch about compression test.	**2**	**U**
c)	Explain with a neat sketch about Ultra Sonic Pulse Velocity test.	**2**	**U**
d)	Explain with a neat sketch about rebound hammer test.	**2**	**R**
23. a)	Explain in detail about corrosion of reinforcing bars.	**3**	**U**
b)	Explain briefly about assessment of evidence of water leakage in a building.	**3**	**U**
c)	Explain in detail about surface deterioration of RCC structure.	**3**	**U**
d)	Explain briefly about deterioration of concrete strength.	**3**	**U**
24. a)	Explain in detail about polymer concrete and mortar.	**4**	**U**
b)	Explain briefly about grouts and shotcrete.	**4**	**R**
c)	Explain the following repairing materials: SIFLON and SIMCON.	**4**	**U**
d)	Explain in detail about cement patching mortar and concrete.	**4**	**R**
25. a)	Explain step by step the rehabilitation procedure for jacketing of RCC column.	**5**	**An**
b)	Explain step by step the retrofitting procedure for restoration of original strength of R.C.C beam.	**5**	**U**
c)	Explain step by step the retrofitting procedure for corrosion damaged elements.	**5**	**U**
d)	Explain step by step the rehabilitation procedure for crack injection repair to concrete structures.	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	2,5,6,8,9,12,15,16(a,c)	30	20%	CO1	20	20%
Understand (U)	1,3,4,7,10,11,13,14,16 b, 17(a,b,c),18(a,b,c),19(a,b,c), 20(a,b,c)	120	80%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G233210**	**Course Name**	**DEFECTS IN BUILDING AND REMEDIES**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What do you mean by the term crack?	**1**	**R**
2.	What are the various classifications of cracks?	**1**	**R**
3.	Define: Micro cracks.	**1**	**R**
4.	What is maintenance of structures?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Define: Defect	**2**	**R**
6.	Why cover thickness survey is to be done?	**2**	**U**
7.	Name the non-destructive test carried out in RCC Structures.	**2**	**U**
8.	Write any two precautions to be taken during core sampling.	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What is deflection of RCC structures?	**3**	**U**
10.	What do you mean by Inspection of RCC Structure?	**3**	**U**
11.	What are the reasons for leakage of water in water tank?	**3**	**R**
12.	What is carbonation test?	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Define: Repair.	**4**	**U**
14.	What is patch repairing?	**4**	**R**
15.	Name the different repairing materials.	**4**	**R**
16	What are the uses of epoxy resin?	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	What do you mean by crack injection repair?	**5**	**U**
18.	Define: Stitching	**5**	**R**
19.	Name the various methods of strengthening of RCC structure.	**5**	**R**
20.	Define: Rehabilitation	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	What are the reasons for cracking?	**1**	**U**
b)	Explain briefly about plastic settlement crack and drying settlement cracks.	**1**	**R**
c)	What are the objectives of maintenance of structures?	**1**	**U**
d)	Explain about safety of building.	**1**	**U**
22.a)	Explain the different typical defects found by visual inspection with a help of a neat sketches.	**2**	**U**
b)	Explain with a neat sketch about compression test.	**2**	**U**
c)	Explain with a neat sketch about Ultra Sonic Pulse Velocity test.	**2**	**U**
d)	Explain with a neat sketch about rebound hammer test.	**2**	**R**
23. a)	Explain in detail about corrosion of reinforcing bars.	**3**	**U**
b)	Explain briefly about assessment of evidence of water leakage in a building.	**3**	**U**
c)	Explain in detail about surface deterioration of RCC structure.	**3**	**U**
d)	Explain briefly about deterioration of concrete strength.	**3**	**U**
24. a)	Explain in detail about polymer concrete and mortar.	**4**	**U**
b)	Explain briefly about grouts and shotcrete.	**4**	**R**
c)	Explain the following repairing materials: SIFLON and SIMCON.	**4**	**U**
d)	Explain in detail about cement patching mortar and concrete.	**4**	**R**
25. a)	Explain step by step the rehabilitation procedure for jacketing of RCC column.	**5**	**An**
b)	Explain step by step the retrofitting procedure for restoration of original strength of R.C.C beam.	**5**	**U**
c)	Explain step by step the retrofitting procedure for corrosion damaged elements.	**5**	**U**
d)	Explain step by step the rehabilitation procedure for crack injection repair to concrete structures.	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	2,5,6,8,9,12,15,16(a,c)	30	20%	CO1	20	20%
Understand (U)	1,3,4,7,10,11,13,14,16 b, 17(a,b,c),18(a,b,c),19(a,b,c), 20(a,b,c)	120	80%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
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TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G235214**	**Course Name**	**Urban Planning and Development**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What are the principles of town planning?	**1**	**R**
2.	Define Zoning.	**1**	**R**
3.	What are all the forms of planning?	**1**	**R**
4.	What is meant by Surveying?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Define rural housing and mention three important provisions in design.	**2**	**R**
6.	Write the classification of residential building.	**2**	**U**
7.	Write short notes on Indian slums.	**2**	**U**
8.	What are the causes of slums?	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	Define master plan.	**3**	**U**
10.	What are all the objects of re-planning?	**3**	**U**
11.	Define smart cities.	**3**	**R**
12.	Define (i) Satellite Town (ii) Sub Urban Area	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	What is the object of outer ring road and inner ring road?	**4**	**U**
14.	List out the uses of road signs and road markings.	**4**	**R**
15.	Define expressways.	**4**	**R**
16	What is traffic congestion?	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Define floor space index.	**5**	**U**
18.	Write a note on set back.	**5**	**R**
19.	What is meant by Green Building?	**5**	**R**
20.	Write Urban Development Missions in India	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	Explain the principles of Town Planning.	**1**	**U**
b)	Explain about forms of planning.	**1**	**R**
c)	Explain the stages in town development.	**1**	**U**
d)	Explain the present position of Town Planning in India.	**1**	**U**
22.a)	Discuss the housing problems in India.	**2**	**U**
b)	Briefly explain the functions of CIDCO.	**2**	**U**
c)	Explain about Indian Slums.	**2**	**U**
d)	Explain about the classifications of residential buildings.	**2**	**R**
23. a)	Describe methods of execution of master plan.	**3**	**U**
b)	What are the objects of re-planning?	**3**	**U**
c)	Briefly explain urban renewal projects.	**3**	**U**
d)	Explain the classifications of public buildings	**3**	**U**
24. a)	Explain any two types of street systems.	**4**	**U**
b)	List out road traffic problems.	**4**	**R**
c)	What are the causes of road accidents?	**4**	**U**
d)	Write short notes on outer and inner ring roads.	**4**	**R**
25. a)	What are the functions of local authority?	**5**	**An**
b)	Write the importance of bye-laws.	**5**	**U**
c)	Briefly explain about Urban Development Missions in India.	**5**	**U**
d)	Write a note on CMDA rules	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	2,4,7,9,11,12,13,19(b), 20(b)	30	20%	CO1	20	20%
Understand (U)	1,3,5,6,8,10,14,15,16(a),(b), (c),17(a),(b),(c),18(a),(b),(c), 19(a),(c),20(a),(c)	120	80%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	-	-	-	CO4	20	20%
Evaluate(E)	--	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL		150	100		100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G235215**	**Course Name**	**Building Bye Laws- And Statutory Drawings**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	Define building byelaws and their role in construction projects	**1**	**R**
2.	Explain the importance of written permission for land development	**1**	**R**
3.	What are the special regulations for heritage structures?	**1**	**R**
4.	How are buildings classified according to byelaws?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	What are the roles of regulatory bodies in enforcing building regulations?	**2**	**R**
6.	Describe the types of occupancies regulated by building classification	**2**	**U**
7.	What is the process for plan scrutiny and compliance checks?	**2**	**U**
8.	Outline the steps involved in obtaining building permission as per NBC.	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What standards apply to parts of buildings like walls and roofs?	**3**	**U**
10.	What are the procedures for emergency evacuation in buildings?	**3**	**U**
11.	Describe fire resistance ratings for building materials and elements.	**3**	**R**
12.	Discuss the purpose and types of statutory drawings in construction	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	What are the components of a floor plan according to byelaws?	**4**	**U**
14.	Describe the process of site survey and data collection.	**4**	**R**
15.	What forms are required for approval as per NBC?	**4**	**R**
16	Define Vaastu and its influence on site selection criteria	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Discuss the significance of cardinal directions in Vaastu principles.	**5**	**U**
18.	How are site defects addressed in Vaastu principles?	**5**	**R**
19.	Explain the principles of building orientation according to Vaastu.	**5**	**R**
20.	What are the criteria for selecting a suitable site?	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	Define building byelaws and their significance in construction projects Discuss the and scope and applicability of building byelaws.	**1**	**U**
b)	Explain the role of regulatory bodies such as BIS and local authorities what are the classifications of buildings according to byelaws?	**1**	**R**
c)	What are the special regulations for heritage structures and earthquake-prone areas?	**1**	**U**
d)	Explain the importance of defining terms in building byelaws. How do regulatory bodies enforce building regulations?	**1**	**U**
22.a)	Outline the legal framework overview and the roles of regulatory bodies. How are building classification systems determined?	**2**	**U**
b)	Describe the types of occupancies regulated by building classification systems. Explain the importance of understanding zoning laws.	**2**	**U**
c)	Discuss the urban planning fundamentals and functions of development authorities. Why is compliance with building regulations important?	**2**	**U**
d)	Explain the rules for obtaining building permission as per the National Building Code. What is involved in the submission of building plans?	**2**	**R**
23. a)	Explain the fire resistance of buildings and their structural elements. How are emergency evacuation procedures implemented?	**3**	**U**
b)	Discuss the importance of fire safety equipment in buildings. How are fire safety regulations enforced?	**3**	**U**
c)	Describe the compliance requirements for passenger elevators or lifts in buildings. How are safety standards ensured?	**3**	**U**
d)	Describe fire safety regulations and prevention measures. What are the fire resistance ratings for building materials?	**3**	**U**
24. a)	Outline the layout of interior spaces and room names in floor plans. What information is included in elevations?	**4**	**U**
b)	Discuss the significance of material specifications in elevations. What do sections in statutory drawings show?	**4**	**R**
c)	Describe the process of site survey and data collection for site plans. What forms are required for approval as per NBC?	**4**	**U**
d)	Describe the components of a site plan, including layout, dimensions, and setbacks. How are site boundaries and utilities plotted?	**4**	**R**
25. a)	Define Vaastu and its importance in building planning. What are the five elements and directions in Vaastu?	**5**	**An**
b)	Explain the concept of Pancha Bhutas (Five Elements) and their influence on building planning. How do directional energies affect building design?	**5**	**U**

c)	Discuss the significance of cardinal directions (North, South, East, West) in Vaastu. What criteria are considered for selecting a suitable site?	**5**	**U**
d)	Discuss the implementation of Vaastu in existing buildings. What are the Vaastu remedies and corrections?	**5**	**R**

Competence Level Under Revised Bloom's Taxonomy	**Question Number**	**Marks Allotted**	**% Of Marks Based On BTL**	**CO**	**Max. Mark**	**% Of Marks Based On Cos**
Remembrance (R)	3,4,5,7,9,11,16C,17(b, c),18c, 19(a,c)	60	40%	CO1	20	20%
Understand (U)	1,2,6,8,10,12,15,16(a, b),17a, 18(a,b),19b,20a	70	46.67%	CO2	20	20%
Apply(App)	-	-	-	CO3	20	20%
Analyze(A)	13,14,20(b,c)	20	13.33%	CO4	20	20%
Evaluate(E)	-	-	-	CO5	20	20%
Create (C)		-	-	-		
TOTAL					100	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G236115**	**Course Name**	**Advance Environmental Engineering**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	What is the necessity of disinfection?	**1**	**R**
2.	Write about Chlorination.	**1**	**R**
3.	List the types of disinfection.	**1**	**R**
4.	List the types of Water Filter?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Write about Bib cocks.	**2**	**R**
6.	Write about water management.	**2**	**U**
7.	Write short notes on fire hydrants.	**2**	**U**
8.	What is use of water meters?	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What is incineration?	**3**	**U**
10.	Define Lagooning.	**3**	**U**
11.	Write about sludge digestion tanks.	**3**	**R**
12.	Write about Imhoff Tank	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	What are the effects of noise pollution?	**4**	**U**
14.	What are the sources of water pollution?	**4**	**R**
15.	What do you mean by compositing?	**4**	**R**
16	Write about Ozone Layer Depletion.	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Write about Cadmium Poisoning.	**5**	**U**
18.	What are the effects of Mercury Poisoning?	**5**	**R**
19.	Write about Environmental Risk Assessment.	**5**	**R**
20.	Write about Ozone Layer Depletion.	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	Explain about various forms of chlorination.	1	U
b)	Explain about Rapid Sand Filter with neat sketch.	1	R
c)	Describe the types and effects of Hardness.	1	U
d)	Explain about Disinfection.	1	U
22.a)	Explain about maintenance of Distribution system.	2	U
b)	Explain about the measures for reshaping of local water balance.	2	U
c)	Describe about the preventive measures for wastage of water.	2	U
d)	Describe about the wastage of water and water waste surveys.	2	R
23. a)	Describe about Trickling Filter with neat sketch.	3	U
b)	Explain about sludge digestion tanks.	3	U
c)	Explain about septic tanks with neat sketch.	3	U
d)	Describe the advantages and disadvantages of Activated Sludge Disposal.	3	U
24. a)	Explain about the sources and effects of Noise pollution.	4	U
b)	Describe the process involved in the control of water pollution.	4	R
c)	Explain about the methods of solid waste disposal.	4	U
d)	Explain about the sources and effects of Soil Pollution.	4	R
25. a)	Explain about the methodology of Environmental Impact Assessment.	5	An
b)	Explain about the sources and effects of Cadmium Poisoning.	5	U
c)	Explain about organizing the job for Environmental Impact Assessment.	5	U
d)	Explain about the sources and effects of Mercury Poisoning.	5	R

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	2,3,8,12,16c,17c,18a, 19b	40	26.66	CO1	30	20%
Understand (U)	1,5,6,7,10,11,15,16a,16b,17a,17b,18b,18c,19a,19c,20a,20b,20c	102	68	CO2	30	20%
Apply(App)	4,9,13	6	4	CO3	30	20%
Analyze(A)	14	2	1.34	CO4	30	20%
Evaluate(E)	-	-		CO5	30	20%
Create (C)	-	-		-		
TOTAL		150	100		150	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G 23 6116**	**Course Name**	**Advanced Concrete Technology**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	List out Bogue's compounds in OPC cement.	**1**	**R**
2.	What is heat of hydration in cement?	**1**	**R**
3.	What is Interfacial Transition Zone?	**1**	**R**
4.	What is C-S-H?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	What is super plasticizer?	**2**	**R**
6.	What do you mean by air entraining admixture?	**2**	**U**
7.	What do the basic products constitute plasticizers?	**2**	**U**
8.	What is the difference between additives and admixtures?	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What is carbonation?	**3**	**U**
10.	What is bleeding?	**3**	**U**
11.	What is Alkali-silica reaction?	**3**	**R**
12.	What are called Plastic shrinkage cracks	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	What would be the effect of plastic shrinkage on hot weather	**4**	**U**
14.	Define cold weathering.	**4**	**R**
15.	What precautions need to be taken for hot water concreting?	**4**	**R**
16	What are the various methods of underwater concreting?	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	What is polymer concrete?	**5**	**U**
18.	What is light weight concrete?	**5**	**R**
19.	Mention different fibers used in FRC.	**5**	**R**
20.	Define:SCC?	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	Explain the development of strength of compounds in cement.	1	U
b)	Explain the water requirements for hydration of cement.	1	R
c)	Explain about composition of cement paste at different stages of hydration.	1	U
d)	Explain In detail about Transition zone in concrete	1	U
22.a)	List out the advantages of mineral admixtures with OPC cement in concrete.	2	U
b)	List out the effect of air entrainment on the properties of concrete.	2	U
c)	Explain Marsh Cone Test on super plasticizer with cement.	2	U
d)	Explain Marsh cone Test on super plasticizer with mortar	2	R
23. a)	Explain the methods of controlling sulphate attack on concrete.	3	U
b)	Explain permeability of cement paste and concrete.	3	U
c)	What are the factors influencing corrosion of reinforcement.	3	U
d)	Describe the Damages caused by corrosion	3	U
24. a)	What are the precautious required during underwater concreting?	4	U
b)	What are the effects of cold water concreting?	4	R
c)	What precautions need to be taken for hot water concreting?	4	U
d)	What are the precautions to be Taken while Concreting in Cold Weather	4	R
25. a)	What are the factors effecting properties of FRC? Explain.	5	An
b)	Explain the applications of polymer impregnated concrete.	5	U
c)	Explain the advantages of SCC.	5	U
d)	What are the applications of FRC?	5	R

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	3,4,8,9,10,13,15,16a,16c,17a,17b,18a,20b	62	41.33	CO1	30	20%
Understand (U)	1,2,5,7,11,14,16b,17c,18b,20a,20c	52	34.68	CO2	30	20%
Apply(App)	6,12,19a,19c	20	13.33	CO3	30	20%
Analyze(A)	19b	8	5.33	CO4	30	20%
Evaluate(E)	18c	8	5.33	CO5	30	20%
Create (C)	-			-		
TOTAL	-	150	100		150	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G 23 61 17**	**Course Name**	**Advanced Transportation Engineering**

	PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**	**Unit**	**Bloom's Level**
1.	How is the CBR value determined	**1**	**R**
2.	What are the objectives of the plate load test?	**1**	**R**
3.	What are the steps involved in sub grade preparation?	**1**	**R**
4.	What is the main difference between Bitumen and Tar?	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	What are the common types of distress assessed and monitored	**2**	**R**
6.	What is deflection testing?	**2**	**U**
7.	What are the key aspects evaluated in surface appearance?	**2**	**U**
8.	What is skid resistance?	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	What are the different types of traffic surveys	**3**	**U**
10.	What is meant by traffic capacity?	**3**	**U**
11.	What are the different types of traffic signs?	**3**	**R**
12.	What is meant by traffic volume?	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Write any two uses of IoT in transportation.	**4**	**U**
14.	What is meant by black spot	**4**	**R**
15.	Expand UMTA.	**4**	**R**
16	Name the different modes of mass transit.	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	What the components of a bridge structure	**5**	**U**
18.	What are the types of bridge foundation?	**5**	**R**
19.	Define coffer dam and its types.	**5**	**R**
20.	What is economic span ?	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	Explain the requirements and properties of aggregates.	1	U
b)	Explain about Plate Test?	1	R
c)	Explain any two tests of aggregates used in road pavements?	1	U
d)	Explain any two types of bitumen test	1	U
22.a)	Explain about raveling and roughness?	2	U
b)	Write about the pavement maintenance recommended by IRC?	2	U
c)	What are the causes of distress in rigid and flexible pavement?	2	U
d)	Explain the structural evaluation by deflection measurements.	2	R
23. a)	Explain the concept of level of service (LOS)?	3	U
b)	Discuss briefly about speed, density and traffic flow.	3	U
c)	Discuss about the various types of at grade intersection	3	U
d)	Explain the traffic sign and its types.	3	U
24. a)	Discuss briefly about road safety audit.	4	U
b)	What are the various causes of road accident?	4	R
c)	Discuss about NUTP and JNNURM.	4	U
d)	What are the various modes of mass transit .	4	R
25. a)	Discuss briefly about various types of coffer dam.	5	An
b)	Write about the factors factors governing the ideal site for bridge?	5	U
c)	Write short notes on (a) abutment (b)wing wall.	5	U
d)	Explain the classification of bridges.	5	R

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	3,5,8,12,14,15,16a,16c,17c,18b,18c,20a	60	40	CO1	30	20%
Understand (U)	2,6,7,11,13,16b,17a,17b,18a,19a,19c,20b,20c	74	49.33	CO2	30	20%
Apply(App)	4,9,10,19b	14	9.33	CO3	30	20%
Analyze(A)	1	2	1.34	CO4	30	20%
Evaluate(E)				CO5	30	20%
Create (C)				-		
TOTAL			100%		150	100%

Faculty In-charge	**Course Coordinator**	**HOD**

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TRICHY-10

Year: III Term : V		**Model Examination**	**Duration: 3Hrs**
Date:		**SESSION:**	**Max.marks:100**
Programme		**CIVIL ENGINEERING**	
Course Code	**1G236118**	**Course Name**	**Advanced Surveying**

PART-A(10X2= 20marks) **Answer any 2 questions from 1,2,3,4**		**Unit**	**Bloom's Level**
1.	Define Simple Curve.	**1**	**R**
2.	What are all the types of simple curve setting method?	**1**	**R**
3.	What is meant by route surveying?	**1**	**R**
4.	Define mine surveying	**1**	**R**
Answer any 2 questions from 5, 6, 7, 8.			
5.	Write the components of Total Station.	**2**	**R**
6.	Write working principles of EDM.	**2**	**U**
7.	What is meant by GPS ?	**2**	**U**
8.	What is meant by COGO?	**2**	**U**
Answer any 2 questions from 9,10,11,12.			
9.	Define hydrographic surveying.	**3**	**U**
10.	What is meant by celestial sphere?	**3**	**U**
11.	What are all the sounding methods in hydrographic surveying?	**3**	**R**
12.	What are the different time system ?	**3**	**R**
Answer any 2 questions from 13,14,15,16.			
13.	Define remote sensing.	**4**	**U**
14.	Define electromagnetic spectrum.	**4**	**R**
15.	Explain spectral signature concept.	**4**	**R**
16	What are the components of remote sensing ?	**4**	**R**
Answer any 2 questions from 17,18,19,20.			
17.	Write the principle of floating mark.	**5**	**U**
18.	What is Planimetric mapping?	**5**	**R**
19.	What are the methods of parallax measurement?	**5**	**R**
20.	Define stereoscopy	**5**	**U**

PART-B(5X16=80marks) Note : 1)Answer all the questions by choosing any 2 subdivision from each question 2) Each question carries8 Marks		Unit	Bloom's Level
21.a)	What are the different surveys for the engineering projects?	1	U
b)	Explain the procedure of simple curve setting method.	1	R
c)	Explain route surveys for highways and railways.	1	U
d)	Explain the different types of Horizontal curves	1	U
22.a)	Briefly explain the various applications of GIS.	2	U
b)	Explain the working principles of electronic theodolite.	2	U
c)	Write the advantages of GPS.	2	U
d)	Explain GPS and GIS	2	R
23. a)	Explain the various types sounding methods in hydrographic surveying.	3	U
b)	Explain about three point problem.	3	U
c)	Briefly explain different time systems.	3	U
d)	Explain about strength of fix	3	U
24. a)	Write the applications of remote sensing in civil engineering.	4	U
b)	What are the merits and demerits of data collection between conventional and remote sensing methods?	4	R
c)	Explain classification of remote sensors.	4	U
d)	Explain interaction of radiation with atmosphere.	4	R
25. a)	Describe the methods of parallax measurements.	5	An
b)	Explain (i) aerial photo (ii) aerial camera	5	U
c)	Explain (i) Tilted Photograph (ii) Vertical Photographs	5	U
d)	Explain Stereoscopy	5	R

Competence Level Under Revised Bloom's Taxonomy	Question Number	Marks Allotted	% Of Marks Based On BTL	CO	Max. Mark	% Of Marks Based On Cos
Remembrance (R)	4,8,9,10,11,13,14,16b, 17c,19b,20b,20c	54	36%	CO1	30	20%
Understand (U)	1,3,5,7,12,16a,17b,18 b,18c,19c,20a	66	44%	CO2	30	20%
Apply(App)	2,6,15,17a,18a,19a	30	20%	CO3	30	20%
Analyze(A)				CO4	30	20%
Evaluate(E)				CO5	30	20%
Create (C)				-		
TOTAL			100%		150	100%

Faculty In-charge	**Course Coordinator**	**HOD**