Adichunchanagiri University

Regulations Governing
Master of Technology (M. Tech)
2024-26

BGS Institute of Technology

B G Nagara, Nagamangala Taluk, Mandya
District, Karnataka-571448

ADICHUNCHANAGIRI
UNIVERSITY

Adichunchanagiri University Logo

The heraldic design of the logo brings out the heritage look & feel of Adichunchanagiri. The teachings from our past, from our nature and surroundings - that has evolved through generations are being taught here to the next generation in a disciplined way from an institution that has a rich traditional foundation.

The colours Maroon and Purple give the logo a royal touch while distinguishing it clearly from the many shades of clichéd blue that is generally associated with education. The colours also symbolise courage, power, nobility, luxury and ambition. Purple colour of the logo is inspired from a shade of purple spotted on a peacock by The University Chancellor Swami Sri Sri Sri Dr. Nirmalanandanatha Maha Swamiji and is also a colour associated with wisdom, dignity, independence, creativity, mystery and magic.

The globe icon used within the shield symbolises Global standards of education, with India part of the map strategically fitting within the "U" as though it is being highlighted, for it is today an education destination for students from world over.

ADICHUNCHANAGIRI UNIVERSITY

"Sa Vidya Ya Vimuktaye - that which liberates is knowledge"

Article titled 'The Science in Spirituality' Gopal C Bhar ***Source – Prabuddha Bharata – April 2017 Issue***

Knowledge or Vidya gives power, pleasure, and honor. Both science and spirituality enrich us with knowledge, but that knowledge is superior, which leads us to liberation. Liberation from physical, mental, and external bonds is attained through the control of external nature with the help of science; while liberation from internal bonds is attained through ethics and religion. Hindu scriptures say: 'Sa vidya ya vimuktaye; that which liberates is knowledge.'

But the main role of knowledge is to free us from all these bondages: fear, doubts, inadequacy, and uncertainty. Total knowledge is apara and para, lower and higher, according to the Mundaka Upanishad.

Despite the assertion that spiritual knowledge is higher, it is emphasized that cultivating both of them (science and spirituality) is required for our full-fledged development. The former knowledge is about doing, while the latter is about being.

It is basically a way of developing a holistic way of life — living a mature and balanced life and achieving the integration of personality. It is a way of turning away from a 'having mode' of life to a 'being mode' of life.

Experience is present in both science and spirituality, but two additional features such as moral and psychological transformation are required in spirituality, but are optional in science. It is possible to be simultaneously immoral and scientific, but it is impossible to be simultaneously immoral and spiritual.

Truth is the regime of both science and spirituality; they have mutual kinship, although the roads they follow are different. Science is objective knowledge while spirituality is subjective knowledge. The former is of the external world while the latter is of the internal world of our body-mind complex.

ADICHUNCHANAGIRI UNIVERSITY

Vision Statement

Education for all with Value Systems of **Empathy, Enrichment, Equity, Excellence, Empowerment** & **Enlightenment** to Serve the Society

Mission Statement

Education to all for Self Reliance, Socio-Economic Change to develop an Inclusive Society with Shared Opportunities & Responsibilities

Empathy towards the Less Fortunate, the Sick, the Suffering & the Disabled

Enrichment to acquire Abundant Knowledge, Requisite Skills & Appropriate Attitude

Excellence for Quality Assurance, Enhancement & Sustenance in Academics & Research to produce Graduates of Global Standards **Equity** for Fairness & Social Justice by providing Equal Opportunities

Empowerment of Graduates to become Intuitive, Innovative & Inventive

Enlightenment to attain Wisdom & Virtues in Life to think beyond Self

ADICHUNCHANAGIRI
UNIVERSITY
(Estd. under Karnataka Act No. 18 of 2013)
B.G. Nagara - 571448

Ref: ACU/AUTY/293(A)/2018-19 Date: 29 NOV 2018

NOTIFICATION

Sub: Regulations, Curricula, and Syllabi of Postgraduate Engineering courses in Master of Technology (VLSI & Embedded systems), Computer science & Engineering, Structural Engineering subjects-reg.

Ref: 1. Minutes of the 1st meeting of the Academic Council held on 21-10-2018.
2. Minutes of the 2nd meeting of the Board of Management held on 27-10-2018.

The Adichunchanagiri University was declared as state private University under ACU Act, 2012 (Karnataka Act No.18 of 2013). In accordance with the resolutions of the various Boards of Studies, Faculty of Engineering, Technology and Management, Academic Council and Board of Management it was decided to approve the regulations, curricula & syllabi for Postgraduate Engineering courses in Master of Technology (VLSI & Embedded systems), Computer science & Engineering, Structural Engineering subjects courses prepared by the University.

In exercise of the powers conferred under section 7 & 8 rules of the ACU Act No.2012, the university has been pleased to approve the regulations, Curricula, & Syllabi of Postgraduate Engineering courses (M.Tech).

These Regulations, Curricula, & Syllabi shall be effective for students admitted to Postgraduate Engineering courses (M.Tech) from the academic year 2018-19 onwards.

By order,

Registrar
ADICHUNCHANAGIRI UNIVERSITY
BG NAGARA-571 448
NAGAMANGALA TALUK
MANDYA DIST., KARNATAKA

Copy to:

1. PS to the Hon'ble Visitor, His Excellency, the Governor of Karnataka
2. PS to the Hon'ble Chancellor
3. OSD to the Vice-Chancellor
4. Secretary, Ministry of Higher Education, Govt.of Karnataka
5. PS to the Registrar(Evaluation), ACU
6. Dean, Research, ACU
7. Dean, Academics, ACU
8. Principal, AIMS, B.G.Nagara-571448, Nagamangala (Tq), Mandya (Dist)
9. Office Copy

B.G. Nagara - 571448, NH-75, Nagamangala Tq., Mandya Dist., Karnataka, India.
Tel: 08234 287285 | Email: info@acu.edu.in, registrar@acu.edu.in | www.acu.edu.in

Definitions of Keywords

The following are the definitions / descriptions that have been followed for the different terms used in the Regulations of M.Tech Programme:

1) **Programme:** Is an educational programme in a particular stream / branch of Engineering / branch of specialization leading to award of Degree. It involves events / activities, comprising of lectures / tutorials / laboratory work / field work, outreach activities / project work / vocational training / viva / seminars / Internship / assignments / presentations / self-study etc., or a combination of some of these.
2) **Branch:** Means Specialization or discipline of M.Tech Degree Programme, like VLSI Design & Embedded Systems, Power Electronics, Structures, Machine Design, etc.
3) **Semester:** Refers to one of the two sessions of an academic year (vide: serial number 4), each session being of sixteen weeks duration. The odd semester may be scheduled from August and even semester from February of the year.
4) **Academic Year:** Refers to the sessions of two consecutive semesters (odd followed by an even) including periods of vacation.
5) **Course:** Refers to usually referred to as 'papers' and is a component of a programme. All Courses need not carry the same weight. The Courses should define learning objectives and learning outcomes. A Course may be designed to comprise lectures/ tutorials / laboratory work / field work / outreach activities / project work / vocational training / viva / seminars / term papers / assignments / presentations / self-study etc., or a combination of some of these.
6) **Credit:** Refers to a unit by which the Course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of lecture or two hours of laboratory / practical Courses / tutorials / fieldwork per week etc.
7) **Audit Courses:** Means Knowledge / Skill enhancing Courses without the benefit of a grade or credit for a Course.
8) **Choice Based Credit System (CBCS):** Refers to customizing the Course work, through Core, Elective and Soft Skill Courses, to provide necessary support for the students to achieve their goals.
9) **Course Registration:** Refers to formal registration for the Courses of a semester (Credits) by every student under the supervision of a Faculty Advisor (also called Mentor, Counsellor etc.,) in each Semester for the Institution to maintain proper record.
10) **Course Evaluation:** Means Continuous Internal Evaluation (CIE) and Semester End Examinations (SEE) to constitute the major evaluations prescribed for each Course. CIE and SEE to carry 50 % and 50 % respectively, to enable each Course to be evaluated for 100 marks, irrespective of its Credits.
11) **Continuous Internal Evaluation (CIE):** Refers to evaluation of students' achievement in the learning process. CIE shall be by the tests, assignments, problem solving, group discussion, quiz, mini-project and seminar throughout the Semester, with weightage for the different components being fixed at the University level.
12) **Semester end examinations (SEE):** Refers to examination conducted at the University level covering the entire Course Syllabus. For this purpose, Syllabi to be modularized and SEE questions to be set from each module, with a choice confined to the concerned module only. SEE is also termed as university examination.

13) **First Attempt:** Refers to a student who has completed all formalities and has become eligible to attend the SEE and has attended at least one head of passing, such attempt shall be considered as first attempt.

14) **Credit Based System (CBS):** Refers to quantification of Course work, after a student completes teaching – learning process, followed by passing in both CIE and SEE. Under CBS, the requirement for awarding degree is prescribed in terms of total number of credits to be earned by the students.

15) **Credit Representation:** Refers to Credit Values for different academic activities considered, as per the Table.1. Credits for seminar, project phases, project viva–voce and internship shall be as specified in the Scheme of Teaching and Examination (Annexure - 1).

16) **Letter Grade:** It is an index of the performance of students in a said Course. Grades are denoted by letters S, A, B, C, D and F.

Table 1: Credit Values

Theory / Lectures (L) (hours/week/Semester)	Tutorials (T) (hours/week/Semester)	Laboratory / Practical (P) (hours/week/Semester)	Credits (L:T:P)	Total Credits
4	0	0	4:0:0	4
3	0	0	3:0:0	3
2	2	0	2:1:0	3
2	0	2	2:0:1	3
2	2	2	2:1:1	4
0	0	6	0:0:3	3

NOTE: Activities like, practical training, study tour and participation in guest lectures not to carry Credits.

17) **Semester Grading System:** Refers to qualitative measure of achievement of a student in each Course, based on the percentage of marks secured in (CIE + SEE). Absolute Grading System is folowed. The rubric attached to Performance Level, Letter grades, Grade Points and Percentage of Marks Scored in a course are as follows:

18) **Grade Point (GP):** Refers to a numerical weightage allotted to each letter grade on a 10-point scale as under.

Letter Grade and corresponding Grade Points on a typical 10 – Point scale

Performance Level	Outstanding	Excellent	Very Good	Good	Average	Fail
Letter Grade	S	A	B	C	D	F
Grade Points	10	9	8	7	6	0
Percentage of Marks Scored in a course	≥ 90	≥ 80 < 90	≥ 70 < 80	≥ 60 < 70	≥ 50 < 60	< 50

19) **Passing Standards:** Refers to passing a Course only when getting GP greater than or equal to 06 (as per serial number 18).

20) **Credit Point:** Is the product of grade point (GP) and number of credits for a Course i.e.,

Credit Point (CrP) = GP X **Credits for the Course**

21) **Semester Grade Point Average (SGPA):** Refers to a measure of the academic performance of a student in a semester. It is the ratio of the total credit points secured by the student in all courses of that semester to the total credits of the courses registered (earned) in that semester. [Refer: MT6.0]
22) **Cumulative Grade Point Average (CGPA):** CGPA is a measure of the overall cumulative academic performance of a student across all semesters. It is calculated as the ratio of the total credit points earned by the student in all courses of all semesters to the sum of the total credits of all those courses. The CGPA shall be expressed up to two decimal places. [Refer: MT6.0]
23) **Transcript or Grade Card:** A transcript or grade card is the official certificate showing the grades earned by a student. A grade certificate shall be issued to every registered student after the only after the completion of each semester. It shall display the programme details (Course Code, Course Title, Credits, Grades secured, and Credit Points) along with the Semester Grade Point Average (SGPA) of that semester and the Cumulative Grade Point Average (CGPA) earned up to that semester.
24) **University:** Adichunchanagiri University (ACU), BG Nagara.

Regulations

24MT1.0	**Title, Duration and Credits of the Programme of Study**
24MT1.1	The Programme shall be called as Master of Technology (Subject of Specialization), abbreviated as M. Tech. (Subject of Specialization).
24MT1.2	The Programme shall extend over a period of four semesters and each semester shall have 16 weeks duration.
24MT1.3	A candidate shall be allowed a maximum duration of 4 years from the first semester of admission to become eligible for the award of Master's Degree, failing which he/she may discontinue the programme or register once again as a fresh candidate to I semester of the programme.
24MT1.4	Prescribed Number of Credits for the Programme for the award of degree shall be 80 to 86.
24MT1.5	The Calendar of Events in respect of the programme shall be notified by the University in advance.
24MT2.0	**Eligibility for Admission (As per the Government orders issued from time to time)**
24MT2.1	Admission to I year/ I semester Master of Technology Programme shall be open to all the candidates who have passed B.E./ B. Tech. Examinations of ACU or any other recognized University/ Institution. The decision of the Equivalence committee shall be final in establishing the eligibility of candidates for a particular Programme. For the foreign degrees, equivalence certificate from the Association of Indian Universities is a must. The candidates who have completed their degree through the distance mode education from any University (National or International) are not eligible for admission to M. Tech. Programs under any quota.
24MT2.2	AMIE in respective branches shall be equivalent to BE Program of ACU for admission to M. Tech.
24MT2.3	Admission to M. Tech. Programme shall be open to the candidates (as per MT 2.1 and 2.2) who have passed the prescribed qualifying examination with not less than 50% of the marks in the aggregate of all the years of the degree examination. However, in the case of candidates belonging to SC/ST and Category I, the aggregate percentage of marks in the qualifying examinations shall not be less than 45%. Rounding off of percentage secured in qualifying examination is not permissible.
24MT2.4	**For admissions under GATE/ PGCET qualification and Roaster system of Government of Karnataka:** The candidates should be GATE qualified or should have appeared for the Entrance Examination conducted by an authority recognized by Government of Karnataka (PGCET)/ACU/ any other University on approval by Government of Karnataka. **For admissions under Management Quota:** The candidates should be GATE qualified or should have appeared for the Entrance Examination conducted by an authority recognized by Government of Karnataka PGCET/ACU/any other University on approval by Government of Karnataka. Further, there shall be an Admissions Committee for PG Programme in each college for each branch of PG studies consisting of the Principal of the College as the Chairman, Head of the concerned Department, one senior faculty of the concerned Department as members. The Admissions Committee shall conduct the interview and select the candidates for admissions. **For admissions under Sponsored Quota:**

	The candidates should be GATE qualified or should have appeared for the Entrance Examination conducted by an authority recognized by Government of Karnataka PGCET/ACU/any other University on approval by Government of Karnataka.
24MT2.5	The candidates, who are qualified in the GATE Examination for the appropriate branch of engineering, shall be given priority. They are exempted from taking Entrance Examination. In case a GATE qualified Candidate appears for entrance examination and become qualified to claim a seat under entrance examination quota, he/she will be considered in the order of merit along with other candidates appeared for the entrance examination.
24MT2.6	If sufficient numbers of GATE qualified candidates are not available, the remaining vacant seats shall be filled from amongst the candidates appeared for Entrance Examination in the order of merit.
24MT2.7	The intake under various categories (regular, sponsored candidates and SC/ST) shall be as sanctioned by the AICTE, State Government and ACU, from time to time.
24MT2.8	Subject to the provisions of 24MT2.1 and 24MT2.2, members of the Teaching/Research Staff working in any Engineering College recognized by AICTE either in the State of Karnataka or outside and who have put in a minimum of 03 years of teaching experience on full-time basis in Engineering Colleges, Polytechnic institutions / any other institutions imparting Engineering education shall be eligible for admission to PG Programs under sponsored quota, if they are sponsored by the respective Institutions / DTE.
24MT2.9	Subject to the provisions of 24MT 2.1 and 24MT 2.2, members working in the State Government / Central Government/ Quasi Government Organizations / Public Sector Industries / Reputed Private Industries, who have put in a minimum of 03 years of working experience and sponsored by the concerned Organizations, shall also be eligible to seek admissions to PG Programs against sponsored quota. Preference for admission under 24MT2.8 and 2.9 shall be given to candidates sponsored by organizations of State and Central Governments.
24MT2.10	The Engineering graduates other than the Karnataka candidates shall obtain Eligibility Certificate from ACU to seek admission to P.G. Programme in the Constituent college of ACU.
24MT2.11	**Admission to vacant seats:** Seats remaining vacant (unfilled), after the completion of PG admission process by Karnataka Examination Authority, shall be filled by the Institution by inviting applications through notification. The seats shall be filled by Candidates preferably who have valid GATE/ PGCET/ACU score. In the absence of such Candidates, admission shall be based on merit in the entrance test conducted at the Institution level. An Admissions Committee, consisting of the Principal of the College, Head of the concerned Department and the subject experts, shall be in charge of admissions.
24MT3.0	**Courses**
24MT3.1	The curriculum of the Programme shall be any combination of following type of courses: i) Professional Core Courses (PC) - relevant to the chosen specialization / branch [May be split into Hard (no choice) and Soft (with choice), if required]. The core course is to be compulsorily studied by a student and is mandatory to complete the requirements of a programme in a said discipline of study. ii) Professional Electives Courses (PE) - relevant to the chosen specialization/ branch: these are the courses, which can be chosen from the pool of papers. It shall be supportive to the discipline / providing extended scope/enabling an exposure to some other discipline / domain / nurturing student skills.

	iii) Open Electives Courses (OE), from other technical and/ or emerging specialization areas. iv) Project Work, Seminar. v) Audit Courses (AC): a) The Audit course can be any credit course offered by the program to which the Candidate is admitted (other than the courses considered for completing the prescribed program credits) or other programs offered in the institution, where the student is studying. b) The students who are interested in audit courses can register for one audit course at a time during II and IV semesters. Students who have registered to audit the courses, considered on par with students registered to the same course for credit, have to satisfy attendance and CIE requirements. However, they need not have to appear for SEE. c) Registration for any audit course, in writing, shall be completed at the beginning of II and IV semesters. The Institution should intimate the Registrar (Evaluation) about the registration at the beginning of the semester and obtain a formal approval for inclusion of the audit course/s in the Grade cards/ Transcripts issued to the students. vi) Internship: Preferably at an industry / R & D organization / IT company/ Government organization of significant repute for a specified period mentioned in Scheme of Teaching and Examination.
24MT4.0	**Internship**
24MT4.1	**Internship:** The student shall undergo Internship for 16 weeks as per the Scheme of Teaching and Examination. 1. The internship can be carried out in any industry/R&D Organization/Research Institute/Institute of repute. 2. (a) The Department/college shall nominate a faculty to facilitate, guide and supervise students under internship. (b) The Internal Guide has to visit work place at least once during the student's internship. 3. The students shall report the progress of the internship to the internal guide in regular intervals and seek his/her advise. 4. The Internship shall be completed during the period specified in Scheme of Teaching and Examination. 5. After completion of Internship, students shall submit a report to the Head of the Department with the approval of both internal and external guides. 6. There will be 100 marks for CIE (Seminar: 75, Internship report: 25) and 100 marks for Viva – Voce conducted during SEE. [To be read along with MT 8.8 and 8.9] 7. The internal guide shall award the CIE marks for seminar and internship report after evaluation. He/she will also be the internal examiner for Viva – Voce conducted during SEE. 8. The external guide from the industry has to be an examiner for the viva voce on Internship. Viva-Voce on internship shall be conducted at the college and the date of Viva-Voce shall be fixed in consultation with the external Guide. The Examiners shall jointly award the Viva - Voce marks. 9. In case the external Guide expresses his inability to conduct viva voce, the Chief Superintendent is permitted to make alternate arrangements with the permission of the concerned BOE Chairperson.

	10. The students are permitted to carry out the internship anywhere in India or Abroad. The University will not provide any kind of Financial Assistance to any student for internship and for the conduct of Viva-Voce on internship.
24MT4.2	**Failing to undergo Internship:** Internship is one of the head of passing. Completion of internship is mandatory. If any student fails to undergo/complete the internship, he/she shall be considered as failed in that Course and shall not be permitted to appear for SEE in that Course. However, student shall appear for SEE after satisfying the conditions prescribed for Internship. The reappearance shall be considered as an attempt.
24MT5.0	**Seminar and Project**
24MT5.1	**Seminar:** Seminar is one of the head of passing. i) Each candidate shall deliver seminar as per the Scheme of Teaching and Examination on the topics chosen from the relevant fields for about 30 minutes. ii) The Head of the Department shall make arrangements for conducting seminars through concerned faculty members of the Department. The committee constituted for the purpose by the Head of the Department shall award the CIE marks for the seminar. The committee shall consist of three faculty from the Department and the senior most acting as the Chairman/Chairperson. [To be read along with 24MT8.8]
24MT5.2	**Project Work:** Project is one of the head of passing. Project work shall preferably be on individual basis. The candidate shall submit a soft copy (CD) of the dissertation work to the University. The CD should contain the entire Dissertation in monolithic form as a PDF file (not separate chapters). The Guide, after checking the report for completeness shall upload the Dissertation along with name, University Seat Number, address, mobile number of the candidate, etc., as prescribed in form available on online Dissertation evaluation portal. The guide shall submit a panel of four approved University Examiners for evaluation of dissertation.
24MT5.3	**Plagiarism Check** Once the Guide uploads the dissertation, the same shall be linked for plagiarism check. The allowable plagiarism index is less than or equal to 25%. If the check indicates a plagiarism index greater than 25%: (i) For the first time, the candidate has to resubmit the dissertation, to the Registrar (Evaluation), ACU along with the penal fees of Rs. 1000/- (Rupees One thousand only) in person. (ii) For the second time, the candidate has to resubmit the dissertation along with the penal fees of Rs. 2000/- (Rupees Two thousand only) in person. (iii) If the dissertation is rejected again during second resubmission with reference to plagiarism index, the candidate shall redo the project and submit after a semester's time subject to provisions of 24MT1.5.
24MT5.4	The dissertation shall be sent through email for evaluation to two examiners - one internal examiner (guide/co-guide) and one external examiner (first) appointed by the University. The evaluation of the dissertation shall be made independently by each examiner.
24MT5.5	Examiners shall evaluate the dissertation normally within a period of not more than two weeks from the date of receipt of dissertation through email.
24MT5.6	The examiners shall independently submit the marks through the specified link.
24MT5.7	Average of the marks awarded by the two Examiners shall be the final evaluation marks for the Dissertation.
24MT5.8	(a) Viva-voce examination of the candidate shall be conducted as per 24MT5.10, if the dissertation work and the reports are accepted by the external examiner (first).

<table>
<tr><td></td><td>(b) If the external examiner (first) finds that the dissertation work and the report are not up to the expected standard and the minimum passing marks cannot be awarded, the dissertation shall not be accepted for SEE.
The external examiner (first) can recommend for modifications/suggestions of dissertation or totally reject the dissertation. The examiner shall offer suggestions for improvement of the dissertation for resubmission or list the reasons for rejection of the dissertation.
(c) The resubmitted Dissertation incorporating the modifications/suggestions [as per 24MT5.8 (b)] of the external examiner (first) and satisfying the provision 24MT5.3 shall be sent again to the external examiner (first) for evaluation. If the dissertation and the report are accepted by the external examiner (first), Viva-voce examination of the candidate shall be conducted as per 24MT5.10.
(d) In case of rejection of Dissertation with reasons, by the external examiner (first), the same will be sent to a Second Examiner (external) approved by the University. The decision of the Second Examiner (external) is final. If the dissertation and the report are accepted by the Second Examiner (external), Viva-voce examination of the candidate shall be conducted as per 24MT5.10. If the Second Examiner (external) rejects the dissertation and the report, the candidate shall have to carry out the dissertation work once again and submit the dissertation subject to provisions of 24MT1.5. In such cases of rejection, the candidate, whose Dissertation is rejected, can rework on the same topic or choose another topic of dissertation after discussion with the guide. In such an event, the report shall be submitted within the next ensuing examination.</td></tr>
<tr><td>24MT5.9</td><td>The external examiner and internal examiner / guide shall conduct viva-voce examination of the candidate as per the date notified by the University Evaluation Section. In case one of the examiners express his/her inability to attend the viva-voce, the senior faculties can be appointed as substitute examiner in his/her place.</td></tr>
<tr><td>24MT5.10</td><td>The relative weights for the evaluation of dissertation and the performance at the viva voce shall be as per the scheme of teaching & examination.</td></tr>
<tr><td>24MT5.11</td><td>The marks awarded by both the Examiners at the viva voce Examination shall be sent jointly to the University immediately after the examination.</td></tr>
<tr><td>24MT5.12</td><td>Examination fee as fixed from time to time by the University for evaluation of dissertation report and conduct of viva voce shall be remitted through the Head of the Institution as per the instructions of Registrar (Evaluation) from time to time.</td></tr>
<tr><td>24MT5.13</td><td>The candidates who fail to submit the dissertation work within the stipulated time have to submit the same at the time of next ensuing examination.</td></tr>
<tr><td>24MT6.0</td><td>Computation of SGPA and CGPA</td></tr>
<tr><td>24MT6.1</td><td>(i) The University adopts absolute grading system wherein the marks are converted to grades, and every semester results will be declared with semester grade point average (SGPA) and Cumulative Grade Point Average (CGPA). The CGPA will be calculated for every semester, except for the first semester.
(ii) The grading system with the letter grades and the assigned range of marks under absolute grading system are as given below:

<table>
<tr><td>Performance Level</td><td>Outstanding</td><td>Excellent</td><td>Very Good</td><td>Good</td><td>Average</td><td>Fail</td></tr>
<tr><td>Letter Grade</td><td>S</td><td>A</td><td>B</td><td>C</td><td>D</td><td>F</td></tr>
<tr><td>Grade Points</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>0</td></tr>
<tr><td>Percentage of Marks Scored in a course</td><td>≥ 90</td><td>≥ 80 < 90</td><td>≥ 70 < 80</td><td>≥ 60 < 70</td><td>≥ 50 < 60</td><td>< 50</td></tr>
</table>
</td></tr>
</table>

(iii) A student obtaining Grade F in a Course shall be considered failed and is required to reappear in subsequent SEE. Whatever the letter grade secured by the student during his /her reappearance shall be retained. However, the number of attempts taken to clear a Course shall be indicated in the grade cards/ transcripts.

24MT6.2 **Computation of SGPA and CGPA (as per UGC Guidelines)**

The following procedures shall be used to compute the SGPA and CGPA respectively:

i) The SGPA is the ratio of sum of the product of the number of credits with the grade points secured by a student in all the courses taken by him/her and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$\mathbf{SGPA} = \frac{\sum(\mathbf{C_i} \times \mathbf{G_i})}{\sum \mathbf{C_i}}$$

Where C_i is the number of credits of the i^{th} course and G_i is the grade point scored by the student in the i^{th} course.

ii) The CGPA is also calculated in the same manner taking into account all the Courses undergone by a student over all the semesters of a programme, i.e.,

$$\mathbf{CGPA} = \frac{\sum(\mathbf{C_i} \times \mathbf{S_i})}{\sum \mathbf{C_i}}$$

where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal places and reported in the transcripts.

Illustration for Computation of SGPA and CGPA

Computation of SGPA

Illustration				
Course	**Credit**	**Grade letter**	**Grade point**	**Credit Point = (Credit × Grade)**
Course 1	4	B	08	4 × 08 = 32
Course 2	4	D	06	4 × 06 = 24
Course 3	4	C	07	4 × 07 = 28
Course 4	3	S	10	3 × 10 = 30
Course 5	3	E	04	3 × 04 = 12
Course 6	3	D	06	3 × 06 = 18
Course 7	2	A	09	2 × 09 = 18
Course 8	2	D	06	2 × 06 = 12
Total	25	--	--	174
Thus, **SGPA= 174/25 = 6.96**				

Semester	**I**	**II**	**III**	**IV**
Credits of the semester	20	20	20	20
SGPA	7.00	8.50	9.20	6.86

$$Thus\ CGPA = \frac{20 \times 7.00 + 20\ \times 8.50 + 20\ \times 9.20 + 20\ \times 6.86}{80} = 7.89$$

24MT6.3 **Transcript Format:** Based on the secured letter grades, grade points, SGPA and CGPA,

<table>
<tr><td></td><td>the transcript for each semester and a consolidated transcript indicating the performances in all semesters shall be issued.</td></tr>
<tr><td>22MT 7.0</td><td>Conversions of Grades into Percentage and Declaration of Class</td></tr>
<tr><td>22MT 7.1</td><td>Conversion formula for the conversion of CGPA into Percentage is given below:
Percentage of marks secured, P = [CGPA Earned – 0.75] × 10
Illustration for a CGPA of 8.20:
P = [8.2 – 0.75] × 10 = 74.5%</td></tr>
<tr><td>24MT7.2</td><td>Class Declaration:
A graduating student is declared to have passed in
<table>
<tr><th>Declaration of Class</th><th>CGPA</th></tr>
<tr><td>First Class with Distinction</td><td>≥ 7.5</td></tr>
<tr><td>First Class</td><td>≥ 6.5 < 7.5</td></tr>
<tr><td>Second Class</td><td>≥ 6.0 < 6.5</td></tr>
</table></td></tr>
<tr><td>24MT8.0</td><td>Continuous Internal Evaluation and Semester End Evaluation</td></tr>
<tr><td>24MT8.1</td><td>For each theory, practical paper and Internship the CIE marks shall be 40.
For seminar, the CIE marks shall be 100.
For Project Phase –I and Project Phase – II the CIE marks shall be 50 respectively.
[To be read along with 24MT8.8]</td></tr>
<tr><td>24MT8.2</td><td>CIE Marks shall be based on
a) Tests (for 50 Marks) and
b) Assignments, Quiz, Simulation, Experimentation, Mini project, oral examination, field work etc., (for 10 Marks) conducted in respective courses.</td></tr>
<tr><td>24MT8.3</td><td>The CIE marks in a theory course, for 50 marks, shall be based on two tests covering the entire syllabus. An additional test may be conducted for the needy students to provide an opportunity to improve their CIE Marks before the end of the semester. The CIE marks shall be the average of the best of two test marks scored. [To be read along with 24MT8.8]</td></tr>
<tr><td>24MT8.4</td><td>The candidates shall write the Tests in Blue Book/s. The Blue book/s and other documents relating to award of CIE marks under 24MT8.2 (b) shall be preserved by the Principal / Head of the Department for at least six months after the announcement of University results and made available for verification at the directions of the Registrar (Evaluation).</td></tr>
<tr><td>24MT8.5</td><td>Every page of the CIE marks list shall bear the signatures of the concerned Teacher, Head of the Department and the Principal.</td></tr>
<tr><td>24MT8.6</td><td>The CIE marks list shall be displayed on the Notice Board and corrections, if any, shall be incorporated before submitting to the University.</td></tr>
<tr><td>24MT8.7</td><td>The CIE marks shall be sent to the university by the Principal well in advance before the commencement of Semester End Examinations.</td></tr>
<tr><td>24MT8.8</td><td>Candidates obtaining less than 50% of the CIE marks in any course (Theory/Laboratory/Seminar/Internship/Project) shall not be eligible to appear for the University examination in that course/s. In such cases, the Head of the Department shall arrange for the improvement of CIE marks in the course/ Laboratory when offered in the subsequent semester subject to the provision of 24MT1.5.</td></tr>
<tr><td>24MT8.9</td><td>Semester End Evaluation: There shall be a University Examination at the end of each semester.</td></tr>
<tr><td>24MT8.10</td><td>There shall be double valuation of theory papers. The theory Answer booklets shall be valued independently by two examiners appointed by the University.</td></tr>
</table>

24MT8.11	If the difference between the marks awarded by the two Examiners is not more than 15 % of the maximum marks, the marks awarded to the candidate shall be the average of two evaluations.
24MT8.12	If the difference between the marks awarded by the two Examiners is more than 15 percent of the maximum marks, the answer booklet shall be evaluated by a third Examiner appointed by the university. The average of the marks of nearest two valuations shall be considered as the marks secured by the candidate. In case, if one of the three marks falls exactly midway between the other two, then the highest two marks shall be taken for averaging.
24MT9.0	**Eligibility for Passing and Award of Degree**
24MT9.1	(1) A student shall be declared successful in the program, if they secure any grade from 'S' to 'D' in the Semester End Examinations and obtain a CGPA greater than or equal to 6.00, and shall be considered as having passed the programme. (2) If a student secures 'F' grade in any of the courses, then he/she has to reappear in that course in the next ensuing examination. (3) In case, if the student is not satisfied with the obtained CGPA, then the candidate may withdraw the SEE results of the previous attempt and obtain written permission from the Registrar (Evaluation) to re-appear in the subsequent SEE to improve CGPA. (4) Students shall not be allowed to re-appear for any individual Course/s again, unless they opt for rejection of results of entire semester.
24MT9.2	For a pass in a Theory/ Internship/ Technical Seminar/ Practical/Project/ Dissertation/ Viva-voce examinations, the student shall secure minimum of 50% of the maximum marks prescribed in the Semester End Examination and 50% of marks in CIE and 50% in the aggregate of CIE and SEE marks.
24MT9.3	IV (Final) semester candidates having backlog courses are permitted to upload the dissertation report and to appear for SEE. The IV semester grade card shall be released only when the candidate completes all the backlog courses and become eligible for the award of degree. [To be read along with 24MT11.2]
24MT9.4	A candidate shall be allowed to reject the total performance of a semester (including CIE marks). Hence, the student must re-register for the said semester. However, in the IV semester the rejection shall not include the Project work. The rejection is permitted only once during the entire programme of study. However, the rejection of performance of IV (Final) Semester project shall not be permitted.
24MT9.5	If the rejection of the University examination results of the semester happens to be of an odd semester, the candidate can take admission to the immediate next even semester. However, if the rejection of the University result is of even semester, the candidate cannot take admission to the next odd semester.
24MT9.6	Application for approval of readmission shall be sent to the Registrar through the Dean/ Principal of the College within 15 days from the date of the announcement of the results after paying the prescribed fee for the semester.
24MT9.7	Readmission to first semester in such cases shall not be considered as fresh admission and therefore the student will continue to have the same Register Number, which was allotted earlier. The Course duration will be counted with reference to old Register Number.
24MT9.8	University Vertical Progression (Promotion / Eligibility to higher Semesters) rules will be applicable for readmitted students.
24MT9.9	A candidate, who opts for rejection of results of a semester shall be eligible for the award of class and distinction, but shall not be eligible for the award of rank.
24MT9.10	**Eligibility for Award of Degree:** A student shall be declared to have completed the degree of Master of Technology,

	provided the student has undergone the stipulated course work as per the regulations and has earned the prescribed Credits, as per the Scheme of Teaching and Examination, of the programme.
24MT10.0	**Attendance Requirement**
24MT10.1	**Registration and Enrolment:** I. Except for the first semester, registration for a semester will be done during a specified week before the semester end examination of the previous semester. II. The registration sheet should have the Candidate details, course name and code, number of credits and category (core/elective/audit) for each course of that semester. III. The Faculty Adviser, assigned by the Head of the Department, will counsel the students in planning their courses of study and provide guidance, motivation, emotional support, and enable the mentees to reach the desired professional and career goals.
24MT10.2	Courses of each semester shall be treated as a separate unit for calculation of the attendance.
24MT10.3	The candidate has to put in a minimum attendance of 75% in each course.
24MT10.4	In case of late admission, approved by competent authority (DTE/ACU), to I semester of the programme the attendance shall be reckoned from the date of admission to the programme.
24MT10.5	A candidate, who does not satisfy the attendance requirement (in one or more Courses) as mentioned in 24MT10.3 shall not be eligible to appear for the SEE of that semester and shall not be permitted to take admission to next higher semester. The candidate shall be required to repeat that semester during the subsequent year.
24MT10.6	Principals of the concerned colleges shall notify regularly, the list of candidates who fall short of attendance.
24MT10.7	The list of the candidates falling short of attendance shall be sent to the University at least one week prior to the commencement of the examination.
24MT11.0	**Promotion and Eligibility**
24MT11.1	**Promotion:** There shall be no restriction for promotion from an odd semester to the next even semester, provided the student has fulfilled the attendance requirement.
24MT11.2	a) Candidates, with a maximum of four backlog courses of first year shall be eligible for taking admission to second year (III semester). b) Each credit course shall be treated as a head of passing.
24MT11.3	The Mandatory non – credit courses, if any, shall not be considered for the Eligibility criterion prescribed for promotion, award of Class, calculation of SGPA and CGPA. However, a pass in the above courses is mandatory before the completion of Degree.
24MT12.0	**Temporary Discontinuation/ Break in the Program**
24MT12.1	(a) If a candidate, for any reason, temporarily discontinues the Programme or take a break from programme during any semester, he/she may be permitted to continue in the programme by registering to the same semester but with the prevailing scheme. The candidate shall complete all the remaining course work subject to the provision 24MT1.5. Also, the Candidates may have to complete additional course/s, if any, as per the decision of concerned Board of Studies and approval of Dean, Faculty of Engineering, Technology & Management on establishing equivalence between two schemes. A Grade card shall be issued to that effect. Additional course/s shall not be considered for the eligibility criterion prescribed for promotion. However, based on the

	individual cases, it is considered to decide the SGPA and CGPA to admit the student for the award of degree. Such candidate shall not be eligible for the award of rank. (b) Candidates who take admission to any semester of the existing scheme from another scheme, as a repeater/ fresher because of various reasons have to complete additional course/s, if any, as per the decision of concerned Board of Studies and approval of Dean, Faculty of Engineering, on establishing equivalence between two schemes. A Grade card shall be issued to that effect. Additional course/s shall not be considered for the eligibility criterion prescribed for promotion. However, based on the individual cases, it is considered to decide the SGPA and CGPA to admit the student for the award of degree. Such candidate shall not be eligible for the award of rank.
24MT13.0	**Award of Prizes, Medals and Ranks**
24MT13.1	For the award of Prizes and Medals, the conditions stipulated by the Donor shall be considered subject to the provisions of the statutes framed by the University for such awards.
24MT13.2	(1) For award of rank in a Specialization of Master of Technology, the CGPA secured by the student from I to IV semester is considered. (2) A student shall be eligible for a rank at the time of award of degree of Master of Technology, provided the student; a. Is not a repeater in any semester. b. Has not rejected the results of any semester. c. Has passed First to Final semester in all the courses in first attempt only. (3) The total number of ranks awarded shall be 10% of total number of students appeared in IV semester subject to a maximum of 10 ranks in a specialization. (4) For award of ranks in a specialization, a minimum of 10 students should have appeared in the IV semester examination.
24MT13.3	Ranks are awarded based on the merit of the students as determined by CGPA. If two or more students get the same CGPA, the tie shall be resolved by considering the number of times a student has obtained higher SGPA. If it is not resolved even at this stage, the number of times a student has obtained higher grades like S, A, B etc., shall be taken into account to decide the order of the rank.
24MT14.0	**Applicability and Power to Modify**
24MT14.1	The regulations governing the Degree of Master of Technology of Adichunchanagiri University shall be binding on all concerned.
24MT14.2	I. Notwithstanding anything contained in the foregoing, the University shall have the power to issue directions/ orders to address any difficulty. II. Nothing in the foregoing may be construed as limiting the power of the University to amend, modify or repeal any or all of the above.

|| Jai Sri Gurudev||

ADICHUNCHANAGIRI UNIVERSITY

Faculty of Engineering Management and Technology

BGS Institute of Technology

M.Tech in Infrastructure Management

Scheme & Syllabus of Teaching and Examination 2024-25

I SEMESTER **Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

Sl. No	Course	Course Code	Course Title	Teaching Hours / Week		Examination				Credits
				Theory	Practical/ Assignment	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	24IEM11	Infrastructure Development & Management	4	-	3	50	50	100	4
2	PCC	24IEM12	Advanced Design of RC Structures	4	-	3	50	50	100	4
3	PCC	24IEM13	Construction Equipment's And Management	4	-	3	50	50	100	4
4	PEC	24IEM14x	Professional Elective I	4	-	3	50	50	100	3
5	PCC	24RMI15	Research Methodology and IPR	2	-	3	50	50	100	3
6	PCC	24IEM L16	Construction Materials Laboratory		3	3	50	50	100	2
TOTAL				**18**	**3**	**18**	**300**	**300**	**600**	**20**

Note: PCC: Professional core, PEC: Professional Elective.

Course code	*Course title*
24IEM141	Prefabrication And Construction Technology
24IEM142	Advanced Concrete Technology
24IEM143	Steel & Composite Construction Technology
24IEM144	Green Building Technology

|| Jai Sri Gurudev||

ADICHUNCHANAGIRI UNIVERSITY

Faculty of Engineering Management and Technology

BGS Institute of Technology

M.Tech in Infrastructure Management

Scheme & Syllabus of Teaching and Examination 2024-25

II SEMESTER **Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

Sl. No	Course	Course Code	Course Title	Teaching Hours / Week		Examination				Credits
				Theory	Practical/ Assignment	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	24IEM21	Project Management For Infrastructure	4	-	3	50	50	100	4
2	PCC	24IEM22	Modern Construction Materials And Technology	4	-	3	50	50	100	4
3	PCC	24IEM23	Resource Management	4	-	3	50	50	100	4
4	PEC	24IEM24x	Professional Elective II	4	-	3	50	50	100	3
5	PEC	24IEM25x	Professional Elective III	4	-	3	50	50	100	3
6	PCC	24IEML26	Project Management Lab		3	3	50	50	100	2
TOTAL				**20**	**3**	**18**	**300**	**300**	**600**	**20**

Note: PCC: Professional core, PEC: Professional Elective.

Course code	*Course title*	*Course code*	*Course title*
24IEM241	Infrastructure For Smart City Planning	24IEM251	Analysis And Design Of Pavement
24IEM242	Pavement Maintenance & Management Systems	24IEM252	Energy Conservation Techniques In Building
24IEM243	Disaster Mitigation & Management	24IEM253	Advance Structural Design And Detail
24IEM244	Repair and Rehabilitation of structures	24IEM254	Composite Materials

|| Jai Sri Gurudev||

ADICHUNCHANAGIRI UNIVERSITY

Faculty of Engineering Management and Technology

BGS Institute of Technology

M.Tech in Infrastructure Management

Scheme & Syllabus of Teaching and Examination 2024-25

III SEMESTER **Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

Sl. No	Course	Course Code	Course Title	Teaching Hours / Week		Examination				Credits
				Theory	Practical/ Assignment	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	24IEM31	Construction Quality And Safety Management	04	-	03	50	50	100	04
2	PEC	24IEM32x	Professional Elective IV	04	-	03	50	50	100	03
3	PCC	24IEM33	Project work Phase-I		03		100		100	03
4	INT	24IEMI34	Internship	(Completed during the intervening vacation of I and II semesters and /or II and III semesters.)		03	50	50	100	10
TOTAL				**8**	**03**	**9**	**250**	**150**	**400**	**20**

Note: *PCC: Professional core, PEC: Professional Elective.*

Course code	*Course title*
24IEM321	Eco-Friendly Constructions
24IEM322	Infrastructure Development
24IEM323	Infrastructure Design in Transportation
24IEM324	Sustainable Development And Urban Planning
24IEM325	NPTEL Certificate

Note:

1. Technical Seminar: CIE marks shall be awarded by a committee comprising of HOD as Chairman, Guide/co-guide, if any, and a senior faculty of the department. Participation in the seminar by all postgraduate students of the same and other semesters of the programme shall be mandatory. The CIE marks awarded for Technical Seminar, shall be based on the evaluation of Seminar Report, Presentation skill and Question and Answer session in the ratio 50:25:25.

2. Internship: All the students shall have to undergo mandatory internship of 16 weeks during III semesters. A University examination shall be conducted during III semester and the prescribed credit shall be counted in the same semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the internship shall be declared as fail in internship course and have to complete the same during the subsequent University examination after satisfying the internship requirements.

|| Jai Sri Gurudev||

ADICHUNCHANAGIRI UNIVERSITY

Faculty of Engineering Management and Technology

BGS Institute of Technology

M.Tech in Infrastructure Management

Scheme & Syllabus of Teaching and Examination 2024-25

IV SEMESTER **Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

Sl. No	Course	Course Code	Course Title	Teaching Hours / Week		Examination				Credits
				Theory	Practical/ Assignment	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	24IEM41	Technical Seminar		3	03	100		100	3
2	PCC	24IEM42	Project Work		4	03	100	100	200	17
TOTAL					**07**	**06**	**200**	**100**	**300**	**20**

Note:

1. Project Work

CIE marks shall be awarded by a committee comprising of HOD as Chairman, Guide/co-guide, if any, and a senior faculty of the department. The CIE marks awarded for project work, shall be based on the evaluation of Project Report subjected to plagiarism check, Project Presentation skill and Question and Answer session in the ratio 50:25:25. SEE shall be at the end of IV semester. Project work evaluation and Viva-Voce examination (SEE), after satisfying the plagiarism check, shall be as per the University norms.

1. Course Information

Section	Details
Course Title	Infrastructure Planning Development & Management
Course Code	24IEM11
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 1st Semester
Course Type	✓Core ☐ Elective ☐ Lab
Prerequisite	Basic understanding of civil engineering, project management concepts.
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	04
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course offers an overview of key infrastructure sectors in India, including power, water, transport, telecom, urban and rural services, along with project finance and lifecycle. It introduces e-governance, e-management, and IOT applications in infrastructure. Students learn about the role of infrastructure in economic growth while analysing risks, challenges, and legal issues. The course emphasizes sustainable development, innovative design, IT systems, and effective strategies for successful infrastructure management.

2. Course Objectives

1. To provide a comprehensive understanding of the structure, operations, and significance of key infrastructure sectors in India.
2. To develop knowledge of e-governance, e-management, and IOT applications for enhancing infrastructure planning and delivery.
3. To analyse the role of infrastructure in economic growth, employment generation, and to understand associated risks, challenges, and legal frameworks.
4. To equip students with strategies for sustainable development, risk management, stakeholder negotiations, and innovative design in infrastructure projects.
5. To enable the use of information technology, life cycle approaches, and integrated systems for effective infrastructure management and future readiness

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain the basic concepts related to Infrastructure Projects.	L2	PO1,PO2,PO6,PO7,PO11

CO2	Explain the role of private sector in infrastructure growth.	L2	PO1,PO2,PO6,PO7,PO11
CO3	Describe the strategies for successful Infrastructure Project implementation.	L2	PO1,PO2,PO6,PO7,PO11
CO4	Understand Infrastructure modelling and Life Cycle Analysis Techniques.	L2	PO1,PO2,PO6,PO7,PO11
CO5	Explain Sustainable development of Infrastructure.	L2	PO1,PO2,PO6,PO7,PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**An Overview Of Basic Concepts Related to Infrastructure:** Introduction to Infrastructure, an overview of the Power Sector in India, an Overview of the Water Supply and Sanitation Sector in India, an overview of the Road, Rail, Air and Port Transportation Sectors in India, an overview of the Telecommunications Sector in India, an overview of the Urban Infrastructure in India, an overview of the Rural Infrastructure in India, The Stages of an Infrastructure Project Lifecycle. an overview of Infrastructure Project Finance.	10	CO1
II	**E- Governance and IOT:** The concept of management, concept of e-management & e-business, e-Government Principles, from e-Government to e-governance, e-governance and developing countries. E governance: Issues in implementation. Introduction to IOT, IOT fundamentals, Development of IOT Applications in Infrastructure.	10	CO2
III	**Development & Challenges to Infrastructure**: Role of Infrastructure development in employment generation and improving of the national economy. Mapping and Facing the Landscape of Risks in Infrastructure Projects, Economic and Demand Risks: The Case study for Political Risks, Socio-Environmental Risks, Cultural Risks in International Infrastructure Projects, Legal and Contractual Issues in Infrastructure, Challenges in Construction and Maintenance of Infrastructure.	10	CO3
IV	**Strategies for Successful Infrastructure Project Implementation**: Risk Management Framework for Infrastructure Projects, Shaping the Planning Phase of Infrastructure Projects to mitigate risks, Designing Sustainable Contracts, Introduction to Fair Process and Negotiation, Negotiating with multiple Stakeholders on Infrastructure Projects.	10	CO4
V	**Sustainable Development Of Infrastructure:** Information Technology and Systems for Successful Infrastructure Management, - Innovative Design and Maintenance of Infrastructure Facilities, Infrastructure Modelling and Life Cycle Analysis Techniques, Capacity Building and Improving the Governments Role in Infrastructure Implementation, An Integrated Framework for Successful Infrastructure Planning and Management – Infrastructure Management Systems and	10	CO5

	Future Directions.		

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	2	-	-	-	2	-
CO2	2	2	-	-	-	3	2	-	-	-	3	-
CO3	2	3	-	-	-	2	2	-	-	-	3	-
CO4	3	2	-	-	-	2	3	-	-	-	2	-

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Infrastructure Sector Poster Presentation (Power, Water, Roads, Rail, Telecom, Urban, or Rural)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Chandan Chowdhury, Aastha Singh,	A Decade of Infrastructure Development in India: Trends and Insights	1st Edition, Indian School of Business (ISB) Research Press, 2024
2	Anita Sengar	IT Infrastructure Management	4th Edition, Buy Books India, 2025

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Biswajeet Pattanayak	Introduction to Human Resource Management	1st Edition, Excel Books, New Delhi, 2017
2	Bohlander & Snell	Managing Human Resources	17th Cengage Learning, New Delhi, 2016

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Advanced Design of RC Structures
Course Code	24IEM12
Program	Infrastructure Management
Academic Year/Semester	2024-2025/ I Sem MTech
Course Type	✓ Core ☐ Elective ☐ Lab
Prerequisite (If any)	Basic knowledge of Reinforced Concrete Design and Structural Analysis
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	4
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This course focuses on advanced principles of reinforced concrete (RC) structural design, enabling students to design complex RC structures such as slabs, beams, chimneys, silos, bunkers, and formwork. It emphasizes limit state design, analytical skills, and performance evaluation of RC structures, integrating theoretical concepts with practical applications to solve real-world structural engineering problems.

2. Course Objectives

1. To make students to learn principles of Structural Design,
2. To design different types of structures and to detail the structures.
3. To evaluate performance of the structures

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of design and development of problem-solving skills	L3	PO1, PO2, PO4
CO2	Understand the principles of Structural Design.	L4	PO1, PO2, PO3, PO5
CO3	Design and develop analytical skills.	L4	PO1, PO2,

			PO3, PO5
CO4	Summarize the principles of structural design and detailing	L4	PO1, PO2, PO3, PO5
CO5	Understands the structural performance.	L4	PO1, PO2, PO4, PO5

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	1. Design of RC slabs by yield line method 2. Design of grid or coffered floors	10	CO1
II	Design of continuous beams with redistribution of moments.	10	CO2
III	1. Design of R C Chimneys 2. Design of flat slabs	10	CO3
IV	1. Design of R C silos 2. Design of R C bunkers	10	CO4
V	Introduction, Requirements of good formwork, Materials for forms, choice of formwork, Loads on formwork, Permissible stresses for timber, Design of formwork, Shuttering for columns, Shuttering for slabs and beams, Erection of Formwork, Action prior to and during concreting, Striking of forms. Recent developments in formwork	10	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	-
CO3	3	3	2	-	2	-	-	-	-	-	-	-
CO4	3	3	2	-	2	-	-	-	-	-	-	-
CO5	3	3	-	2	2	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*

6. Details of Practical Sessions (if applicable)

Practical	Title of Experiment / Activity

1	Field Visit to Shuttering and Concreting Practices

7. Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Bungale. S. Taranath.	Structural Analysis and Design of Tall Buildings	1st Edition McGraw-Hill Book Company, New York,1999
2	Krishnamurthy K T Gharpure S.C. and A B Kulkarni	Limit design of reinforced concrete structures	1st Edition Khanna Publishers,1985
3	Varghese P C Prentice	Limit State Design of Reinforced Concrete	2nd Edition Prentice-Hall of India,2007
4	Krishna Raju N	Advanced Reinforced Concrete Design	2nd Edition CBS Publishers & Distributors
5	Gambhir M L	Design of Reinforced Concrete Structures	3rd Edition PHI Pvt. Ltd, New Delhi, 2008

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Unnikrishna Pillai and Devdas Menon	Reinforced Concrete Design	3rd Edition Tata McGraw-Hill Publishers Company Ltd., New Delhi,2006
2	HsuT.T.C. and MoY.L.	Unified Theory of Concrete Structures	1st Edition John Wiley Sons,2010
3	Shah.H.J,	Reinforced Concrete	8th Edition Charotar Publishing House, 2009
4	A Park and Paulay,,	Reinforced and Prestressed Concrete	1st Edition New York, 1975

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sachin M S	**Name**: Dr. Shruthi R	**Name:** Dr. M Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Construction Equipment and Management
Course Code	24IEM13
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 1st Semester
Course Type	✔ Core ☐ Elective ☐ Lab
Prerequisite (If any)	Basic Civil Knowledge, Project Planning Skills, Equipment Handling Awareness
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	4
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	It covers plants and equipment for material production, including crushers and mixers, and their production rate calculations. Students learn about the operations, applications, and performance of key construction equipment like dozers, excavators, and tunnelling machinery. The course also addresses specialized equipment, equipment selection criteria, and acquisition options. Additionally, it emphasizes equipment management, maintenance, safety, and the economic aspects of owning versus hiring equipment.

2. Course Objectives

1. Understanding of plants and equipment for material production, their advantages, and production rate calculations.
2. Knowledge of operations, applications, and performance of key construction equipment like dozers and excavators.
3. Familiarity with specialized equipment for dredging, tunnelling, dewatering, and floor finishing.
4. Insight into criteria for selecting construction equipment based on task, cost, and engineering considerations.
5. Awareness of equipment management, maintenance, safety, and economic aspects of owning versus hiring.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Classify different types of plants and equipment used for material production and construction activities.	L2	PO1, PO2, PO3, PO4, PO5
CO2	Analyse the operations, applications and performance of earthmoving and material handling equipment.	L4	PO1, PO2, PO3, PO4, PO5

CO3	Compare the suitability of miscellaneous equipment such as dredging, tunnelling and dewatering equipment for specific site conditions.	L4	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate equipment selection based on task, cost and engineering considerations for efficient construction management.	L4	PO1, PO2, PO3, PO4, PO5
CO5	Examine equipment management practices including maintenance, repair, safety and economic life assessment.	L4	PO1, PO2, PO3, PO4, PO5

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Plants and Equipment for Production of Materials:** Crushers, mixers, bituminous mixing plants, concrete mixing plants, transit mixers, Advantages, choice, production rate calculation.	10	CO1
II	**Construction Equipment:** Operations, applications and performance of dozers, excavators, graders, compactors, pavers, haulers, crawler, wheel tractors, power shovels, pile driving equipment's, hauling equipment's, and drilling, blasting and tunnelling equipment.	10	CO2
III	**Miscellaneous Equipments:** Equipment for: Dredging, tunnelling, dewatering. Equipment for flooring dewatering and floors finishing. Sprayers, kerb casting equipment, screening equipment.	10	CO3
IV	**Selection of Construction Equipment:** Task considerations, cost considerations, engineering considerations, equipment acquisition options.	10	CO4
V	**Management of Construction Equipment:** Need for mechanization of construction – planning and financing construction plant and equipment – Owning and operating equipment versus hiring – planning for infrastructure mechanization equipment management – equipment maintenance and repair, log maintenance, safety during operation, economical life of equipment.	10	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	1	2	-	-	-	-	-	-	-
CO2	2	3	2	3	3	-	-	-	-	-	-	-
CO3	2	3	2	3	2	-	-	-	-	-	-	-
CO4	2	3	3	3	2	-	-	-	-	-	-	-
CO5	2	3	2	3	2	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Equipment Selection Case Study.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Robert L. Peurifoy, Clifford J. Schexnayder, Aviad Shapira, Robert L. Schmitt and Aaron Cohen	Construction Planning, Equipment and Methods	10th Edition, McGraw Hill, 2024
2	S. C. Sharma	Construction Equipment and its Management	5th Edition, Khanna Publishers, 2023

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	John E. Schaufelberger and Giovanni C. Migliaccio	Construction Equipment Management	2nd Edition, Routledge Taylor & Francis Group, 2019
2	K K Chitkara	Construction Project Management	4th Edition, McGraw Hill, 2019

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback.

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sunil R	**Name:** Dr. Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Prefabrication and Construction Technology
Course Code	24IEM141
Program	Infrastructure Management
Academic Year/Semester	2024-2025/ I Sem M. Tech
Course Type	☐ Core ✓ Elective ☐ Lab
Prerequisite (If any)	Basic knowledge of Reinforced Concrete Design and Structural Analysis.
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	3
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This course focuses on the principles, design, and construction of prefabricated structures, emphasising modular coordination, structural stability, and performance evaluation. It covers the analysis and design of prefabricated elements such as slabs, walls, roofs, and industrial components, along with detailing, connections, and construction techniques. The curriculum integrates theoretical concepts with practical applications to equip students with skills for designing and evaluating prefabricated structures in modern construction.

2. Course Objectives

1. To make students learn the principles of structural design in prefabricated construction.
2. To analyze and design different types of prefabricated structural elements and systems.
3. To understand detailing, connections, and construction aspects of prefabricated structures.
4. To evaluate the performance, stability, and serviceability of prefabricated structures under various loading conditions.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand general principles of pre-fabrication.	L2	PO1, PO2, PO4
CO2	Plan simple buildings using various types of prefabricated elements.	L4	PO1, PO2,

			PO3, PO5
CO3	Design simple prefabricated elements. .	L4	PO1, PO2, PO3, PO5
CO4	Outline the various phases involved in precast/pre-fabricated technology.	L3	PO1, PO2, PO4, PO6
CO5	Distinguish pre-engineered buildings from conventional units.	L4	PO1, PO2, PO4, PO6

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Types of RC Prefabricated Structures:** Long wall and cross wall large panel buildings- One-way and two-way prefabricated slabs - Framed buildings with partial and curtain walls, single-storey industrial buildings with trusses and shells - Crane – Gantry systems.	10	CO1
II	**Functional Design Principles:** Modular coordination – Standardization - Disuniting, Diversity of prefabricates – Production – Transportation – Erection - Stages of loading and codal provisions Safety factors - Material properties - Deflection control - Lateral load resistance - Location and types of shear walls	10	CO2
III	**Floors, Stairs and Roofs:** Types of floor slabs –Methods of Analysis and design example of cored and panel types and two-way systems - Staircase slab design - Types of roof slabs and insulation requirements - Description of joints, behaviour and requirements - Deflection control for short term and long-term loads - Ultimate strength calculations in shear and flexure.	10	CO3
IV	**Walls:** Types of wall panels - Blocks of large panels – Curtain partition and load bearing walls Load transfer from floor to wall panels – Vertical loads Eccentricity and stability of wall Panels –Use of Design curves -Types of wall joints, their behaviour and design – Leak prevention, Joint sealants, and sandwich wall panels.	10	CO4
V	**Industrial Buildings:** Components of single storey industrial sheds with crane gantry systems - Design aspects of R.C. Roof Trusses - Roof panels R.C. Crane - Gantry Girders - Corbels and columns and Wind bracing.	10	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	-
CO3	3	3	2	-	2	-	-	-	-	-	-	-
CO4	3	3	-	2	-	2	-	-	-	-	-	-
CO5	3	3	-	2	2	2	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*

6. Details of Practical Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Technical Talk / Expert Lecture – Industry expert session on modular coordination, standardisation, and codal safety factors.

7. Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	L. Mokk	Prefabricated Concrete for Industrial and Public Structures	1st Edition, Publishing House of the Hungarian Academy of Sciences, Budapest, 2007.
2	T. Koncz	Manual of Precast Concrete Construction, Vol. I, II, III & IV	1st Edition, Berlin, 1971.
3	B. Lewicki	Building with Large Prefabricates	1st Edition, Elsevier Publishing Company, Amsterdam, London, New York, 1998.
4	Hass, A.M	Precast Concrete Design and Applications	1st Edition, Applied Science Publishers, 1983.

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Handbook	Precast concrete for buildings	1st Edition, ICI Bulletin 02, Indian Concrete Institute,
2	Bureau of Indian Standards (BIS)	National Building Code of India	BIS, New Delhi, 2005
3	Marashev, V.I., Sigalov, E.Y., and Baikov, U.N.	Design of RC Structures	1st Edition, Mir Publishers, Moscow. 1980
4	Structural Engineering Research Centre (SERC)	Design & Construction of Prefabricated Residential & Industrial Buildings	1st Edition, SERC, Chennai 1990.

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sachin M S	**Name**: Dr. Shruthi R	**Name:** Dr. M Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Advanced Concrete Technology
Course Code	24IEM142
Program	Infrastructure Management
Academic Year/Semester	2025-2026 / 1st Semester
Prerequisite	Materials in Civil Engineering, Structural Engineering Basics
Course Type	☐ Core ✓Elective ☐ Lab
Contact Hours per Week	Lecture: 3 Tutorial: 1 Practical: 0 Total: 4
Credits	3
W.e.f	2024-25
Approved in AC on	September -2024
Course Description	This course provides an in-depth understanding of the science, engineering, and applications of modern concrete materials. It covers the microstructural behavior, durability, and performance of concrete, with emphasis on sustainable and high-performance alternatives. Students will learn about advanced admixtures, special concretes, and innovative testing methods used to improve strength, workability, and longevity. The course also explores the use of industrial by-products, nanomaterials, fibers, and supplementary cementitious materials to develop eco-friendly concretes. Practical sessions and case studies will enhance students' ability to design, evaluate, and apply concrete for complex engineering projects and modern construction practices.

2. Course Objectives

1. Provides a comprehensive treatment of the constituent materials of concrete.
2. Learn the principles of Concrete mix design, and assess the performance of various cement-based materials including normal and high strength concrete as well as special cement composites.
3. To differentiate between different types of concrete and Learn characterize and predict the behavior of special concrete.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	On complete of this course the students will able to understand the construction material, meeting the demanding performance requirements based on men, machines and materials.	L2	PO1,PO2

CO2	Innovative special concrete with mixes, applications and limitations	L3	PO1,PO2,PO3,PO4
CO3	Testing methods developed to increase the scope of concrete usage as an advanced material	L4	PO1,PO3, PO4

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Fiber reinforced concrete:** History, mechanism, different types of fibers, Aspect ratio, Volume of fiber orientation of fibers, balling effect, properties of fiber reinforced concrete, application of fiber reinforced concrete. Types of Fiber reinforced concrete. **Ferro cement:** Definition, different materials used, casting techniques, properties of Ferro cement, applications.	08	CO1
II	**Light Weight Concrete:** Introduction, classification, properties, strength and durability, mix proportioning and problems **High Density Concrete:** Radiation shielding ability of concrete, materials for high density concrete, mix proportioning, properties in fresh and hardened state, placement methods	08	CO1
III	**Ready mix concrete:** Concept, ready mix concrete plants, difficulties faced and their solution , use of admixtures in ready mix concrete, economics and quality control aspects of ready mix concrete. **High Performance Concrete:** Constituents, mix proportioning, properties in fresh and hardened states, applications & limitations	08	CO2
IV	**Polymer concrete:** Polymers, resins, polymerization, different types of polymer concrete like polymer impregnated concrete, polymer concrete (Resin concrete) and polymer modified concrete, their properties and applications. **Self-compacting concrete:** Development of SCC, basic principles and requirements , workability tests for SCC, mix design of SCC, acceptance criteria for SCC, adoption of SCC in the precast industry, present status of SCC.	08	CO2
V	**Concrete from Industrial wastes:** a. Blast furnace slag cement concrete b. Fly-ash concrete c. Silica fume concrete Recycled aggregate Concrete	08	CO3

5. CO–PO Mapping Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	2	-	-	-	-	-	-	-	-
CO3	3	-	2	2	2	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Mix design exercise for radiation shielding concrete
2	Mix proportioning for SCC.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Aitcin P.C	High performance concrete	1st edn (E & FN Spon, 1998).
2	Kumar Mehta.P, Paul J.N.Monterio	Microstructure, Properties and Materials	3rd Edition, McGraw-Hill, 2020.

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Krishnaraju.N	Design of concrete mixes	CBS Publication and distributors, Delhi 5th Edition Early 2017 (E-book Jan 30, 2017)
2	Shetty M S	Concrete Technology	The 8th Edition (co-authored Shetty & Jain) was released in 2019 by S. Chand Publishing S. Chand publishing House Ltd., New Delhi

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20

Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, Semester End Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Amith B J	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD and Associate Professor	**Designation:** Director,IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Steel & Composite Construction Technology
Course Code	24IEM143
Program	Infrastructure Management
Academic Year/Semester	2024-2025/ I Sem M. Tech
Course Type	☐ Core ✓ Elective ☐ Lab
Prerequisite (If any)	Basic knowledge of Steel Structure Design and Reinforced Concrete
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	3
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This course introduces students to the behaviour, design, and construction of steel and steel-concrete composite structures. It covers structural steel detailing, fabrication, erection practices, and maintenance, along with the analysis and design of composite beams, columns, and floors. The curriculum emphasizes practical applications, safety, and economic considerations in steel and composite construction, preparing students for real-world structural engineering challenges

2. Course Objectives

1. To introduce students to the behaviour, classification, and applications of structural steel and composite constructions.
2. To develop skills in structural steel detailing, fabrication methods, erection practices, and maintenance.
3. To analyze and design steel and steel–concrete composite structural elements such as beams, columns, floors, and connectors.
4. To evaluate the performance, safety, and economy of steel and composite structures in real-world applications.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of problem-solving skills.	L2	PO1, PO2, PO4
CO2	Understand the design principles of steel and composite construction technology.	L3	PO1, PO2, PO3, PO5

CO3	Develop analytical skills of composite structures.	L4	PO1, PO2, PO3, PO5
CO4	Summarize the solution of problem-solving skills.	L4	PO1, PO2, PO3, PO5
CO5	Understand the concepts of steel detailing, fabrication, erection, and construction.	L4	PO1, PO2, PO4, PO6

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Introduction:** Materials, classification and properties Structural steel sections and data Behaviour of steel structures: Steel water tanks, Chimneys and Stacks, Bridge Structures, Building Frames, Steel Space grids.	10	CO1
II	**Structural Steel Detailing:** Symbols, layout drawings, shop detail drawings, assembly marking. **Structural steel fabrication:** Methods - tools, equipment and practices, Punching, Reaming and drilling, cutting Operations, fittings, fasteners, bolting, riveting and welding, Assembly, inspection, cleaning, sand blasting, and painting: Transportation of fabricated components, Storage and handling.	10	CO2
III	**Erection of steel structures** Erection equipment, erection tools, methods of erection, section sequence, field connections, and detailing to facilitate erection. Specifications, Estimating, and Costing Steel Work. Fire protection of steel construction, Maintenance and repair of steel structures	10	CO3
IV	**Composite Constructions** Introduction to composite construction, basic concepts, types of composites, Constructions Steel concrete composite, Analysis and of composite beams Composite floors.	10	CO4
V	**Shear connectors** Functions & types Steel concrete composite columns, columns subjected to axial loads and moments. Encased composite construction of beams and columns, concepts and design.	10	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	-
CO3	3	3	2	-	2	-	-	-	-	-	-	-
CO4	3	3	2	-	2	-	-	-	-	-	-	-
CO5	3	3	-	2	2	2	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*

6. Details of Practical Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Case Study Presentation – Real-world applications of steel water tanks, chimneys, bridges, and space grids.

7. Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Ramachandra	Design of Steel Structures,	1st Edition, Standard Book House, New Delhi.
2	E. R. Bryan	The Stressed Skin Design of Steel Buildings,	1st Edition, Wiley (New York), 1973
3	Viest et al.	Composite Construction, Design for Buildings",	1st Edition, ASCE/McGraw-Hill, Inc.1997
4	P. Dayaratnam	Design of Steel Structures	2nd Edition, A. H. Wheeler Publishing Co. Ltd., 2008
5	IS: 11384, IRC-22, (Details as per current editions)	Indian Standard Codes of Practice,	Bureau of Indian Standards.

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	G. M. Sabnis,	Handbook of Composite Construction Engineering,	1st Edition, Van Nostrand Reinhold, 1979
2	R. I. Viest, J. P. Colaco, R. W. Furlong, L. G. Griffis, R. T. Leon & L. A. Wyllie,	Composite Construction: Design for Buildings,	1st Edition, ASCE/McGraw-Hill, Inc., 1997.

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20

Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sachin M S	**Name**: Dr. Shruthi R	**Name:** Dr. M Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: Head and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1.Course Information

Section	Details
Course Title	Green Building Technology
Course Code	24IEM144
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 1st Semester
Course Type	☐Core ✓Elective ☐ Lab
Prerequisite	Introduction to Building Science, Basic Environmental Engineering Concepts.
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total:04
Credits	03
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course provides a comprehensive understanding of energy use and management in buildings, addressing indoor environmental control and factors affecting energy consumption. It covers essential requirements such as thermal comfort, ventilation, illumination, and acoustic needs. The course examines the impact of climate, solar radiation, and building orientation on energy efficiency. It also focuses on end-use energy utilization, thermal performance, and technological options for energy management, including audits and targeting for sustainable building design.

2. Course Objectives

1. Exposure to the green building technologies and their significance.
2. Understand the judicial use of energy and its management.
3. Educate about the Sun-earth relationship and its effect on climate.
4. Enhance awareness of end-use energy requirements in the society.
5. Develop suitable technologies for energy management.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand Energy Use & Performance: Influenced by both internal (occupants, equipment, lighting) and	L2	PO1, PO2, PO7, PO11, PO12

	external (climate, orientation, shading) factors.		
CO2	Comprehend indoor environmental requirements including thermal comfort, ventilation, illumination, and air quality.	L2	PO1, PO2, PO7, PO11, PO12
CO3	Understand the building orientation on energy efficiency.	L2	PO1, PO2, PO7, PO11, PO12
CO4	Understand end-use energy requirements, heat transfer, and thermal performance standards of building envelopes.	L2	PO1, PO2, PO7, PO11, PO12
CO5	Comprehend the energy management principles, conduct energy audits, and recommend technological solutions for energy optimization in buildings.	L2	PO1, PO2, PO7, PO11, PO12

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	Overview of the significance of energy use and energy processes in building - Indoor activities and environmental control - Internal and external factors on energy use and the attributes of the factors - Characteristics of energy use and its management - Macro aspect of energy use in dwellings and its implications.	08	CO1
II	Indoor environmental requirement and management - Thermal comfort - Ventilation and air quality – Air conditioning requirement - Visual perception - Illumination requirement - Auditory requirement.	08	CO2
III	Climate, solar radiation and their influences - Sun-earth relationship and the energy balance on the earth's surface - Climate, wind, solar radiation, and temperature - Sun shading and solar radiation on surfaces - Energy impact on the shape and orientation of buildings.	08	CO3
IV	End-use, energy utilization and requirements - Lighting and day lighting - End-use energy requirements - Status of energy use in buildings Estimation of energy use in a building. Heat gain and thermal performance of building envelope - Steady and non-steady heat transfer through the glazed window and the wall - Standards for thermal performance of building envelope - Evaluation of the overall thermal transfer.	08	CO4

V	Sustainable Development Of Infrastructure, Energy management options - Energy audit and energy targeting - Technological options for energy management.	08	CO5

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	3	-	-	-	2	2
CO2	3	3	-	-	-	-	2	-	-	-	2	3
CO3	3	3	-	-	-	-	3	-	-	-	3	2
CO4	3	3	-	-	-	-	3	-	-	-	2	3
C05	3	3	-	-	-	-	3	-	-	-	3	2

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Field Visit or Guest Lecture (Green buildings, smart buildings)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Tong Yang, Derek Clements-Croome, Matthew Marson	Building energy management system, Encyclopaedia of Sustainable Technologies	Elsevier, 2nd Edition, 2022
2	Mohamed Ebeed et al, Scientific Reports,	Smart building energy management with renewable and storage system,	Nature Publishing, 2024

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Abraham M. (Ed.)	Sustainable technologies	Elsevier, 2022
2	Chen, S., et al	Advanced Energy Management for residential buildings	Technical publication, 2023

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20

Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Research Methodology & IPR
Course Code	24RMI15
Program	Civil Engineering
Academic Year/Semester	2024-25 /I Sem M.Tech
Course Type	✓ Core ☐ Elective ☐ Lab
Prerequisite (If any)	Statistics, analytical & writing skills, basic understanding of innovation, legal/ethical awareness, and documentation ability.
Contact Hours per Week	Lecture: 3 Tutorial: 0 Practical: 0 Total: 3
Credits	3
W.e.f	2024-25
Approved in AC on	Sept 2024
Course Description	This course introduces the fundamentals of research methodology and intellectual property rights (IPR). It equips students with skills in research design, data collection, analysis, and report writing, while providing insights into patents, copyrights, trademarks, and related legal frameworks. The course emphasizes ethical research practices and the protection of innovations through IPR.

2. Course Objectives

1. To give an overview of the research methodology and explain the technique of defining a research problem
2. To explain carrying out a literature search, its review, developing theoretical and conceptual frame works and writing a review.
3. To explain the details of sampling designs, and also different methods of data collections.
4. To explain the art of interpretation and the art of writing research reports.
5. To explain various forms of the intellectual property, its relevance and business impact in the changing global business environment.
6. To discuss leading International Instruments concerning Intellectual Property Rights.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Discuss research methodology and the technique of defining a research problem	L2	PO1, PO2,PO12.

CO2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review.	L2	PO1, PO2, PO3, PO12.
CO3	Explain various research designs and their characteristics.	L2	PO1, PO2, PO3, PO12.
CO4	Explain the art of interpretation and the art of writing research reports	L2	PO1, PO2, PO3, PO12.
CO5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.	L2	PO1, PO2, PO3, PO12.

4. Course Content (Module-Wise)

Module	Topics	Hours	COs
I	**Research Methodology:** Introduction, Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, and Problems Encountered by Researchers in India.	8	CO1
II	**Procedural Statements and Routines:** **Defining the Research Problem:** Research Problem, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration. **Reviewing the literature:** Place of the literature review in research, Bringing clarity and focus to your research problem, Improving research methodology, Broadening knowledge base in research area, Enabling contextual findings, How to review the literature, searching the existing literature, reviewing the selected literature, Developing a theoretical framework, Developing a conceptual framework, Writing about the literature reviewed.	8	CO2

III	**Research Design:** Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Important Experimental Designs. **Design of Sample Surveys:** Introduction, Sample Design, Sampling and Non-sampling Errors, Sample Survey versus Census Survey, Types of Sampling Designs.	8	CO3
IV	**Data Collection**: Experimental and Surveys, Collection of Primary Data, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method. **Interpretation and Report Writing:** Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report of the Research Report, Types of Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports	8	CO4
V	**Intellectual Property:** The Concept, Intellectual Property System in India, Development of TRIPS Complied Regime in India, Patents Act, 1970, Trade Mark Act, 1999,The Designs Act, 2000, The Geographical Indications of Goods (Registration and Protection) Act1999, Copyright Act,1957,The Protection of Plant Varieties and Farmers' Rights Act, 2001,The Semi-Conductor Integrated Circuits Layout Design Act, 2000, Trade Secrets, Utility Models, IPR and Biodiversity, The Convention on Biological Diversity (CBD) 1992, Competing Rationales for Protection of IPRs, Leading International Instruments Concerning IPR, World Intellectual Property Organisation (WIPO),WIPO and WTO, Paris Convention for the Protection of Industrial Property, National Treatment, Right of Priority, Common Rules, Patents, Marks, Industrial Designs, Trade Names, Indications of Source, Unfair Competition, Patent Cooperation Treaty (PCT), Advantages of PCT Filing, Berne Convention for the Protection of Literary and Artistic Works, Basic Principles, Duration of Protection, Trade Related Aspects of Intellectual Property Rights(TRIPS) Agreement, Covered under TRIPS Agreement, Features of the	8	CO5

	Agreement, Protection of Intellectual Property under TRIPS, Copyright and Related Rights, Trademarks, Geographical indications, Industrial Designs, Patents, Patentable Subject Matter, Rights Conferred, Exceptions, Term of protection, Conditions on Patent Applicants, Process Patents, Other Use without Authorization of the Right Holder, Layout-Designs of Integrated Circuits, Protection of Undisclosed Information, Enforcement of Intellectual Property.		

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	2
CO2	3	3	3	-	-	-	-	-	-	-	-	2
CO3	3	3	2	-	-	-	-	-	-	-	-	2
CO4	3	3	2	-	-	-	-	-	-	-	-	2
CO5	3	3	2	-	-	-	-	-	-	-	-	2

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Technical Talk on " Intellectual Property Rights"

7. Textbooks

Sl.No	Author(s)	Title	Publisher & Year
1	C. R. Kothari, Gaurav Garg.	Research Methodology: Methods and Techniques,	New Age International, 4th Edition, 2018.
2	Ranjit Kumar	Research Methodology: A Step-by-Step Guide for Beginners (for the topic Reviewing the Literature under Module 2).	SAGE Publications Ltd., 2011.
3	The Institute of Company Secretaries of India	Professional Programme: Intellectual Property Rights, Law and Practice (Study Material for the topic Intellectual Property under Module 5).	Statutory Body under an Act of Parliament, September 2013.

8. Reference Books

Sl.No	Author(s)	Title	Publisher & Year
1	Trochim	Research Methods: the concise knowledge base.	Atomic Dog, Publishing 2005
2	Fink	A Conducting Research Literature Reviews: From Internet to Paper.	5th edition, 2019.

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments ,Semester End Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Dr. Manjula K	**Name: Dr. Shruthi R**	**Name: Dr. Shankar M**	**Name: Dr. B N Shobha**
Designation: Associate Professor	**Designation: Associate Professor & HOD**	**Designation: Director, IQAC**	**Designation: Principal**
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Construction Materials Laboratory
Course Code	24IEML16
Program	Infrastructure Management
Academic Year/Semester	2025-2026 / 1st Semester M. Tech
Course Type	☐ Core ☐ Elective ✓Lab
Contact Hours per Week	Lecture: 0 Tutorial: 0 Practical: 4 Total: 4
Credits	2
W.e.f	2024-25
Approved in AC on	September -2024
Course Description	This laboratory course provides practical exposure to the properties, behavior, and performance evaluation of construction materials commonly used in civil engineering. Students will conduct standard tests on materials such as cement, concrete, fine and coarse aggregates, bricks, steel, timber, and bitumen to assess their quality and suitability for various applications. Emphasis is placed on understanding material characteristics like strength, durability, workability, and consistency in accordance with relevant IS codes and international standards. The course bridges theoretical knowledge with hands-on experimentation, enabling students to interpret test results and apply them in construction practices.

2. Course Objectives

1. The objective of this course is to make students to learn principles of design of experiments.
2. To investigate the performance of the structural elements.
3. To evaluate the different testing methods and equipment's.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of Design and development of experimental skills.	L2	PO1 ,PO2,PO4,PO5,
CO2	Understand the principles of design of experiments.	L2	PO1,PO2,P03,PO10
CO3	Design and Develop analytical skills.	L3	PO1,PO2, ,P04 ,PO5 PO12

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
1	Tests on Cement	4	CO1
2	Tests on aggregate, gradation	4	CO1
3	Concrete mix design	4	CO1
4	Tests on Fresh Concrete	4	CO2
5	Tests on Harden Concrete	4	CO2
6	Tests on fiber reinforced concrete,	4	CO2
7	Tests related to self-compacting concrete,	4	CO3
8	Non-destructive tests- Rebound hammer test, Ultrasonic Pulse velocity test, Rebar Locator.	4	CO3
9	Tests on reinforcement steel, Corrosion tests.	4	CO3
10	Tests on bitumen, marshal mix design	4	CO3

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	1	-	-	-	-	-	-	-
CO2	3	3	1	-	-	-	-	-	-	1	-	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Material Identification and Characterization
2	Non-Destructive Testing (NDT) of Concrete Structures

6. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Ravi Kumar Sharma	Testing of construction materials	1st Edition I K International Pvt Ltd, 12 Mar 2019 - Technology & Engineering

2	Dr. Atul Ramdas Kolhe, Dr. Vinesh Sukhadeo Thorat, Dr. Pravin Jaysing Gorde, Mr. Shubham Eknath Chandgude	Text book of building construction and construction materials	1st Edition Academic Guru Publishing House, 19 Apr 2024 - Study Aids

7. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	S.K. Garg	Construction Materials and Testing	2nd Edition Khanna Publishers 2022
2	S.N. Rangwala	Construction Materials and Testing	2nd Edition Charotar Publishing House 2021

8. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test	10
Record	40
End Semester Examination	50

1. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, Semester End Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr.Amith B J	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD & Associate Professor	**Designation:** Director IQAC	**Designation: Dean and Principal**
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Project Management for Infrastructure
Course Code	24IEM21
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 2nd Semester
Course Type	✓Core ☐ Elective ☐ Lab
Prerequisite	Management principles, construction engineering concepts, project planning, scheduling, and execution techniques.
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	04
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course introduces fundamental concepts and techniques of project management, covering project formulation, processes, and relationships with other management disciplines. It emphasizes project planning and control using methods like CPM, PERT, and modern project management software. Key topics include quality, risk management, contract administration, and construction safety protocols. The course also engages students with real-world case studies and capstone projects to develop practical skills for managing resources, schedules, and project challenges effectively.

2. Course Objectives

1. To Understand the fundamental project management processes, techniques, and their interrelation with other management disciplines.
2. To enable to plan, schedule, and control project activities effectively using techniques like CPM, PERT, and project management software
3. To develop knowledge of quality management, risk mitigation, safety regulations, and contract administration in construction projects.
4. To acquire skills in resource planning, scheduling, levelling, and cost-duration optimization with practical software applications.
5. To analyse real-world projects and capstone experiences to apply project management principles for solving practical challenges

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain project, project management, life cycle and project formulation	L2	PO1, PO2, PO3, PO7, PO11
CO2	Analyze and Manage time in projects through Gantt charts, and network techniques.	L3	PO1, PO2, PO3, PO7, PO11
CO3	Analyze and manage time in projects through CPM and PERT, update and monitor projects	L3	PO1, PO2, PO3, PO7, PO11
CO4	Optimize resources of projects using scheduling, fast tracking and re-estimation techniques	L2	PO1, PO2, PO3, PO7, PO11
CO5	Explain different approaches for estimating cost	L2	PO1, PO2, PO3, PO7, PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**PROJECT MANAGEMENT**: AN OVERVIEW Introduction, Project Management process, Project Management techniques, Relationship to other management disciplines, Related endeavours, Concentric project management, Project formulation and development.	10	CO1
II	**PROJECT PLANNING AND TIME MANAGEMENT:** Purpose, Project scheduling, activity definition, activity sequencing, activity duration estimating, schedule development, schedule control, project management using CPM\PERT- Network basics, Network development, PERT analysis, advantages. Computerized network analysis- features of PM software, capabilities of PM software, multi project analysis	10	CO2
III	**MANAGEMENT OF QUALITY**: RISK, SAFTEY, CONTRACT &SAFTEY Introduction to Management, quality planning and assurance, quality control process risk identification and assessment, risk mitigation strategies, risk monitoring and control. Types of construction contract, contract negotiation and administration. Construction site safety protocols, occupational health and safety regulations, safety audits and compliance.	10	CO3
IV	**RESOURCE PLANNING**: Introduction, Inputs, Tools, Outputs, Resource scheduling, Resource leveling, Resource restrained scheduling, strategies for shortening the schedule Assigning resources: Work duration, resources, Effort driven scheduling, create a resource list, Exercise on resource planning using software, Level now command, levelling Gantt	10	CO4

	chart, assigning rate to resources, techniques of duration cost trade-off..		
V	**CASE STUDY AND REAL WORLD APPLICATIONS:** Introduction, importance of analysis projects, analysis of different projects, challenges solutions, and best practices. Introduction to cap stone, importance and purpose of cap stone projects, difference between cap stone project and project .	10	CO5

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	2	-	-	-	3	-
CO2	3	3	3	-	-	-	2	-	-	-	3	-
CO3	3	3	3	-	-	-	2	-	-	-	3	-
CO4	3	3	3	-	-	-	2	-	-	-	3	-
CO5	3	3	2	-	-	-	2	-	-	-	3	-

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Risk Brainstorm (Group Activity)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Terry Schmidt	Building energy management system	Encyclopaedia of Sustainable Technologies, Elsevier, 2nd Edition, 2022
2	Mohamed Ebeed et al,	Strategic project management made simple: practical tools for, leaders & teams	Wiley, 2024

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Harold Kerzner,	Project management: A systems approach to planning, scheduling & controlling	Wiley, 14th Edition, 2022
2	Mike Clayton	Risk Happens!:Managing risk & avoiding failure in business projects	Taylor & Francis, 2nd Edition, 2023

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr.B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Modern Construction Materials and Technology
Course Code	24IEM22
Program	Infrastructure Management
Academic Year/Semester	2025-26/2nd Sem
Course Type	✔Core ☐ Elective ☐ Lab
Prerequisite (If any)	Building Materials, Material Science Basics & Construction Technology Fundamentals.
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total:4
Credits	4
W.e.f	2024-25
Approved in AC on	September 2024
Course Description	Advanced materials and techniques used in modern construction practices covering special concretes, composites, smart materials, substructure and superstructure methods, and demolition techniques.

2. Course Objectives

1. Awareness of special concretes, composites, smart and intelligent materials.
2. Knowledge of advanced construction techniques for substructure construction.
3. Familiarity with techniques for superstructure construction.
4. Exposure to methods for construction of special structures.
5. Insight into demolition and dismantling methods.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain the properties and applications of special concretes, composites, smart and intelligent materials.	L2	PO1, PO2
CO2	Describe properties and applications of advanced metals and coatings used in construction.	L2	PO1, PO2
CO3	Analyse the suitability of composites, polymers, waterproofing compounds, and intelligent materials for modern construction applications.	L3	PO1,PO2, PO3,PO5
CO4	Apply appropriate substructure construction techniques such as jacking, tunnelling, shoring, trenchless technology, and offshore works.	L3	PO1,PO2, PO3,PO5
CO5	Evaluate and select appropriate superstructure construction techniques for tall buildings, large span structures, and high-rise applications.	L3	PO1, PO2, PO3,PO5, PO6

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Special Concretes:** Concretes, Behaviour of concretes – Properties and Advantages of High Strength and High Performance Concrete – Properties and Applications of Fiber Reinforced Concrete, Self compacting concrete, Alternate Materials to concrete on high performance & high Strength concrete.	8	CO1
II	**Metals:** Types of Steels – Manufacturing process of steel – Advantages of new alloy steels – Properties and advantages of Aluminium and its products – Types of Coatings & Coatings to reinforcement – Applications of Coatings.	8	CO2
III	**Composites And Other Materials**: Types of Plastics – Properties & Manufacturing process – Advantages of Reinforced polymers–Types of FRP–FRP on different structural elements – Applications of FRP - Types and properties of Water Proofing Compounds – Types of Non- weathering Materials and its uses – Types of Flooring and Facade Materials and its application Types & Differences between Smart and Intelligent Materials - Special features – Case studies showing the applications of smart & Intelligent Materials	8	CO3
IV	**Sub Structure Construction:** Box jacking- pipe jacking- under water construction of diaphragm walls and basement- tunneling Techniques - cable anchoring and grouting- driving diaphragm walls, sheet piles, laying operations for built up offshore system- shoring for deep cutting- large reservoir construction – trenchless technology.	8	CO4
V	**Superstructure Construction For Buildings:** Vacuum dewatering of concrete flooring - concrete paving Technology, Techniques of construction for continuous concreting , Operation in tall buildings of various shapes and varying sections – launching techniques- suspended form work -erection techniques of tall structures, Large span structures- launching techniques for heavy decks, In situ pre-stressing in high rise structures, aerial transporting, handling, erecting lightweight components on tall structures	8	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	–	–	–	–	–	–	–	–	–	–
CO2	3	2	–	–	–	–	–	–	–	–	–	–
CO3	3	2	2	–	1	–	–	–	–	–	–	–
CO4	3	2	2	–	1	–	–	–	–	–	–	–
CO5	3	2	3	–	2	1	–	–	–	–	–	–

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practicals Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Mini seminar on modern coatings and advanced steel/aluminium products.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	M.S. Shetty	Concrete Technology – Theory and Practice	6th Edition S. Chand, 2021
2	S.K. Duggal	Building Materials	5th Edition New Age International, 2020

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	P.C. Varghese	Advanced Construction Materials	2nd Edition PHI Learning, 2018
2	A.M. Neville	Properties of Concrete	5th Edition Pearson Education, 2019

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mrs. Uma A	**Name:** Dr. Shruthi R	**Name:** Dr.M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1.Course Information

Section	Details
Course Title	Resource Management
Course Code	24IEM23
Program	Infrastructure Management
Academic Year/Semester	2024-2025/ II Sem M.Tech
Course Type	✓**Core** ☐Elective ☐ Lab
Prerequisite	Basic knowledge of Management Principles and Project Planning..
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	4
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This course introduces the concepts and practices of effective resource management in engineering and organizational contexts. It covers planning, allocation, scheduling, and optimization of manpower, materials, machines, money, and time to achieve project objectives. Emphasis is placed on sustainable utilization of resources, cost-effectiveness, and application of modern tools and techniques for efficient management.

1. Course Objectives

1. Demonstrate principles and techniques of effective resource management in engineering and organizational practice
2. Develop skills in planning, allocation, and utilization of manpower, materials, machines, money
3. Utilize modern tools, techniques, and strategies for efficient resource optimization.
4. Implement sustainable and cost-effective approaches in resource utilization

2. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain the need and importance of human resource management, labour laws relating to Construction industry	L3	PO1,PO2, PO6, PO9,PO11
CO2	Identify the need and measures the resources in construction industry.	L2	PO1,PO2, PO6, PO9,PO11
CO3	Explain the need for applying Materials Management	L3	PO1,PO2, PO6, PO9,PO11

CO4	Enumerate the need, importance, elements of quality and significance of Inventory Management	L3	PO1,PO2, PO6, PO9,PO11

4.Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Resource Planning** Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control- Types of resources, manpower, Equipment Material, Money, Time Systems approach in resource management, Characteristics of resources- Resources Utilization, measurement of actual resources required-Tools for measurement of resources	08	CO1
II	**Human Resources Management** Introduction:Concept- Growth – Role and function. Manpower Planning for Construction Companies – Line and Staff function. Recruitment, selection, placement, induction and training; over staffing; Time office and establishment functions; wage and salary administration – Discipline Separation Process.	08	CO2
III	**Materials Management** Importance of materials management and its role in construction industry-scope, objectives and functions, integrated approach to materials management, Role of materials manager, Classification and Codification of materials of construction. ABC analysis Procedure and its use, Standardization in materials and their management, Procurement, identification of sources of procurement, vendor analysis, Vendor analysis concept of (MRKP), Material requirement planning, planning, purchase procedure, legal aspects.	08	CO3
IV	**Inventory Management** Inventory Control techniques. EOQ, Advantages and limitation of use of EOQ, Periodic ordering, order point control, safety stock, stock outs, application of AC analysis in inventory control, concept of (JIT)- Just in time management, Indices used for assessment of effectiveness of inventory management.	08	CO4
V	**Stores Management** Receipt and inspection, care and safety in handling, loss on storage, wastage, Bulk purchasing, site layout and site organization, scheduling of men, materials and equipment. Use of MMS Materials Management Systems in materials planning, procurement, inventory, control, cost control etc.	08	CO4

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO1 2
CO1	3	2	-	-	-	2	-	-	2	-	2	-
CO2	3	3	-	-	-	2	-	-	1	-	1	-
CO3	3	2	-	-	-	2	-	-	2	-	2	-
CO4	3	3	-	-	-	2	-	-	2	-	1	-

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Prepare a Resource Allocation Plan for a small construction project (e.g.building a single-storey residential house)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	K. S. Menon	Purchasing and Inventory Control	Wheeler Publishing, New Delhi, 2015
2	Dr. Mahesh Verma	Construction Equipment Planning and Applications	CBS Publishers, New Delhi, 2016

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Biswajeet Pattanayak	Introduction to Human Resource Management	Excel Books, New Delhi, 2017
2	Bohlander & Snell	Managing Human Resources	Cengage Learning, New Delhi, 2016

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.

Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Akshay Kumar H S	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr.B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director,IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Infrastructure for Smart City Planning
Course Code	24IEM241
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 1st Semester
Course Type	☐ Core ✔ Elective ☐ Lab
Prerequisite (If any)	Urban Planning Basics, Civil Engineering Fundamentals, Sustainability Awareness
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	3
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	It introduces global standards, smart city policies, and governance, with a focus on India's 100 Smart Cities Mission. The course covers green building concepts, sustainability, and energy-efficient systems for smart cities. It addresses water supply, sanitation, waste management, and power distribution, emphasizing planning and institutional arrangements. Additionally, it explores smart urban transport systems, e-governance, and IoT applications for efficient urban management.

2. Course Objectives

1. Knowledge of global standards, India's smart cities mission, and governance frameworks for smart city planning and development.
2. Understanding of green building concepts, sustainability principles, and energy-efficient systems in smart cities.
3. Familiarity with water supply, sanitation, waste management, and power distribution systems, including norms and planning issues.
4. Insight into smart urban transport systems, infrastructure planning, and traffic management principles.
5. Awareness of e-governance principles, IoT fundamentals, and their applications in smart city management.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain the concepts, dimensions, global standards and governance practices related to smart cities.	L2	PO1, PO2, PO3, PO7, PO11
CO2	Differentiate sustainable development approaches including green buildings, rating systems and energy efficient solutions in urban planning.	L4	PO1, PO2, PO3, PO7, PO11

CO3	Analyse water supply, sanitation, solid waste and power systems with respect to norms, standards and management issues in urban infrastructure.	L4	PO1, PO2, PO3, PO7, PO11
CO4	Evaluate urban transport systems, planning processes and traffic management approaches for enhancing accessibility and mobility.	L4	PO1, PO2, PO3, PO7, PO11
CO5	Examine the role of e – governance and IoT applications in smart city planning, implementation and service delivery.	L4	PO1, PO2, PO3, PO7, PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Introduction:** Understanding – Dimensions – Global experience, Global standards and performance bench marks, Practice codes. India 100 smart cities policy and mission, Smart city planning and development, Financing smart cities development, Governance of smart cities.	08	CO1
II	**Green Building Concepts And Sustainable Development:** Green projects in smart cities, sustainability – green building – Rating system – Energy efficient building – energy saving systems.	08	CO2
III	**Water Supply And Drainage:** Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues. Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Municipal and other wastes – generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues.	08	CO3
IV	**Smart Urban Transport Systems:** Elements of Infrastructure (Physical, Social, Utilities and services), Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, Provision of infrastructure. Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues. Urban form and Transport patterns, land use – transport cycle, concept of accessibility. Hierarchy, capacity and geometric design elements of roads and intersections. Basic principles of Transport infrastructure design. Urban transport planning process –Transport, environment and safety issues. Principles and approaches of Traffic Management, Transport System Management.	08	CO4
V	**E- Governance And Iot:**	08	CO5

	The concept of management, concept of e-management & e-business, e-Government Principles, Form e-Government to e-governance, e-governance and developing countries, Designing and Implementing e-Government Strategy, E governance: Issues in implementation. IOT fundamentals, protocols, design and development, data analytics and supporting services, case studies.		

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	-	2	-	-	-	3	-
CO2	2	3	2	-	-	-	3	-	-	-	2	-
CO3	2	3	2	-	-	-	3	-	-	-	2	-
CO4	2	3	3	-	-	-	3	-	-	-	2	-
CO5	2	2	3	-	-	-	2	-	-	-	3	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Case Study Analysis – 100 Smart Cities Mission.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Allen G. Noble, Frank J. Costa and Robert B. Kent	Regional Development and Planning for the 21st Century	1st Edition, Routledge Taylor & Francis Group, 2019
2	Andy Pike, Andres Rodriguez-Pose and John Tomaney	Handbook of Local and Regional Development	1st Edition, Routledge Taylor & Francis Group, 2020

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Daniel G Paolek AIA, Karen Parolek, Paul C. Crawford FAICP	Form Based Codes: A Guide for Planners, Urban Designers, Municipalities and Developers	1st Edition, John Wiley, 2008
2	Houbing Song, Ravi Srinivasan, Tamim Sookoor and Sabina Jeschke	Smart Cities: Foundations, Principles and Applications	1st Edition, John Wiley, 2017

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback.

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sunil R	**Name:** Dr. Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Pavement Maintenance & Management Systems
Course Code	24IEM242
Program	Infrastructure Management
Academic Year/Semester	2024-25 / 2nd Sem
Course Type	☐ Core ✓ Elective ☐ Lab
Prerequisite	Fundamentals of Transportation Engineering and Pavement Design
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	03
W.e.f	2024-25
Approved in AC on	Sep 2024
Course Description	This course provides an in-depth understanding of Pavement Maintenance and Management Systems (PMMS), focusing on their components, objectives and maintenance measures. It covers the requirements, design methods and evaluation techniques for flexible pavements, including serviceability concepts, overlays and riding quality assessments. The course introduces methods for pavement performance evaluation and prediction using mechanistic, empirical and deterioration models to analyze structural and functional conditions. Students will also learn about design alternatives, economic evaluation and life cycle costing to select optimal pavement strategies. Finally, the role of expert systems and computer-based applications in pavement evaluation, rehabilitation, and management is emphasized through case studies and practical examples.

2. Course Objectives

1. To provide fundamental knowledge of pavement maintenance and management systems, including their components, objectives, and practical applications.
2. To develop the ability to evaluate pavement performance and predict deterioration using analytical, empirical, and modeling techniques.
3. To enable students to analyze and select appropriate maintenance, design and management strategies, incorporating life cycle costing, economic evaluation, and modern expert systems.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand the principles of pavement maintenance and management system.	2	PO1, PO2, PO3, PO4

CO2	Apply suitable maintenance and management strategies using modern evaluation and prediction models.	3	PO1, PO2, PO5
CO3	Summarize the solution of maintenance techniques.	4	PO1, PO2, PO3, PO4
CO4	Apply computer-based expert systems for pavement evaluation, rehabilitation, and effective pavement management decision-making.	3	PO1, PO2, PO3, PO4, PO5

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Introduction:** Introduction to Pavement Maintenance, Management System, Components of Pavement, components of pavement management systems, pavement maintenance measures, planning investment, research management Maintenance Measures, PMMS objectives.	08	CO1
II	**Requirements and Evaluation of flexible pavements** Design requirements, factors affecting structural condition of flexible pavements, structural behaviour and evaluation of structural condition of pavements. Design methods for flexible pavements, design of overlays by Benkelman Beam Rebound Deflection Technique Pavement Serviceability concepts, Evaluation of riding quality by psycho- physical method Pavement Maintenance Measures, Implementation of Maintenance management programs	08	CO2
III	**Pavement Performance Evaluation:** General concepts, serviceability, pavement distress survey systems, performance evaluation Pavement Performance Prediction: concepts, modeling techniques structural condition deterioration models, mechanistic and empirical models, HDM and other models, comparison of different deterioration models. Functional condition deterioration models, unevenness prediction models and other models, comparison Modeling in rehabilitation budget planning, case studies, Problems	08	CO2
IV	**Design alternatives and Selection** Design objectives and constraints, basic structural response models, physical design inputs, alternate pavement design strategies and economic evaluation, reliability concepts in pavement engineering, life cycles costing, analysis of alternate pavement strategies based on distress and performance, case studies and Problems.	08	CO3
V	**Expert systems and Pavement Management** Role of computers in pavement management, applications of expert systems for managing pavements, expert system for pavement evaluation and rehabilitation knowledge – based expert systems, case studies.	08	CO4

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	-	-	-	-	-	-	-	-
CO2	3	2	-	-	1	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-
CO4	2	2	2	2	1	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical Sessions

Practical	Title of Experiment / Activity
1	*Pavement Condition Survey*

7. Textbook

S. No.	Author(s)	Title	Publisher & Year
1	Ralph Hass, Ronald Hudson and Zanieswki	Modern Pavement management	Krieger Publications, 1994
2	W. Ronald Hudson, Ralph Haas and Waheed Uddin	Infrastructure Management: Integrating Design, Construction, Maintenance, Rehabilitation, and Renovation	McGraw Hill, 2013

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	E. Ray Brown, Prithvi S. Kandhal, Freddy L. Roberts, Y. Richard Kim, Dah-Yinn Lee	Hot Mix Asphalt Materials, mixture design and construction	National Asphalt Pavement Association Research and Education Foundation, Maryland, USA, 2023

8. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr Gagan Krishna R R	**Name:** Dr Shruthi R	**Name:** Dr M Shankar	**Name:** Dr B N Shobha
Designation: Assistant Professor	**Designation:** HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Disaster Mitigation & Management
Course Code	24IEM243
Program	Infrastructure Management
Academic Year/Semester	2024-25 / 2nd Sem
Course Type	☐ Core ✓ Elective ☐ Lab
Prerequisite	Fundamentals of Environmental Studies and Basics of Civil/Environmental Engineering.
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	03
W.e.f	2024-25
Approved in AC on	Sep 2024
Course Description	This course provides students with a foundational understanding of disasters, their types, significance and impacts on communities. It explores the relationship between vulnerability, disaster prevention and risk reduction, emphasizing the importance of proactive management. Students are introduced to various approaches and strategies for Disaster Risk Reduction (DRR) and the role of institutional frameworks in managing disasters. The course also focuses on enhancing students' awareness of national and local disaster management processes. Finally, it aims to develop basic skills and sensitivity for responding effectively to potential disaster situations in their surroundings.

2. Course Objectives

1. To provide students with a foundational understanding of disasters, their types, significance, and the relationship with vulnerability and risk reduction.
2. To introduce students to approaches and strategies of Disaster Risk Reduction (DRR) and enhance their awareness of institutional processes in disaster management.
3. To develop basic skills and sensitivity in students for responding effectively to potential disaster situations in their surroundings.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	To provide students an exposure to disasters, their significance and types.	L2	PO1, PO2, PO7

CO2	To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.	L2	PO1, PO2, PO7
CO3	Analyze how development and climate change influence disaster vulnerabilities and mitigation strategies.	L4	PO1, PO2
CO4	To enhance awareness of Institutional processes in the country.	L2	PO1, PO2, PO6, PO7
CO5	To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity.	L3	PO1, PO2, PO3, PO6, PO7

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Introduction To Disasters:** Definition, Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types Of Disasters – Earthquake, Landslide, Flood, Drought, Fire Etc – Classification, Causes, Impacts Including Social, Economic, Political, Environmental, Health, Psychosocial, Etc.- Differential Impacts- In Terms Of Caste, Class, Gender, Age, Location, Disability – Global Trends In Disasters: Urban Disasters, Pandemics, Complex Emergencies, Climate Change- Dos And Don‟ts During Various Types Of Disasters.	08	CO1
II	**Approaches To Disaster Risk Reduction** Disaster Risk Reduction Strategies, Disaster Cycle, Phases of Disaster, Preparedness Plans, Action Plans and Procedures, Early warning Systems Models in disaster preparedness, Components of Disaster Relief-(Water, food, sanitation, shelter, Health and Waste Management), Community based DRR, Structural non-structural measures in DRR, Factors affecting Vulnerabilities, , Mainstreaming disaster risk reduction in development, Undertaking risk and vulnerability assessments, Policies for Disaster Preparedness Programs, Preparedness Planning, Roles and Responsibilities, Public Awareness and Warnings, Rehabilitation measures and long term reconstruction.	08	CO2
III	**Inter-Relationship Between Disasters And Development** Factors Affecting Vulnerabilities, Differential Impacts, Impact Of Development Projects Such As Dams, Embankments, Changes In Land-Use Etc.- Climate Change Adaptation- IPCC Scenario And Scenarios In The Context Of India – Relevance Of Indigenous Knowledge, Appropriate Technology And Local Resource	08	CO3
IV	**Disaster Risk Management In India** Hazard And Vulnerability Profile Of India, Components Of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional Arrangements (Mitigation, Response And Preparedness, Disaster Management Act And Policy – Other Related Policies, Plans, Programmes And Legislation – Role Of GIS And Information Technology Components In Preparedness, Risk Assessment, Response And Recovery Phases Of Disaster – Disaster Damage Assessment.	08	CO4

V	**Disaster Management:** Applications And Case Studies Cases Studies: Bhopal Gas Disaster, Gujarat Earth Quake, Orissa Super-cyclone, south India Tsunami, Bihar floods, Plague Surat, Landslide in North East, Heat waves of AP& Orissa, 278 Cold waves in UP. Bengal famine, best practices in disaster management, Local Knowledge Appropriate Technology and local Responses, Indigenous Knowledge, Development projects in India (dams, SEZ) and their impacts.	08	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	2	-	-	-	-	-
CO2	3	2	-	-	-	-	2	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	2	2	-	-	-	-	-
CO5	2	2	2	-	-	2	2	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical Sessions

Practical	Title of Experiment / Activity
1	Case Study Analysis on Development vs. Disaster

7. Textbook

S. No.	Author(s)	Title	Publisher & Year
1	R.B.Singh	Environmental Geography	Heritage Publishers New Delhi, 1990
2	Savinder Singh	Environmental Geography	Pravalika Publications, 2015
3	Kates,B.I & White, G.F	The Environment as Hazards	oxford, New York, 1993
4	R.B. Singh	Natural Hazards and Disaster Management: Vulnerability and Mitigation	Rawat Publication, New Delhi, 2006
5	R. Subramanian	Disaster Management	Vikas Publishing House, 2018

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Pardeep Sahni, Alka Dhameja, Uma Medury	Disaster Mitigation Experiences & Reflectios	PHI Learning Pvt. Ltd., 2001

2	Department of Agriculture and Cooperation	Disaster Management Report	Govt. of India.

8. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr Gagan Krishna R R	**Name:** Dr Shruthi R	**Name:** Dr M Shankar	**Name:** Dr B N Shobha
Designation: Assistant Professor	**Designation:** HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Repair and Rehabilitation of Structures
Course Code	24IEM244
Program	Infrastructure Management
Academic Year/Semester	2024-25 / 2nd Sem
Course Type	☐Core ✓ Elective ☐ Lab
Prerequisite	Fundamentals of Structural Engineering and Concrete Technology
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	3
W.e.f	2024-25
Approved in AC on	Sep 2024
Course Description	This course introduces deterioration causes, diagnostic methods, and quality assurance in concrete structures. It covers durability factors, corrosion protection, maintenance strategies, and advanced repair materials. Techniques like epoxy injection, shotcrete and underpinning are discussed through case studies, enabling students to develop practical skills in structural repair and rehabilitation.

2. Course Objectives

The objective of this course is to make students
1. To investigate the cause of deterioration of concrete structure.
2. To strategize different repairs and rehabilitation of structure.
3. To evaluate the performance of the materials for repair.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Diagnose deterioration in concrete structures using NDT and quality assessment methods.	L3	PO1, PO2, PO3, PO7
CO2	Assess factors affecting durability and apply methods to protect concrete structures from corrosion.	L3	PO1, PO2, PO3, PO7
CO3	Plan and implement maintenance, repair and rehabilitation strategies for damaged structures.	L3	PO1, PO2, PO3, PO7

CO4	Select appropriate repair materials and techniques for different types of structural damage.	L3	PO1, PO2, PO3, PO7

4. Course Content (Module-Wise)

Module	Topics	Hours	COs
I	**General:** Introduction, Cause of deterioration of concrete structures, Diagnostic methods & analysis, preliminary investigations, experimental investigations using NDT, load testing, corrosion mapping, core drilling and other instrumental methods. Quality assurance for concrete construction, as built concrete properties strength, permeability, thermal properties and cracking.	8	CO2
II	**Influence on Serviceability and Durability:** Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, corrosion mechanism, Effects of cover thickness and cracking, methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, and cathodic protection.	8	CO2
III	**Maintenance and Repair Strategies:** Definitions: Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance, Preventive measures on various aspects. Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration, testing techniques.	8	CO4
IV	**Materials for Repair:** Special concretes and mortars, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fiber reinforced concrete. Techniques for Repair: Rust eliminators and polymers coating for rebar during repair foamed concrete, mortar and dry pack, vacuum concrete, Gunite and Shot Crete Epoxy injection, Mortar repair for cracks, shoring and underpinning.	8	CO4
V	**Examples of Repair to Structures:** Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering wear, fire, leakage, marine exposure, engineered demolition techniques for dilapidated structures - case studies.	8	CO4

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	2	-	-	-	-	-
CO2	2	2	2	-	-	-	2	-	-	-	-	-
CO3	3	3	2	-	-	-	2	-	-	-	-	-
CO4	2	2	3	-	-	-	2	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical Sessions

Practical	Title of Experiment / Activity
1	Case Study on Structural Failures & Rehabilitation

7. Textbook

S. No.	Author(s)	Title	Publisher & Year
1	Sidney, M. Johnson	Deterioration, Maintenance and Repair of Structures	McGraw-Hill Inc., US, 1981
2	Denison Campbell, Allen & Harold Roper	Concrete Structures – Materials, Maintenance and Repair	Longman Scientific & Technical (Longman Pub Group / John Wiley & Sons), 1991.

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	R.T Allen and S.C Edwards	Repair of Concrete Structures	CRC Press (Taylor & Francis Group), 2019.

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, Semester End Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC**	**Principal**
Name: Mr Gagan Krishna R R	**Name:** Dr Shruthi R	**Name:** Dr M Shankar	**Name:** Dr B N Shobha
Designation: Assistant Professor	**Designation:** HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Analysis and Design of Pavement
Course Code	24IEM251
Program	Infrastructure Management
Academic Year/Semester	2024-25 / 2nd Sem
Course Type	☐ Core ✓ Elective ☐ Lab
Prerequisite	Fundamentals of Transportation Engineering and Pavement Materials.
Contact Hours per Week	Lecture: 4 Tutorial: 0 Practical: 0 Total: 4
Credits	03
W.e.f	2024-25
Approved in AC on	Sep 2024
Course Description	This course introduces the fundamental concepts of pavement engineering, covering the types, components and factors affecting the design and performance of highway and airport pavements. It provides an understanding of stresses and strains in flexible pavements, including theories such as Boussinesq's and Burmister's multi-layer models and the effects of traffic wheel loads. Students learn various flexible pavement design methods, including empirical, semi-empirical and theoretical approaches, along with recognized standards like AASHTO, Asphalt Institute, Shell, and IRC methods. The course also explores stresses in rigid pavements, including Westergaard's equations and teaches the principles of rigid pavement design such as joint and reinforcement detailing. Finally, practical skills are developed through the use of design software like KENLAYER, Asphalt Institute Design Guide, KENSLAB, and HIPERPAVE for flexible and concrete pavement design.

2. Course Objectives

1. Learn the fundamentals and types of pavements.
2. Apply stress analysis and design methods for flexible and rigid pavements.
3. Use software tools to design and evaluate pavements effectively.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Explain pavement types, components, and analyze factors influencing their performance.	L2	PO1, PO2, PO7
CO2	Analyze pavement stresses and strains using layered theory and evaluate wheel load effects with EWL concepts.	L4	PO1, PO2, PO3

CO3	Design flexible pavements for highways and airports using empirical and theoretical methods.	L3	PO1, PO2, PO3
CO4	Analyze stresses in rigid pavements using Westergaard's equations under traffic and temperature effects.	L4	PO1, PO2, PO3
CO5	Design rigid pavements and joints for highways and runways using IRC methods and software tools.	L3	PO1, PO2, PO3, PO5

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Introduction:** Types and component parts of pavements, Factors affecting design and performance of pavements. Highway and airport pavements. Stresses and strains in flexible pavements.	08	CO1
II	Stresses and strains in an infinite elastic half space - use of Boussinesq's equations- Burmister's two layer and three layer theories; Wheel load stresses, various factors in traffic wheel loads; Equivalent single wheel load of multiple wheels. Repeated loads and EWL factors	08	CO2
III	**Flexible pavement design methods for highways and airports:** Empirical, semi-empirical and theoretical approaches; Development, principle, design steps of the different pavement design methods including AASHTO, Asphalt Institute, Shell Methods. IRC method of pavement design	08	CO3
IV	**Stresses in rigid pavements:** Types of stresses and causes; Introduction to Westergaard's equations for calculation of stresses in rigid pavement due to the influence of traffic and temperature; Considerations in rigid pavement analysis, EWL; wheel load stresses, warping stresses, frictional stresses, combined stresses.	08	CO4
V	**Rigid pavement design:** Design of cement concrete pavement for highways and runways; Design of joints, reinforcements, tie bars, dowel bars. IRC method of design; Design of continuously reinforced concrete pavements; Use of relevant software in flexible pavement design (KENLAYER, Asphalt Institute, Design Guide 2002) and concrete pavement design (KENSLAB, HIPERPAVE)	08	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	2	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	2	3	3	-	-	-	-	-	-	-	-	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	3	-	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

6. Details of Practical Sessions

Practical	Title of Experiment / Activity
1	Technical talk on Pavement Design

7. Textbook

S. No.	Author(s)	Title	Publisher & Year
1	E.J. Yoder and M.W. Witczak	Principles of Pavement Design	John Wiley and sons Inc, 2020.
2	Nai C. Yang	Design of functional pavements	McGraw Hill Book Company, 1972
3	Yang H. Huang	Pavement Analysis and Design	Pearson Prentice Hall, 2004
4	S.K. Khanna, C.E.G. Justo and A. Veeraragavan	Highway Engineering	Nem Chand & Bros, Roorkee, 2014

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Ralph Haas, W. Ronald Hudson and Lynne Cowe Falls	Pavement Asset Management	Wiley & Sons, 2015
2	IRC Code books	IRC 37-2001, IRC 81-1997, IRC 58 – 2002, IRC 59 – 1976, IRC 101-1988	Indian Roads Congress
3	David Croney, Paul Croney	Design & Performance of Road Pavements	McGraw hill Book Co., 1997

8. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.

Indirect	Course Exit Survey, Student Feedback

Prepared by	**Vetted by**		**Confirmed by**
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr Gagan Krishna R R	**Name:** Dr Shruthi R	**Name:** Dr M Shankar	**Name:** Dr B N Shobha
Designation: Assistant Professor	**Designation:** HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1.Course Information

Section	Details
Course Title	Energy Conservation Techniques in Building
Course Code	24IEM252
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 2nd Semester
Course Type	☐Core ✓ Elective ☐ Lab
Prerequisite	Basic understanding of heat transfer, and building concepts
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	03
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course introduces the fundamentals of energy systems, energy production, HVAC, solar energy, and conservation practices. It covers green building design, energy-efficient strategies, audits, and evaluation tools for sustainable development. Students learn energy management of electrical and mechanical systems, focusing on savings, peak demand, and operational efficiency. The course emphasizes practical approaches to conservation, audits, recovery systems, and long-term energy management in buildings and facilities.

2. Course Objectives

1. To provide a fundamentals of energy systems, conservation practices, and energy audits in residential, commercial, and institutional buildings.
2. To develop knowledge of green building concepts, energy-efficient design strategies, and evaluation tools such as LEED standards.
3. To analyse energy flow, consumption patterns, and identify wastage to propose effective conservation measures and sustainable solutions.
4. To impart skills in energy management of electrical and mechanical systems including pumps, fans, lighting, HVAC, and compressed air systems.
5. To enhance competence in operation, maintenance, and recovery systems for improving efficiency, reducing costs, and ensuring long-term energy sustainability

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand the fundamentals of energy production, consumption, and conservation in different building types.	L2	PO1, PO2, PO6,PO7, PO11
CO2	Apply principles of green building design, energy-efficient strategies, and evaluation tools for sustainable development.	L2	PO1, PO2, PO6,PO7, PO11
CO3	Conduct energy audits, analyze energy flow, and recommend effective conservation measures	L2	PO1, PO2, PO6, PO7, PO11
CO4	Manage electrical and mechanical systems for improved efficiency, reduced peak demand, and optimized energy use.	L2	PO1, PO2, PO6,PO7, PO11
CO5	Implement energy operation, maintenance, and recovery techniques to enhance long-term sustainability in facilities	L2	PO1, PO2, PO6,PO7, PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Fundamentals of Energy** - Energy production systems-Heating, Ventilating and Ai conditioning Solar Energy and conservation-Energy Economic Analysis-Energy Conservation And Audits Domestic Energy Consumption-Savings-Primary Energy use in Buildings Residential Commercial Institutional And Public Buildings.	08	CO1
II	**Energy Conservation:** Energy and resource conservation-Principles, Design of green building srating systems-LEED Standards-Evaluation Tools for Building Energy-Embodied and Operating Energy-Peak demand Comfort and Indoor Air Quality-Visual and Acoustical Quality-Energy Efficient Design Strategies Contextual factors-Longevity and Process Assessment	08	CO2
III	**Energy Efficiency:** Energy in Building Design-Energy Efficient and Environmental Friendly Building- Climate, Sun and solar Radiation-Psychometrics-Passive Heating and Cooling Systems Energy Audit-Types of Energy Audit-Analysis of results. Energy flow diagram-Energy consumption/Unit production Identification of wastage-Priority of conservative measures Maintenance of Energy Management Program.	08	CO3

IV	**Energy Management :** Energy Management of Electrical Equipment- Improvement Power Factor Management of Maximum Demand- Energy Savings in Pumps-Fans Compressed Air Systems Energy Savings in Lighting Systems-Air Conditioning Systems Applications-Facility	08	CO4
V	**Energy Operation And Maintenance:** Facility Modifications-Energy Recovery Dehumidifier Water Heat Recovery-Steam Plants and Distribution Systems- Energy Savings In Pumps-Fans Compressed air systems- Applications	08	CO5

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	3	-	-	-	2	-
CO2	3	2	-	-	-	2	3	-	-	-	2	-
CO3	3	3	-	-	-	2	3	-	-	-	3	-
CO4	3	3	-	-	-	2	2	-	-	-	3	-
CO5	3	2	-	-	-	2	3				3	

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Green Building Presentation (Poster or Model or Sketch)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Chandan Chowdhury, Aastha Singh,	A Decade of Infrastructure Development in India: Trends and Insights	Indian School of Business (ISB) Research Press, 2024
2	Anita Sengar	IT Infrastructure Management	Buy Books India, 2025

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Biswajeet Pattanayak	Introduction to Human Resource Management	Excel Books, New Delhi, 2017
2	Bohlander & Snell	Managing Human Resources	Cengage Learning, New Delhi, 2016

9.Assessment Scheme

Component	Weightage (%)

Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Advance structural design and detail
Course Code	24IEM253
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 2nd Semester
Course Type	☐Core ✓ Elective ☐ Lab
Prerequisite	Basic knowledge of structural analysis, strength of materials, RCC design.
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	03
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course introduces the limit state method of design and provisions of IS codes for various loads. It covers the analysis, design and detailing of reinforced concrete elements such as columns, multi-storey frames, and grid floors. Students will also study the design of special structures like silos, bunkers, flat slabs, and chimneys. Emphasis is placed on applying BIS codes for safe, economical and practical structural detailing.

2. Course Objectives

1. To understand the limit state method and basic IS code provisions for loads and design.
2. To learn the design and detailing of columns under biaxial moments.
3. To study the analysis, design, and detailing of multi – storey frames and grid floors.
4. To gain knowledge in the design of special concrete structures like silos, bunkers, flat slabs & chimneys.
5. To develop skills in preparing structural drawings and detailing as per BIS codes.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Apply the limit state design principles and relevant IS code provisions for different types of loads in	L2	PO1, PO2, PO3, PO6,PO12

	structural design		
CO2	Analyse and design reinforced concrete columns subjected to biaxial bending moments using BIS handbook provisions	L3	PO1, PO2, PO3, PO6,PO12
CO3	Design and detail multi – storey building frames and grid floor for practical applications	L3	PO1, PO2, PO3, PO6,PO12
CO4	Develop the capability to design and detail special concrete structures such as silos, bunkers, flat slabs, and chimneys	L3	PO1, PO2, PO3, PO6,PO12
CO5	Prepare structural drawings and detailing in compliance with requirements for safe construction practice	L3	PO1, PO2, PO3, PO6,PO12

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	Introduction: Introduction to limit state method of design; provisions in the Indian Standard codes for loading, wind loads and seismic loads, design and detailing of concrete structures. Examples of design using BIS handbook Structural Analysis, Design and Detailing for: Columns with biaxial moments.	08	CO1
II	Structural Analysis, Design and Detailing for: Multi-story building frame design and Grid floors.	08	CO2
III	Structural Analysis, Design and Detailing for: Silos and bunkers.	08	CO3
IV	Structural Analysis, Design and Detailing for: Flat slabs.	08	CO4
V	Structural Analysis, Design and Detailing for: Concrete Chimneys.	08	CO5

5.CO–PO Mapping Matrix

CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	-	-	2	-	-	-	-	-	2
CO2	3	3	3	-	-	3	-	-	-	-	-	2
CO3	3	3	3	-	-	2	-	-	-	-	-	2

CO4	3	3	3	-	-	2	-	-	-	-	-	2
CO5	3	2	3	-	-	2	-	-	-	-	-	2

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Risk Brainstorm (Group Activity)

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Terry Schmidt	Building energy management system	Encyclopaedia of Sustainable Technologies, Elsevier, 2nd Edition, 2022
2	Mohamed Ebeed et al,	Strategic project management made simple: practical tools for, leaders & teams	Wiley, 2024

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Harold Kerzner,	Project management: A systems approach to planning, scheduling & controlling	Wiley, 14th Edition, 2022
2	Mike Clayton	Risk Happens!:Managing risk & avoiding failure in business projects	Taylor & Francis, 2nd Edition, 2023

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.

Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr.B N Shobha
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Composite Materials
Course Code	24IEM254
Program	Civil Engineering
Academic Year/Semester	2024-2025/ II Sem MTech
Course Type	☐ Core ✓ **Elective** ☐ Lab
Prerequisite (If any)	Basic understanding of finite element methods to model and analyze composite structures using computational tools.
Contact Hours per Week	Lecture: 4Tutorial: 0 Practical: 0 Total: 4
Credits	3
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This course introduces students to the fundamental concepts, behavior, and applications of composite materials in civil engineering. It covers the classification, properties, and manufacturing techniques of composites, emphasizing their use in structural applications. The course includes macro- and micro-mechanical behavior of laminas, classical lamination theory, and failure criteria, with a focus on analytical skills and practical problem-solving through numerical examples.

2. Course Objectives

This course will enable students to:

1. Understand the properties, classification, and applications of composite materials in civil engineering.
2. Analyze the macro- and micro-mechanical behavior of composite laminas.
3. Apply classical lamination theory and failure criteria to design composite structures.
4. Evaluate the performance and limitations of composite materials in structural applications.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand the properties, classification, and applications of composite materials in civil engineering.	L2	PO1, PO2
CO2	Analyze the macro-mechanical behavior of composite laminas	L4	PO1,PO3, PO4

CO3	Evaluate the micro-mechanical behavior and stiffness properties of composite laminas.	L5	PO1, PO3, PO4
CO4	Apply classical lamination theory and failure criteria to design composite structures	L3	PO1, PO2, PO3
CO5	Summarize the performance and limitations of composite materials in structural applications.	L5	PO2, PO4, PO5

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	Introduction: Introduction: Introduction to Composite materials, classifications (thermoset and thermoplastic) and civil/structural engineering applications. Constituent materials of composites – Reinforcements and matrix. Rule of mixture. Selection of materials. Manufacturing techniques – Hand layup method and compression moulding method. Basics of fiber reinforced composite (Synthetic and natural FR Polymer composites). Advantages and Limitations of composites.	08	CO1
II	Macro-mechanical Behaviour of a Lamina: Introduction, Stress-Strain Relations for Anisotropic Materials. stiffness', compliances, and engineering constants for orthotropic materials. Restrictions on engineering constants. Numerical problems.	08	CO2
III	Macro-mechanical Behaviour of a Lamina contd... Stress-strain relations for plane stress in an orthotropic material. Stress-strain relations for a lamina of arbitrary orientation. Invariant properties of an orthotropic lamina. Strengths of an orthotropic lamina, thermal and mechanical stress analysis. Numerical problems	08	CO3
IV	Micro-mechanical behaviour of a lamina: introduction, mechanics of materials approach to stiffness. Determination of E1. Determination of E2. Determination of v12. Determination of G12. Numerical problems.	08	CO4
V	Classical composite lamination theory, cross and angle – play laminates, symmetric, antisymmetric and general symmetric laminates. Mechanical coupling. Analysis of simple laminated structural elements ply-stress and strain, lamina failure theories concepts- Maximum Stress Failure Criterion, Maximum Strain Failure Criterion and Tsai-Hill Failure Criterion. Numerical Problems	08	CO5

5. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Analysing failure modes and long-term performance.

6. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	2	2	-	-	-	-	-	-	-	-
CO3	3	-	3	2	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-
CO5	-	3	-	3	2	--	-	-	-	-	-	-

(*Mapping: 1 – Low, 2 – Medium, 3 – High*

7.Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Barbero E J	Introduction to Composite Materials Design	CRC Press, 2010
2	Gibson R F	Principles of Composite Material Mechanics	CRC Press, 2011

8.Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Mallick P k	Fiber -Reinforced Composites: Materials, Manufacturing & Design	CRC Press 2007
2	Chawla K K	Composite Materials: Science and Engineering	Springer 2007

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignments/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	**Vetted by**		**Confirmed by**
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Varun C S	**Name**: Dr. Shruthi R	**Name:**Dr M Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**:HOD & Associate Professor	**Designation:**Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1.Course Information

Section	Details
Course Title	Project Management lab
Course Code	24IEML26
Program	Infrastructure Management
Academic Year/Semester	2024-2025/ II Sem M.Tech
Course Type	☐Core ☐Elective ✓ Lab
Prerequisite	Basic knowledge of Project Management concepts, Scheduling techniques, and Construction/Engineering Operations.
Contact Hours per Week	Lecture: 0 Tutorial: 0 Practical: 3 Total: 3
Credits	2
W.e.f	2024-2025
Approved in AC on	Sept 2024
Course Description	This laboratory course provides hands-on experience in applying project management tools and techniques to real-world engineering and construction projects. It includes project planning, scheduling, resource allocation, cost estimation, risk analysis, and the use of software like MS Project or Primavera for project execution, monitoring, and control. Emphasis is on practical skills, team collaboration, and decision-making in project management. .

1. Course Objectives

1. Demonstrate project planning and scheduling techniques for engineering and construction projects.
2. Develop skills in resource allocation, cost estimation, and risk analysis for effective project execution.
3. Utilize project management software tools (e.g., MS Project, Primavera) for monitoring and controlling projects.
4. Enhance teamwork, decision-making, and problem-solving abilities in project management scenarios.

2. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of Design and development of experimental skills.	L3	PO1,PO2, PO6, PO9,PO10
CO2	Understand the principles of design of experiments.	L2	PO1,PO2, PO6, PO9,PO10

CO3	Design and Develop analytical skills	L3	PO1,PO2, PO6, PO9,PO10
CO4	Summarize the management methods by software‟s.	L3	PO1,PO2, PO6, PO9,PO10

4.Course Content

Sl.No	Practical/Experiments	Hours	COs
1	Spread sheet programming.	4	CO1
2	Programming management problems for price forecasting, regression analysis, inventory models.	4	CO1
3	Operation Research and project management problems.	4	CO2
4	Database Management using popular DBMS like Access.	4	CO2
5	Introduction to Project Management Software‟s	4	CO3
6	Defining custom data items, Planning resources and costs	4	CO3
7	Resource levelling, Quantity and Cost Estimation	4	CO3
8	Using MS Project software Working on Practical Projects.	4	CO4
9	Using Primavera Software Working on Practical Projects.	4	CO4
10	Modelling / Handling actual practical project management projects.	4	CO4

5.CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	-	-	2	2	-	-
CO2	3	3	-	-	-	2	-	-	1	1	-	-
CO3	3	2	-	-	-	2	-	-	2	2	-	-
CO4	3	3	-	-	-	2	-	-	2	1	-	-

6.Details of Practical’s Sessions

Practical	Title of Experiment / Activity
1	Preparation of a Project Schedule using MS Project / Primavera / Excel

7.Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	K. Nagarajan	Project Management	New Age International Publishers, New Delhi, 2018
2	Prasanna Chandra	Projects: Planning, Analysis, Selection, Implementation and Review, Tata McGraw-Hill, New Delhi, 2017.	Tata McGraw-Hill, New Delhi, 2017

8.Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Harold Kerzner	Project Management: A Systems Approach to Planning, Scheduling, and Controlling	Wiley, New Delhi, 2017
2	Bohlander & Snel	Managing Human Resources	Cengage Learning, New Delhi, 2016

9.Assessment Scheme

Component	Weightage (%)
Internal Assessment	10
Record	40
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Akshay Kumar H S	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr. B N Shobha
Designation: Assistant Professor	**Designation**:: HOD and Associate Professor	**Designation:** Director,IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Construction Quality and Safety Management
Course Code	24IEM31
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 3rd Semester
Course Type	✓Core ☐ Elective ☐ Lab
Prerequisite (If any)	Basic knowledge of construction processes or prior coursework in civil engineering is typically required.
Contact Hours per Week	Lecture: 03 Tutorial: 01 Practical: 00 Total: 04
Credits	4
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course introduces the principles of quality management and safety in construction, covering quality control, assurance, and total quality management concepts. It emphasizes codes, standards, QA/QC procedures, reliability testing, and value engineering in project execution. Students will learn to integrate quality and safety practices into all stages of construction, focusing on risk reduction, accident prevention, and compliance with legal and safety standards. The course builds a foundation for developing quality culture and effective safety Management in the construction industry.

2. Course Objectives

1. Various loads that act on the bridges as per IRC.
2. Analysis for the maximum BM and SF at critical section using load distributing theories.
3. Design of various components using limit state method with reinforcement details

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of problem-solving skills for ecofriendly construction	L2	PO1,PO2,PO3
CO2	Understand the principles of ecofriendly construction planning.	L2	PO1,PO2,PO7
CO3	Develop analytical skills for cost effective construction techniques.	L4	PO2,PO3,PO11

4.Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Quality and concept of QM** - Necessity for improving quality, concept of quality control, quality assurance, quality management and total quality management, Total quality management concepts; ISO9000 documentation; QA/QC systems and organizations, Quality Audits; Problem solving techniques; Statistical Quality Control; Quality Function Deployment; Material Quality Assurance; Specifications and Tolerances. Quality Planning - Quality policy, objectives and methods in construction industry - consumers satisfaction, time of completion - statistical tolerance.	10	CO1
II	**Codes and standards quality manuals** - documents - contract and construction programming - inspection procedures -processes and products - total QA / QC programme and cost implication. **Managing Quality-** in various projects stages from concept to completion by building quality into design of structures, Inspection of incoming material and machinery In process quality inspections and tests. **Reliability & Probability testing-** reliability coefficient and reliability prediction - selection of new materials - influence of drawings, detailing, specification, standardization bid preparation - construction activity, environmental safety and social factors Natural causes and speed of construction - life cycle costing - value engineering and value analysis.	10	CO2
III	**Quality Assurance Department** -and quality control responsibilities of the line organization, developing quality culture in the organization, training of people, Construction accidents -importance, causes of accident, safety measures, construction industry related laws. Human factors in safety – legal and financial aspects of accidents in construction – occupational and safety hazard assessment.	10	CO3
IV	**Safety Programmes** - elements of safety programmes, job-site assessment, safety meetings, safety incentives, contractual obligations, safety in construction contracts Safety in Design- safety culture - Safe Workers- Safety and First Line Supervisors - Safety and Middle Managers - Top Management Practices, Company Activities and Safety - Safety Personnel - Sub-contractual Obligation - Project Coordination and Safety Procedures - Workers Compensation , Safety issues; Injury accidents and their causes; Safety program Components; Role of workers, Supervisors, Managers and Owners; Safety Procedures for various construction operations; Safety audits; Safety laws.	10	CO2
V	**Safety Management** - safety and first line supervisors, safety and middle managers, top management practices, safety audit, safety equipment planning and site preparation, safety system of storing construction materials Excavation - blasting- timbering-scaffolding- safe use of ladders- safety in welding. First- aid- Fire hazards and preventing methods	10	CO3

5.CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	3	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	2	-

(Mapping: 1 – Low, 2 – Medium, 3 – High)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Video demonstration on basic tests on coarse aggregates and fine aggregates.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Amarjit Singh, K. N. Jha & A. R. Sreedevi	Construction Quality Management and Control	1st Edition, Pearson Education India, 2008
2	Abdul Razzak Rumane	Quality Management: How to Achieve Sustainability in Projects	1st Edition, CRC Press (Taylor & Francis), 2013

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Abdul Razzak Rumane	Total Quality Management: Applications and Concepts for Construction Projects	1st Edition, CRC Press (Taylor & Francis), 2012
2	J. J. O'Brien	Construction Inspection Handbook: Total Quality Control	4th Edition, Springer, 2005

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignment/Seminars	10
End Semester Examination	50

10.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignment, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Navyashree HR	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. Shobha B N
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Eco-Friendly Constructions
Course Code	24IEM321
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 3rd Semester
Course Type	☐ Core ✓Elective ☐ Lab
Prerequisite (If any)	Basic understanding of construction materials and sustainability concepts is typically required.
Contact Hours per Week	Lecture: 03 Tutorial: 01 Practical: 00 Total: 04
Credits	3
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	This course focuses on eco-friendly planning, sustainable materials, and cost-effective construction techniques. Students will learn about energy-efficient shelters, use of locally available and innovative building materials, and prefabrication methods. Emphasis is placed on integrating sustainability, affordability, and structural performance in Modern construction practices.

2. Course Objectives

1. Introduce concepts of eco-friendly planning and energy-efficient housing.
2. Familiarize with locally available and innovative construction materials.
3. Understand cost-effective techniques like prefabrication and modular systems.
4. Learn about equipment and technologies for economical construction.
5. Appreciate the link between sustainability, cost efficiency, and safety.

3.Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of problem-solving skills for ecofriendly construction	L2	PO1,PO2,PO3
CO2	Understand the principles of eco-friendly construction planning.	L2	PO1,P2,PO7
CO3	Develop analytical skills for cost effective construction techniques.	L3	PO2,PO3,PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Eco-friendly Planning:**-Energy Efficient Shelters, Housing Options Today, Site Planning and Use of On-Site Resources, Smaller Houses that Utilize Space and Materials More Efficiently, Working With Nature, Better Window Planning, Balancing Energy and Aesthetic Needs.	08	CO1
II	**Eco-friendly Materials**: Construction materials–locally available building materials- Soil, fly ash, Ferrocement, Lime, Fibres, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer- ADOBE, Cob Rammed Earth, Light Clay.	08	CO2
III	**Eco-friendly Materials:** Straw-Bale, Bamboo, Agro-Industrial Waste, Innovative Materials Developed by CBRI, SERC, Structural Properties Of Alternate Building Materials, Earthen Finishes , Earth Plasters, Earth Floors.	08	CO3
IV	**Cost Effective Construction Techniques:** Construction Techniques Innovative Techniques developed by CBRI, SERC for foundation, superstructure, roofing, pre-fabricated construction techniques, advantage of pre-fabrication areas where pre-fabrication can be introduced, modular contained earth, earth bag construction	08	CO2
V	**Cost Effective Construction Equipments** Brick moulding machine, Stabilized soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile makingmachine, Ferrocement wall panel & Roofing channel making machine, R.C.C. Chaukhat making machine.	08	CO3

5.CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	3	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	2	-

(Mapping: 1 – Low, 2 – Medium, 3 – High)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Video Demonstration on Preparation of stabilized soil blocks using fly ash/lime and testing its compressive strength.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Charles J. Kibert	Sustainable Construction: Green Building Design and Delivery	5th Edition, John Wiley & Sons, 2013
2	Christian M. Carrico	Green Building: An Engineering Approach to Sustainable Construction	1st Edition, Elsevier, 2005

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Rafael Sacks, Ghang Lee, Luciana Burdi & Marzia Bolpagni	BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers	4th Edition, Wiley, March 2015
2	Hui Xu, Yongtao Tan, Peng Mao & Xiaolong Gan	Green Building Design and Construction for a Sustainable Future	Reprint, MDPI Books, July 2020

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignment/ Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback.

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Faculty**
Name: Navyashree H R	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. Shobha B N
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Infrastructure Development
Course Code	24IEM322
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 3rd Semester
Course Type	☐ Core ✓Elective ☐ Lab
Prerequisite (If any)	Foundational knowledge of civil engineering and construction principles is usually required.
Contact Hours per Week	Lecture: 03 Tutorial: 01 Practical: 00 Total: 04
Credits	3
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	This course introduces the nature and role of the construction industry in national development, with emphasis on employment generation and economic growth. It covers government policies, planning frameworks, and agencies involved in infrastructure, along with the current status of key sectors in India. Students will learn issues of Management, funding mechanisms, and project models such as BOT and PPP to analyze and develop sustainable infrastructure solutions.

2. Course Objectives

1. Understand the role of construction industry in economy and employment.
2. Learn government policies, five-year plans, and agencies in infrastructure.
3. Know the status of infrastructure in key sectors of India.
4. Analyze issues and management in public and private sector projects.
5. Understand funding, consultancy, BOT and PPP models.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Achieve Knowledge of problem-solving skills for infrastructure development.	L2	PO1,PO2,PO3
CO2	Understand the principles of infrastructure development.	L2	PO1,P2,PO7
CO3	Develop analytical skills for infrastructure development.	L3	PO2,PO3,PO11

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	Construction Industry-Nature, characteristics, size and structure, Role of infrastructure development in employment generation and improving of the National economy.	08	CO1
II	Infrastructure Policies and Agencies-Indian government policy, Five year plan of government, Various Agencies associated with infrastructure development in India as regards various sectors.	08	CO2
III	Status of Infrastructure in India-Roads and buildings, communication, water supply, irrigation, power energy sectors, ports and aviation, health and educational services, rural development	08	CO3
IV	Infrastructure development-Issues related with infrastructure development, Government sector management, public sector management, private sector management	08	CO2
V	Funding and Consultant-Funding and managing infrastructure projects, role, and responsibility of project management consultants. Project Development-BOT projects, PPP projects, related to role of government, concern Construction Company, benefits and limitations	08	CO3

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	3	-	-	-	-	-
CO3	-	2	3	-	-	-	-	-	-	-	2	-

(Mapping: 1 – Low, 2 – Medium, 3 – High)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Site visit of an ongoing infrastructure project.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Y. K. Guruprasad, G. R. Dodagoudar, K. S. Nanjunda Rao & P. C. Pandey	Recent Advances in Infrastructure Development and Management	1st Edition, Lecture Notes in Civil Engineering Vol. 566, Springer Singapore, August 2013
2	Sudarshan Kurwadkar, Rajan Choudhary, Pijush Samui & Satyajeet Nanda	Recent Developments in Sustainable Infrastructure	1st Edition, Lecture Notes in Civil Engineering Vol. 594, Springer Singapore, August, 2009

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Francesco Dell'Isola	Advances in Mechanics of Materials for Environmental and Civil Engineering	Springer, 2016
2	Ehsan Momeni	Artificial Intelligence in Mechatronics and Civil Engineering	CRC Press, 2008

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignment/ Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback.

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Navyashree HR	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. Shobha B N
Designation: Assistant Professor	**Designation:** HOD&Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Infrastructure design in Transportation
Course Code	24IEM323
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 3rd Semester
Course Type	☐ Core ✓Elective ☐ Lab
Prerequisite (If any)	Basic knowledge of transportation engineering and civil engineering fundamentals
Contact Hours per Week	Lecture: 03 Tutorial: 01 Practical: 00 Total: 04
Credits	3
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	This course This course covers the design, analysis, and management of highways, railways, and airports. It includes geometric design of roads and runways, drainage systems, pavement construction, railway track design, and economic evaluation. Students will learn to apply engineering principles to plan, design, and evaluate transportation Infrastructure efficiently and safely.

2. Course Objectives

1.Get the advance knowledge about geometric design, drainage and economics of highway.
2.Understand various aspects of geometrical elements, points and crossings, significance of maintenance of tracks.
3. Learn different types of structural components, engineering properties of the materials, to calculate the material quantities required for construction.
4.Design and plan airport layout, design facilities required for runway, taxiway and impart knowledge about visual aids.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Design road geometrics, structural components of pavement and drainage.	L4	PO1, PO3 ,PO5
CO2	Evaluate the highway economics by few select methods and also will have a basic knowledge of highway drainage concepts.	L4	PO2, P03, PO8
CO3	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.	L4	PO1, PO2, PO7
CO4	Suggest and estimate the material quantity required for laying a railway track	L3	PO1, PO3, PO11

CO5	Understand the design geometric aspects of runway and taxiway.	L2	PO1, PO2, PO3

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	**Highway Geometric Design** Highway Geometric Design of horizontal alignment elements: Cross sectional elements–width, surface, camber, Sight distances–SSD, OSD, ISD, HSD, Radius of curve, Transition curve, Design of horizontal and vertical alignment–curves, super-elevation, widening, gradients summit and valley curves.	10	CO1
II	**Highway Drainage**: Significance and requirements, Surface drainage system and design- Examples, sub surface drainage system, design of filter materials, Types of cross drainage structures, their choice and location. **Highway Economics**: Highway user benefits, VOC using charts only-Examples, Economic analysis - annual cost method-Benefit Cost Ratio method-NPV-IRR methods- Examples, Highway financing-BOT-BOOT concepts.	10	CO2
III	**Pavement Construction:** Uses and properties of bituminous mixes and cement concrete in pavement construction. Earthwork; cutting and Filling, Preparation of subgrade Specification and construction of i) Granular Sub base, ii) WBM Base iii) WMM base, iv) Bituminous Macadam v) Dense Bituminous Macadam vi) Bituminous Concrete, vii) Dry Lean Concrete sub base and PQC viii) concrete roads.	10	CO3
IV	**Design of Railways** Track Stress, coning of wheels modern methods, Soil suitability analysis – Geometric design ofrailways, gradient, super elevation, widening of gauge on curves- Points and Crossings. Train resistance and hauling power; track components: rails, sleepers, fastenings, ballast and formation. Railways systems– Role of railways in transportation, Advantages of railways, Indian railways, classification, present scenario of railway development in India, Modernization of railways, development of high and super high-speed railways.	10	CO4
V	**Airport Design:** Overview of air transportation, Role of FAA and ICAO, air transport in India, types of airports, Heliports, STOL ports, complexities in airport planning, elements of airport planning, airport master plan, environmental impact Runway Design: Orientation, Wind Rose Diagram, Runway length, Geometric design of runways, Configuration and Pavement Design Principles, Elements of Taxiway Design, Airport Zones, Passenger Facilities and Services, Runway and Taxiway Markings and lighting.	10	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	-	2	-	-	-	-	-	-	-
CO2	-	2	2	-	-	-	-	2	-	-	-	-
CO3	2	3	-	-	-	-	2	-	-	-	-	-
CO4	2	-	2	-	-	-	-	-	-	-	2	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-

(Mapping: 1 – Low, 2 – Medium, 3 – High)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Marshall Stability Test for bituminous mix.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1	Satish Chandra & M. M. Agarwal	Railway Engineering	2nd Edition, Oxford University Press India, 2013
2	S. K. Khanna, M. G. Arora & S. S. Jain	Airport Planning and Design	6th Edition, Nem Chand & Bros, Roorkee, 2005

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1	Ministry of Road Transport & Highways (IRC)	Specifications for Road and Bridge Works	5th Revision, Indian Roads Congress for MoRTH, New Delhi, April 2013
2	J. S. Mundrey	A Course in Railway Track Engineering	4th Edition, Tata McGraw-Hill Education, New Delhi, c. 2010

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assignment/ Seminars	10
End Semester Examination	50

1 0 . Course Outcome Attainments

Type	Method
Direct	Internal Tests, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Navyashree HR	**Name:** Dr.Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. Shobha B N
Designation: Assistant Professor	**Designation:** HOD&Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Sustainable Development & Urban Planning
Course Code	24IEM324
Program	Infrastructure Management
Academic Year/Semester	2024-2025 / 3rd Semester
Course Type	☐Core ✔ Elective ☐ Lab
Prerequisite	Foundational Knowledge in Environmental Science
Contact Hours per Week	Lecture: 04 Tutorial: 00 Practical: 00 Total: 04
Credits	03
W.e.f	2024 - 25
Approved in AC on	Sept 2024
Course Description	This course provides a comprehensive introduction to sustainable development, focusing on its definitions, principles, and historical emergence. It explores the interlinkages between environment, development, and globalization, including the Millennium Development Goals and their impacts. The syllabus covers environmental sustainability, empowerment of marginalized groups, sustainability indicators, urban planning, and the built environment. It aims to equip students with integrated knowledge and tools for applying sustainable development principles in policy and practice.

2. Course Objectives

1. Understand the core concepts, historical emergence of sustainable development and its global and Indian context.
2. Comprehend the interlinkages between environment, development, globalization, and their impacts on policy and practice.
3. Understand the role of empowerment, sustainability indicators, and hurdles to sustainability in development processes.
4. Understand principles of environmental and urban planning for sustainable resource management and development.
5. Interpret the integration of science, technology, finance, and governance in promoting sustainable development outcomes

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Understand a clear understanding of sustainable development concepts, principles, and their application in environment	L2	PO1, PO2, PO6, PO7, PO12
CO2	Comprehend the interconnections between environment, development, globalization, and policy impacts at local, national, and global levels	L2	PO1, PO2, PO6, PO7, PO12
CO3	Understand sustainability indicators and assessment mechanisms to monitor progress and address barriers to sustainable development	L2	PO1, PO2, PO6, PO7, PO12
CO4	Understand strategies for empowerment and inclusive participation of diverse groups in sustainable development processes	L2	PO1, PO2, PO6, PO7, PO12
CO5	Comprehend integrated urban and environmental plans that promote sustainable resource use	L2	PO1, PO2, PO6, PO7, PO12

4. Course Content (Unit-Wise)

Unit	Topics	Hours	COs
I	Introduction To Sustainable Development Definitions and principles of Sustainable Development - History and emergence of the concept of Sustainable Development - Environment and Development linkages- Globalization and environment – Millennium Development Goals: Status (global and Indian) - Impacts on approach to development policy and practice in India, future directions.	08	CO1
II	Environmental Sustainability Land, Water and Food production - Moving towards sustainability: Energy powering Sustainable Development - Financing the environment and Sustainable Development.	08	CO2
III	Empowerment Of Women, Children, Youth, Indigenous People, Non-Governmental Organizations, Local Authorities, Business And Industry - Sustainability Indicators – Hurdles To Sustainability-Operational Guidelines- Interconnected Prerequisites For Sustainable Development - Science And Technology For Sustainable Development - Performance Indicators Of Sustainability And Assessment Mechanism – Constraints And Barriers For Sustainable Development	08	CO3
IV	Urban Planning And Environment Environment and Resources, Sustainability Assessment, Future Scenarios, Form of Urban Region,	08	CO4

	Managing the change, Integrated Planning, Sustainable Development.		
V	The Built In Environment Urban Form, Land Use, Compact Development, Principles of street design- complete streets, Transport Integrated Urban land use Planning, Guidelines for Environmentally sound Transportation.	08	CO5

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	2	3	-	-	-	-	2
CO2	3	3	-	-	-	2	3	-	-	-	-	3
CO3	3	3	-	-	-	2	3	-	-	-	-	3
CO4	3	3	-	-	-	2	3	-	-	-	-	2
CO5	3	2	-	-	-	2	3	-	-	-	-	2

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Plantation Drive

7. Textbooks

Sl. No.	Author(s)	Title	Publisher & Year
1	Charles Kibert,	Engineering for Sustainable Development: Theory and Practice	1st Edition, Wiley, 2020
2	Raluca-Andreea Felsegh	Clean Technologies and Sustainable Development in Civil Engineering	1st Edition, IGI Global, 2021

8. Reference Books

Sl. No.	Author(s)	Title	Publisher & Year
1	Sanjay Kumar Kanwar, Ganesh Shukla, John Singh	Sustainable Civil Engineering: Principles and Applications	1st Edition, Routledge, 2023
2	Andrew Braham	Fundamentals of Sustainability in Civil Engineering	1st Edition, Institution of Structural Engineers, 2017

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment Test I	20
Internal Assessment Test II	20
Assessment/ Seminars	10
End Semester Examination	50

10. Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assessment, End Semester Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Anusha P	**Name**: Dr. Shruthi R	**Name:** Dr. M. Shankar	**Name**: Dr. Shobha B N
Designation: Assistant Professor	**Designation**: HOD and Associate Professor	**Designation:** Director,IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Project Work Phase - I
Course Code	22IEM33
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 3rd Semester
Course Type	☐ Core ☐ Elective ✔ Lab
Prerequisite (If any)	Research Method Basics, Technical Report Writing, Subject Knowledge Foundation
Contact Hours per Week	Lecture: 00 Tutorial: 00 Practical: 03 Total: 03
Credits	3
W.e.f	2024 – 2025
Approved in AC on	Sep 2024
Course Description	The Project Work Phase - I course in civil engineering initiates students into a comprehensive project, focusing on planning and preliminary design. Students identify a real-world civil engineering problem, conduct literature reviews, and formulate objectives. The course emphasizes teamwork, research, and application of engineering principles to develop feasible solutions. Activities include project proposal preparation and feasibility studies for structures, transportation, or environmental systems. This phase builds foundational skills for executing civil engineering projects effectively.

2. Course Objectives

1. Project is an important part of the M.Tech curriculum covered in the final year.
2. It is divided into Project Stage I and Project Stage II at Semesters III and IV of the Final Year.
3. This project is a substantial piece of work that will require creative activity and original thinking.
4. The project aims to provide students with a transitional experience from the academic world to the professional world.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Identify relevant research problems in Civil Engineering through literature review and field studies.	L1	PO2, PO4, PO5, PO10, PO12
CO2	Formulate research objectives and methodology for addressing the identified problem.	L2	PO2, PO4, PO5, PO10, PO12
CO3	Apply appropriate experimental, analytical or computational techniques to investigate the chosen problem.	L3	PO2, PO4, PO5, PO10, PO12

CO4	Analyse experimental or analytical results to draw meaningful interpretations related to the research objectives.	L4	PO2, PO4, PO5, PO10, PO12
CO5	Evaluate the feasibility and limitations of the proposed methodology and suggest scope for future work.	L4	PO2, PO4, PO5, PO10, PO12

4. Course Content (Guidelines)

Sl. No.	Content	Hours	COs
1	1. Each student will do the project. 2. Select a project problem statement based on an industrial or societal issue and ideate on it. 3. Research on the project topic through existing theories, literature, technology, patents, etc. 4. Define objectives, scope, and outcomes of the project in the 1st presentation. 5. Maintain a notebook to keep records of all the meetings, discussions, notes, etc. This is to be done by the individual student. 6. Some of the parameters mentioned in the above table will be evaluated and assessed at the group level and some at an individual level.		

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	-	2	1	-	-	-	-	2	-	3
CO2	-	3	-	3	2	-	-	-	-	2	-	3
CO3	-	2	-	3	3	-	-	-	-	1	-	2
CO4	-	2	-	3	2	-	-	-	-	2	-	2
CO5	-	3	-	3	2	-	-	-	-	2	-	3

(*Mapping: 1 –1 Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions (if applicable)

Practical	Title of Experiment / Activity
1	Literature Review Mapping.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1			
2			

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1			
2			

9. Assessment Scheme

Component	Weightage (%)
Project Work Phase I Report	30
Presentation Skill	50
Viva and Answer	20

10. Course Outcome Attainment

Type	Method
Direct	Internal Assessment.
Indirect	Course Exit Survey, Student Feedback.

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Sunil R	**Name:** Dr. Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director, IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1.Course Information

Section	Details
Course Title	Internship
Course Code	24IEMI34
Program	Infrastructure Management
Academic Year/Semester	2025-2026 / 3rd Semester
Course Type	☐ Core ☐ Elective ✓Lab
Prerequisite (If any)	Structural Mechanics, Strength of Materials, Concrete and Steel Design
Contact Hours per Week	Lecture: 0 Tutorial: 0 Practical: 3 Total: 3
Credits	10
W.e.f	2024-25
Approved in AC on	September -2024
Course Description	The Internship provides postgraduate students with an opportunity to integrate academic learning with professional experience in industry, research organizations, consultancy firms, or government agencies. This course bridges classroom knowledge with real-world applications, enabling students to gain practical exposure, enhance technical competencies, and develop problem-solving, teamwork, and communication skills. The internship also encourages students to understand industry practices, ethical responsibilities, and emerging trends in their field of specialization. A final report and presentation are required to document the learning outcomes, challenges addressed, and contributions made during the internship

2. Course Objectives

1.To expand thinking and broaden the knowledge and skills acquired through course work in the field.
2.To relate to, interact with, and learn from current professionals in the field.
3.To gain a greater understanding of the duties and responsibilities of a professional.
4.To understand and adhere to professional standards in the field.
5.To gain insight to professional communication including meetings, memos, reading, writing, public speaking, research, client interaction, input of ideas, and confidentiality.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Gain practical experience within industry in which the internship is done. Develop and refine oral and written communication skills.	L2	PO1 ,PO2,PO3,P04

CO2	Acquire knowledge of the industry in which the internship is done.	L2	PO1,PO2,P03, ,PO6
CO3	Apply knowledge and skills learned to classroom work. Expand intellectual capacity, credibility, judgment, intuition.	L3	PO1,PO2, P06 ,PO8,
CO4	Develop a greater understanding about career options while more clearly defining personal career goals.	L3	PO1,PO2,P03, PO5
CO5	Experience the activities and functions of professionals. Identify areas for future knowledge and skill development.	L3	PO1,PO2, P010, PO12

4.CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**
CO2	**3**	**3**	**2**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	**3**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	**2**	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	**2**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**

(*Mapping: 1 – Low, 2 – Medium, 3 – High*)

5.Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to acquire as much knowledge as possible without causing any inconvenience at the place of internship. Seminar: Each student is required to Present the seminar on the internship orally and/or through power point slides. .
2	Answer the queries and involve in debate/discussion.

6. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1			
2			

7. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1			
2			

8. Assessment Scheme

Component	Weightage (%)
Internal Assessment	50
End Semester Examination	50

9.Course Outcome Attainment

Type	Method
Direct	Internal Tests, Assignments, Semester End Exams.
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mr. Amith B J	**Name:** Dr. Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director IQAC	**Designation:** Dean and Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Technical Seminar
Course Code	24IEM41
Program	Infrastructure Management
Academic Year/Semester	2025–2026 / 4th Semester
Course Type	☐ Core ☐ Elective ✔ Lab
Prerequisite	Academic Prerequisites, Topic Related Prerequisites & Presentation Skills/Preparation.
Contact Hours per Week	Lecture: 00 Tutorial: 00 Practical: 03 Total: 03
Credits	3
W.e.f	2024 – 2025
Approved in AC on	September 2024
Course Description	The seminar course provides students with an opportunity to explore recent developments in their field of specialization, develop self-learning skills, and present their findings effectively. The course emphasizes communication, critical thinking, teamwork, and technical writing, preparing students to present ideas confidently and engage in professional discussions.

2. Course Objectives

1. Develop self-learning and independent study habits through literature survey.
2. Enhance technical writing skills by preparing structured reports using standard tools.
3. Improve oral communication and presentation skills using appropriate media.
4. Build confidence to face an audience, answer queries, and participate in debates/discussions.
5. Encourage teamwork, peer learning, and exchange of ideas in a professional setting.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Identify, select, and analyze recent topics relevant to their area of specialization.	L4	PO1, PO2, PO4, PO12
CO2	Conduct a literature survey and organize technical content systematically.	L3	PO1, PO2, PO4, PO5, PO12
CO3	Prepare a well-structured technical report using proper tools	L3	PO5, PO10, PO12
CO4	Present technical content confidently using oral and visual presentation methods.	L4	PO9, PO10, PO12
CO5	Defend ideas, answer queries, and actively participate in group discussions.	L4	PO9, PO10, PO11, PO12

4. Course Content (Guidelines)

Unit	Topics	Hours	COs
I	1. Choose, preferably through peer reviewed journals, a recent topic of his/her interest relevant to the Course of Specialization. 2.Carryout literature survey, organize the Course topics in a systematic order. 3. Prepare the report with own sentences. 4. Type the matter to acquaint with the use of Micro-soft equation and drawing tools or any such facilities. 5. Present the seminar topic orally and/or through power point slides. 6. Answer the queries and involve in debate/discussion. 7. Submit two copies of the typed report with a list of references.	-	-

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	-	-	-	-	-	1	-	2
CO2	2	2	-	3	1	-	-	-	-	1	-	3
CO3	-	-	-	-	3	-	-	-	-	2	-	2
CO4	-	-	-	-	-	-	-	-	2	3	-	2
CO5	-	-	-	-	-	-	-	-	3	3	1	3

(*Mapping: 1 –1 Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Mini Presentation Practice.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1			
2			

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1			
2			

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment	100

10. Course Outcome Attainment

Type	Method
Direct	Seminar Report, Presentation Skill, Question and Answers
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
Name: Mrs. Navyashree H R	**Name:** Dr. Shruthi R	**Name:** Dr. M Shankar	**Name:** Dr. B N Shobha
Designation: Assistant Professor	**Designation:** HOD & Associate Professor	**Designation:** Director,IQAC	**Designation:** Dean & Principal
Signature:	**Signature:**	**Signature:**	**Signature:**

1. Course Information

Section	Details
Course Title	Project Work Phase - II
Course Code	24IEM42
Program	Infrastructure Management
Academic Year/Semester	2025 – 2026 / 4th Semester
Course Type	☐ Core ☐ Elective ✔ Lab
Prerequisite	Academic Requirements, Technical & Research Skills.
Contact Hours per Week	Lecture: 02 Tutorial: 00 Practical: 01 Total: 03
Credits	17
W.e.f	2024 – 2025
Approved in AC on	September 2024
Course Description	The Project Work Phase - II course in Infrastructure Management initiates students into a comprehensive project, focusing on planning and preliminary design. Students identify a real-world civil engineering problem, conduct literature reviews, and formulate objectives. The course emphasizes teamwork, research, and application of engineering principles to develop feasible solutions. Activities include project proposal preparation and feasibility studies for structures, transportation, or environmental systems. This phase builds foundational skills for executing civil engineering projects effectively.

2. Course Objectives

1. Identify and formulate a real-world civil engineering problem through literature review and preliminary investigation.
2. Develop skills in preparing project proposals with clearly defined objectives, scope, and methodology.
3. Inculcate the ability to analyze feasibility considering technical, environmental, and societal aspects.
4. Strengthen knowledge application in preliminary design using civil engineering principles.
5. Enhance teamwork, project management, and technical communication skills.

3. Course Outcomes (COs)

COs	Course Outcome Statement	BTL	POs Mapped
CO1	Identify and formulate a civil engineering problem statement through literature review and preliminary investigation.	L4	PO1, PO2, PO4
CO2	Develop a project proposal outlining objectives, scope and methodology for a civil engineering project.	L4	PO1, PO3, PO4

CO3	Analyse the feasibility of proposed civil engineering solutions considering technical, societal and environmental factors.	L4	PO2, PO3, PO6
CO4	Apply civil engineering principles to design preliminary solutions for the identified project problem.	L3	PO1, PO3, PO5
CO5	Collaborate effectively in a team to plan and present the project proposal.	L3	PO9, PO10, PO11

4. Course Content (Guidelines)

Unit	Topics	Hours	COs
I	1. Each Student will do a project. 2. Select a project problem statement based on an industrial or societal issue and ideate on it. 3. Research on the project topic through existing theories, literature, technology, patents, etc. 4. Define objectives, scope, and outcomes of the project in the 1st presentation. 5. Maintain a notebook to keep records of all the meetings, discussions, notes, etc. This is to be done by the individual student. 6. Some of the parameters mentioned in the above table will be evaluated and assessed at the group level and some at an individual level.	-	-

5. CO–PO Mapping Matrix

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	3	-	-	-	-	-	-	-	-
CO2	3	-	3	2	-	-	-	-	-	-	-	-
CO3	-	2	3	-	-	3	-	-	-	-	-	-
CO4	3	-	3	-	2	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	3	3	2	-

(*Mapping: 1 –1 Low, 2 – Medium, 3 – High*)

6. Details of Practical's Sessions

Practical	Title of Experiment / Activity
1	Presentation on Research Methodology and IPR.

7. Textbooks

S. No.	Author(s)	Title	Publisher & Year
1			
2			

8. Reference Books

S. No.	Author(s)	Title	Publisher & Year
1			
2			

9. Assessment Scheme

Component	Weightage (%)
Internal Assessment	50
End Semester Exam	50

10. Course Outcome Attainment

Type	Method
Direct	Project Report, Presentation Skill, Question and Answers
Indirect	Course Exit Survey, Student Feedback

Prepared by	Vetted by		Confirmed by
Faculty	**HOD**	**IQAC, ACU**	**Principal**
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