



GANDHINAGAR INSTITUTE OF TECHNOLOGY

Gandhinagar University

Academic Regulation & Curriculum

for

M.Tech in

Construction Engineering and Management

w.e.f. 2026-27

Preamble

The Department of Civil Engineering, Gandhinagar Institute of Technology, Gandhinagar University, is committed to providing quality postgraduate education, applied research exposure, industry-oriented learning, and professional development in the field of Civil Engineering and allied infrastructure domains. The M.Tech programme in Civil Engineering with specialization in Construction Engineering and Management is designed to develop technically competent, professionally responsible, and industry-ready construction professionals capable of contributing to the planning, execution, monitoring, and management of civil infrastructure projects.

The Construction Engineering and Management specialization focuses on the integration of engineering knowledge with modern construction practices, project planning, resource management, cost control, quality assurance, safety management, contract administration, construction equipment management, sustainability, digital construction tools, and research-based problem solving. The programme aims to strengthen the ability of students to manage complex construction projects by applying scientific, technical, managerial, financial, and regulatory principles.

The programme is aligned with the broad philosophy of Outcome-Based Education, Choice-Based Credit System, industry relevance, research orientation, and multidisciplinary learning. It encourages students to develop analytical thinking, professional judgement, leadership qualities, communication skills, ethical values, and lifelong learning ability required for successful careers in construction industries, infrastructure companies, consulting organizations, government departments, research institutions, and entrepreneurship.

The curriculum of the programme is expected to include advanced courses related to construction project management, construction methods and equipment, contract management, estimation and costing, quality and safety management, infrastructure planning, sustainable construction, construction materials, project finance, risk management, Building Information Modelling, digital tools for construction management, research methodology, seminar work, dissertation, and industry-based project work.

Through classroom teaching, case studies, site visits, seminars, software-based learning, research assignments, industry interaction, and dissertation work, the programme aims to prepare graduates who

can handle real-time challenges of the construction sector with technical competence, professional ethics, and innovative thinking. The department continuously strives to bridge the gap between academic learning and construction industry requirements through expert lectures, industrial visits, project-based learning, consultancy exposure, and research-oriented activities.

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1. Institutional Vision and Mission

1.1 Vision

To create a flexible and learner-focused engineering ecosystem that builds strong technical skills, practical knowledge, and innovative thinking, preparing graduates to adapt, perform, and lead in a rapidly evolving technological and societal environment.

1.2 Mission

To provide a holistic learning environment that develops technically skilled, innovative, and socially responsible engineers capable of addressing industrial, technological, and societal needs.

2. Departmental Vision and Mission

2.1 Vision

To impart outcome-based Civil Engineering education that develops professionally competent, ethically grounded, environmentally conscious, and innovation-oriented civil engineers capable of contributing to sustainable infrastructure development and societal well-being.

2.2 Mission

- To provide strong foundations in civil engineering science, design, construction practices, and modern infrastructure technologies.
- To develop practical competency through laboratories, field surveys, site visits, internships, live projects, software training, and industry interaction.
- To inculcate professional ethics, safety culture, environmental responsibility, teamwork, communication skills, and lifelong learning.
- To encourage research, consultancy, entrepreneurship, innovation, and problem solving in structural, geotechnical, transportation, environmental, water resources, construction management, and allied civil engineering domains.

3. Programme Educational Objectives

The Programme Educational Objectives (PEOs) describe the expected accomplishments of Civil Engineering graduates a few years after completion of the programme.

PEO 1: To equip postgraduate students with advanced knowledge of construction engineering, project planning, scheduling, cost management, quality control, safety management, and infrastructure project execution.

PEO 2: To develop the ability to analyse, plan, manage, and monitor construction projects using modern engineering tools, project management techniques, digital technologies, and sustainable construction practices.

PEO 3: To prepare graduates for professional careers in construction industries, infrastructure development organizations, consultancy firms, government departments, research institutions, and entrepreneurship by strengthening managerial, technical, and decision-making skills.

PEO 4: To inculcate research aptitude, ethical responsibility, leadership ability, teamwork, communication skills, and lifelong learning attitude for contributing effectively to the construction sector and the welfare of society.

4. Programme Details

4.1 Programme Structure and Duration

- **Programme Name:** Master of Technology in Construction Engineering and Management
- **Duration:** 2 Years
- **Semesters:** 4
- **Mode:** Full Time
- **Intake:** 18 Seats
- **Credit Structure:** As per NEP / University norms and approved curriculum
- **Medium of Instruction:** English
- **Programme Level:** Postgraduate

4.2 Eligibility Criteria for Admission

Candidates seeking admission to the M.Tech in Civil Engineering with specialization in Construction Engineering and Management shall have passed B.E. / B.Tech. or equivalent degree in Civil Engineering or relevant allied engineering discipline from a recognized university.

The candidate shall have obtained minimum 50% marks in the qualifying examination for open category and minimum 45% marks for SC / ST / SEBC / EWS category candidates, or as prescribed by the Admission Committee for Professional Courses, Gandhinagar University, AICTE, and other competent authorities from time to time.

Candidates having valid GATE score may be considered as per applicable admission rules. Admission may also be granted through ACPC, University admission process, or any other procedure prescribed by the competent authority.

4.3 Admission Procedure

Admission to the M.Tech in Civil Engineering (Construction Engineering and Management) programme may be granted through the Admission Committee for Professional Courses, Government of Gujarat,

based on prevailing admission norms, or through the direct admission process conducted by the University as per applicable rules, eligibility criteria, and availability of seats.

The University reserves the right to modify the admission process, eligibility conditions, and document requirements as per statutory guidelines and institutional regulations.

4.4 Credit Summary

The credit distribution was prepared as per the approved teaching scheme and curriculum structure of the M.Tech in Civil Engineering (Construction Engineering and Management) programme.

The credit structure may include programme core courses, programme elective courses, open elective or interdisciplinary courses, seminar, research methodology, dissertation phase work, internship or industry-based project work, and other academic components prescribed by the University.

4.4 Credit Summary

The M.Tech in Civil Engineering with specialization in Construction Engineering and Management shall follow the credit structure prescribed by Gandhinagar University. The programme is structured over four semesters with a total of 72 credits.

Discipline-wise Credit Distribution

Discipline / Course Component	Percentage	Credits	1st Year	2nd Year	Total
Professional Core	35%	25	25	0	25
Programme Electives	17%	12	12	0	12
Mandatory Learning Course / Research Methodology and IPR	4%	3	3	0	3
Internal Review	5%	4	0	4	4
Dissertation	39%	28	0	28	28
Total	100%	72	40	32	72

Definition of Credit

1 Hour Lecture per Week = 1 Credit

1 Hour Tutorial per Week = 1 Credit

2 Hours Practical / Laboratory / Fieldwork per Week = 1 Credit

Audit courses are non-credit courses but shall be completed as prescribed by the University.

5. Curriculum Structure

Program Name: Master of Technology (02)								Program Code: CL (193 Construction Engineering and Management)				
Semester / Year : First Year Master of Technology - Semester I								Effective From Academic Year: 2025-26				
Subject Code	Course Type	Subject Name	Credit	Hours per week				Theory (Marks)		Practical (Marks)		Total (Marks)
				L	T	P	Total	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
10000152	Audit Course	Disaster Management	0	2	0	0	2	0	50	0	0	50
10000151	MLC	Research Methodology and IPR	3	1	1	2	4	0	0	80	20	100
101430101	Professional Core	Construction Equipment	4	3	0	2	5	60	40	30	20	150
101430102	Professional Core	Modern Construction Materials	4	3	0	2	5	60	40	30	20	150
101430103	Professional Core	Project Formulation and Appraisal	4	3	0	2	5	60	40	30	20	150
	Program Elective I	Elective-I	4	3	0	2	5	60	40	30	20	150
		Total	19	15	1	10	26					750

Course Elective offered			
101430111	Program Elective I	Construction Project Management	
101430112	Program Elective I	Construction Personnel Management	
101430113	Program Elective I	Design of Energy Efficient Buildings	

Program Name: Master of Technology (02)				Program Code: CL (143 Construction Engineering and Management)								
Semester / Year: First Year Master of Technology - Semester II				Effective From Academic Year: 2025-26								
Subject Code	Course Type	Subject Name	Credit	Hours per week				Theory (Marks)		Practical (Marks)		Total (Marks)
				L	T	P	Total	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
10000251	Audit Course	Technical Writing	0	2	0	0	2	0	50	0	0	50
101430201	Professional Core	Advanced Construction Engineering and Computing Techniques Laboratory	2	0	0	4	4	0	0	80	20	100
101430202	Professional Core	Advanced Construction Techniques	4	3	0	2	5	60	40	30	20	150
101430203	Professional Core	Construction Planning, Scheduling and Control	4	3	0	2	5	60	40	30	20	150
101430204	Professional Core	Research Review & Seminar	3	0	0	6	6	0	0	0	100	100
	Program Elective II	ELECTIVE - II	4	3	0	2	5	60	40	30	20	150
	Program Elective III	ELECTIVE - III	4	3	0	2	5	60	40	30	20	150
		Total	21	14	0	18	32					850

Course Elective offered			
101430206	Program Elective II	Economics and Finance Management in Construction	
101430207	Program Elective II	Management Information Systems	
101430208	Program Elective II	Project Safety Management	
101430209	Program Elective III	Quality Control and Assurance in Construction	
101430210	Program Elective III	Quantitative Techniques in Management	
101430211	Program Elective III	Resource Management and Control in Construction	

Program Name: Master of Technology (02)				Program Code: CL (143 Construction Engineering and Management)								
Semester / Year : III/II				Effective From Academic Year: 2026-27								
Subject Code	Course Type	Subject Name	Credit	Hours per week				Theory (Marks)		Practical (Marks)		Total (Marks)
				L	T	P	Total	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
101430301	Internal Review	Internal Review I	2	0	0	4	4	0	0	0	100	100
101430302	Dissertation	Dissertation Phase I	14	0	0	28	28	0	0	100	0	100
		Total	16	0	0	32	32					200

Program Name: Master of Technology (02)				Program Code: CL (143 Construction Engineering and Management)								
Semester / Year : IV/II				Effective From Academic Year: 2026-27								
Subject Code	Course Type	Subject Name	Credit	Hours per week				Theory (Marks)		Practical (Marks)		Total (Marks)
				L	T	P	Total	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
101430401	Internal Review	Internal Review II	2	0	0	4	4	0	0	0	100	100
101430402	Dissertation	Dissertation Phase II	14	0	0	28	28	0	0	100	0	100
		Total	16	0	0	32	32					200

6. Teaching, Learning and Evaluation

6.1 Teaching Methodology

The programme shall adopt a learner-centric and outcome-oriented teaching-learning process. The teaching methodology may include:

- Classroom Teaching
- Case Studies
- Construction Project Case Analysis
- Site Visits
- Industry Interaction
- Expert Lectures
- Seminars and Presentations
- Software-Based Learning
- Project Planning and Scheduling Exercises
- Research Assignments
- Field-Based Learning
- Dissertation Work
- Industry-Oriented Projects
- Digital and Blended Learning
- AI-Based Learning Tools
- Use of Modern Construction Management Software

The teaching-learning process shall emphasize real-time problem solving, analytical thinking, project management ability, leadership, technical documentation, and professional decision-making skills.

6.2 Attendance Rules

- Minimum 75 percent attendance shall be mandatory in each course unless revised by university regulations.

- Students below the prescribed attendance requirement may not be permitted to appear in the any examination.
- Additional attendance requirements may apply for practical courses, fieldwork, survey camps, internships, workshops, seminars, site visits, and project work.

6.3 Examination and Evaluation System

The evaluation system may consist of Continuous Internal Evaluation and End Semester Examination as prescribed by the University.

Continuous Internal Evaluation may include:

- Mid-Semester Examination
- Assignments
- Case Study Reports
- Class Tests
- Presentations
- Seminars
- Software-Based Assignments
- Site Visit Reports
- Research Papers / Review Papers
- Dissertation Progress Review
- Project Work
- Viva Voce Examination

6.4 Weightage

The evaluation weightage shall be as per Gandhinagar University norms. Unless modified by competent authority, the general evaluation pattern may be followed as under:

- **Continuous Internal Evaluation:** 33 percent
- **Mid-Semester Examination:** 20 percent
- **End-Semester Examination:** 47 percent

For practical, project, seminar, internship, studio, and field courses, the assessment distribution shall be as prescribed in the approved curriculum and University examination rules.

6.5 Passing Standards

A student shall be declared to have successfully passed a course subject to fulfilling the minimum passing criteria prescribed by the University from time to time.

The passing criteria for the M.Tech in Civil Engineering (Construction Engineering and Management) programme shall generally include:

- Minimum prescribed marks in the End-Semester Examination, wherever applicable.
- Minimum prescribed aggregate marks considering all evaluation components including continuous internal evaluation and end-semester examination.
- Separate passing criteria may be applicable for theory, practical, laboratory, fieldwork, workshop, project, seminar, and internship components.
- Students must fulfil academic, practical, attendance, fieldwork, safety, documentation, and evaluation requirements for successful completion of each course and the programme.
- The University reserves the right to revise the evaluation and passing criteria from time to time as per academic regulations and statutory guidelines.

6.6 Grading System

The programme shall follow Gandhinagar University grading norms. The indicative grade table is given below and shall remain subject to revision by the University.

Grade	Grade Points	From Marks	To Marks
AA	10	80	100
AB	9	73	79
BB	8	66	72

BC	7	60	65
CC	6	55	59
CD	5	50	54
DD	4	45	49
FF	0	0	44

6.7 Project Work / Dissertation / Seminar

Students shall undertake dissertation work, research project, or industry-based project work as prescribed in the curriculum.

The dissertation shall focus on advanced study, research, analysis, design, planning, management, or problem-solving related to Construction Engineering and Management.

The dissertation work may include:

- Problem Identification
- Literature Review
- Research Methodology
- Data Collection
- Field Study / Case Study
- Experimental or Analytical Work
- Software-Based Analysis
- Project Planning and Scheduling
- Cost and Resource Analysis
- Sustainability / Safety / Quality Assessment
- Result Analysis
- Dissertation Report Preparation
- Presentation and Viva Voce

7. Rules and Regulations

7.1 Rules for Promotion

A student enrolled in the M.Tech in Civil Engineering (Construction Engineering and Management) programme shall be promoted to the subsequent semester in accordance with the academic regulations and promotion rules prescribed by the University from time to time.

Promotion shall be subject to fulfilment of attendance requirements, academic performance criteria, dissertation progress, and completion of prescribed credits.

7.2 Maximum Duration for Completion

The maximum duration for completion of the M.Tech programme shall be as prescribed by the University and applicable regulatory authorities from time to time.

Normally, a student is expected to complete the programme within the prescribed two-year duration. Extension, if any, shall be governed by University rules.

7.3 Internship Guidelines

Students may undergo internship, industrial training, field work, or industry-oriented experiential learning as prescribed in the curriculum.

The training or industry-based work may be carried out in:

- Construction Companies
- Infrastructure Development Organizations
- Project Management Consultancy Firms
- Road and Building Departments
- Irrigation and Water Resources Departments
- Urban Development Authorities
- Real Estate and Housing Organizations
- Public Works Departments

- Smart City Projects
- Metro and Transportation Projects
- Quality Control Laboratories
- Construction Material Testing Laboratories
- Government and Public Sector Organizations
- Research and Consultancy Organizations

Students may be required to submit the following documents after completion of training or project work:

- Internship / Industry Project Report
- Training Completion Certificate
- Daily Work Diary / Logbook
- Site Visit Report
- Presentation
- Viva Voce
- Project Assignment Report, wherever applicable

7.4 Discipline Rules

Students shall maintain discipline, professional ethics, safety standards, and proper conduct within the institution, laboratories, drawing halls, workshops, construction sites, field visits, survey camps, internships, examinations, technical events, and all academic activities associated with the programme.

Students are expected to:

- Attend classes, laboratories, tutorials, fieldwork, and workshops regularly.
- Follow institutional rules, safety instructions, laboratory manuals, fieldwork procedures, and site-specific safety norms.
- Respect faculty members, staff, fellow students, industry mentors, site personnel, and institutional property.
- Maintain academic honesty and integrity in assignments, designs, drawings, practical work, field records, project reports, and examinations.

- Use laboratory equipment, surveying instruments, machines, tools, software, and field instruments responsibly and only under authorized supervision.
- Wear required safety gear during site visits, laboratory activities, and fieldwork wherever instructed.

Any form of misconduct, indiscipline, ragging, use of unfair means, plagiarism, data fabrication, harassment, unsafe conduct, or damage to institutional property shall be treated seriously and may result in disciplinary action as per University rules and applicable regulations.

7.5 Anti-Ragging Policy

The programme shall strictly comply with UGC Anti-Ragging Regulations, AICTE Anti-Ragging Guidelines, anti-ragging affidavit requirements, and institutional disciplinary procedures. Ragging in any form is strictly prohibited and shall invite strict disciplinary action as per applicable regulations.

7.6 Ethical Use of Technology and AI Tools

Students are encouraged to use modern digital technologies, construction management software, simulation platforms, data analysis tools, and AI-based learning tools for academic, research, and project purposes.

Students may use:

- Project Management Software
- Planning and Scheduling Tools
- Building Information Modelling Tools
- CAD and Drafting Software
- GIS and Remote Sensing Tools
- Statistical and Data Analysis Tools
- AI-Based Learning Platforms
- Digital Documentation Tools
- Research Databases and E-Resources

The use of AI tools and digital technologies shall be ethical, responsible, and aligned with academic integrity. Students shall not engage in plagiarism, unauthorized copying, fabrication of data, false reporting, or misuse of AI-generated content in academic submissions, project work, dissertation,

8. Student Support

8.1 Industry Collaboration

The department shall actively promote collaboration with construction industries, infrastructure companies, consultancy firms, government departments, professional bodies, research institutions, and technology providers to enhance the practical relevance of the M.Tech Construction Engineering and Management programme.

Such collaborations may include:

- Industry Internships
- Site Visits
- Expert Lectures
- Technical Workshops
- Live Construction Project Studies
- Consultancy Assignments
- Joint Research Activities
- Skill Development Programmes
- Software Training
- Placement and Career Development Activities

The institution may establish Memoranda of Understanding with industries, government agencies, professional bodies, and research organizations for academic enrichment, laboratory development, collaborative research, technology transfer, consultancy, and industry-oriented learning.

8.2 Research and Consultancy

The department shall encourage faculty members and postgraduate students to undertake research, consultancy, innovation, and applied studies in the field of Construction Engineering and Management.

Research and consultancy areas may include:

- Construction Project Planning and Scheduling
- Resource Optimization
- Construction Quality and Safety Management
- Cost Control and Value Engineering
- Construction Materials and Sustainable Technologies
- Contract Management and Dispute Resolution
- Infrastructure Project Management
- Risk Management in Construction Projects
- Digital Construction and BIM
- Smart Construction Practices
- Life Cycle Costing
- Green and Sustainable Infrastructure

Students may be encouraged to participate in conferences, workshops, research publications, technical competitions, funded projects, patents, consultancy assignments, and collaborative research initiatives.

8.3 Library and Laboratory Facilities

Adequate library, laboratory, computing, and digital learning facilities shall be made available to support effective teaching, research, dissertation work, and skill development under the programme.

The department shall provide access to textbooks, reference books, national and international journals, standards, codes, research publications, e-resources, technical manuals, and digital databases.

The following laboratories and facilities may support the programme:

- Surveying Laboratory

- Advanced Surveying Laboratory
- Transportation Laboratory
- Highway Laboratory
- Strength of Materials Laboratory
- Construction Materials Laboratory
- Geology and Geotechnical Laboratory
- Environmental Laboratory
- Computer Laboratory

The Computer Laboratory may support software-based learning related to project planning, scheduling, quantity estimation, drafting, GIS, data analysis, Building Information Modelling, and research documentation.

8.4 Student Support and Mentoring

A structured system for student mentoring, academic counselling, research guidance, and professional development shall be implemented for postgraduate students.

The department shall facilitate:

- Academic Mentoring
- Dissertation Guidance
- Research Methodology Support
- Career Guidance
- Technical Skill Development
- Professional Certification Guidance
- Higher Study and Research Support
- Entrepreneurship Guidance
- Personal and Professional Development

Students may also be provided opportunities for participation in seminars, workshops, conferences, expert sessions, industrial visits, site studies, project competitions, and professional activities.

8.5 Placement and Career Development

The department shall promote placement and career development activities through industry interaction, alumni engagement, internships, professional networking, and campus engagement initiatives.

Efforts shall be made to establish linkages with:

- Construction Companies
- Infrastructure Development Firms
- Project Management Consultancy Organizations
- Government Departments
- Public Sector Undertakings
- Real Estate and Housing Organizations
- Urban Development Authorities
- Smart City Projects
- Road and Transportation Agencies
- Material Testing and Quality Control Laboratories
- Research and Consultancy Organizations

Career development activities such as resume preparation, interview preparation, aptitude training, project presentation skills, technical documentation, soft skill development, software training, expert sessions, and placement-oriented workshops may be organized to improve employability.

9. Programme Credibility

9.1 Executive Summary

The M.Tech in Civil Engineering with specialization in Construction Engineering and Management is designed to develop postgraduate professionals capable of managing construction and infrastructure projects with technical competence, managerial ability, ethical responsibility, and research orientation.

The programme integrates advanced civil engineering knowledge with construction project management principles, enabling students to understand the complete project life cycle from planning and estimation to execution, monitoring, quality control, safety, cost management, and project closure.

The programme emphasizes the use of modern construction practices, digital tools, planning and scheduling techniques, contract management, sustainability, and project-based learning to prepare graduates for professional roles in construction industries, infrastructure organizations, consultancy firms, government departments, and research institutions.

The teaching-learning process is supported through classroom instruction, case studies, site visits, laboratories, seminars, dissertation work, software applications, and industry interaction. Students are encouraged to develop analytical ability, leadership qualities, professional communication, decision-making skills, and research aptitude.

Graduates of the programme shall be prepared for careers in construction project management, planning and scheduling, quantity surveying, contract management, infrastructure management, site coordination, quality control, safety management, consulting, research, teaching, and entrepreneurship.

9.2 Scope and Career Opportunities

Graduates of the programme may find career opportunities in:

- Construction Companies
- Infrastructure Development Organizations
- Project Management Consultancy Firms
- Real Estate and Housing Sector

- Road and Building Departments
- Irrigation and Water Resources Departments
- Urban Development Authorities
- Smart City Projects
- Metro Rail and Transportation Projects
- Public Works Departments
- Government and Public Sector Units
- Quality Control and Material Testing Laboratories
- Research and Consultancy Organizations
- Academic Institutions
- Entrepreneurship and Construction Startups

9.3 Potential Job Roles

Graduates of the programme may work in roles such as:

- Construction Project Manager
- Planning Engineer
- Site Project Coordinator
- Quantity Surveyor
- Estimation and Costing Engineer
- Contracts Engineer
- Project Control Engineer
- Quality Control Engineer
- Construction Safety Engineer
- Infrastructure Planning Engineer
- Construction Consultant
- BIM Coordinator
- Project Scheduler
- Construction Research Associate
- Academic / Teaching Professional

- Entrepreneur in Construction Sector

9.4 Higher Study and Professional Opportunities

Students graduating from the programme may pursue:

- Ph.D. in Civil Engineering
- Ph.D. in Construction Engineering and Management
- Research and Innovation-Oriented Higher Studies
- Professional Certifications in Project Management
- Certifications in Construction Safety and Quality Management
- Certifications in BIM and Digital Construction
- Certifications in Planning and Scheduling Software
- Government and Competitive Examinations
- Academic and Research Careers
- Entrepreneurship and Consultancy Practice

10. Collaborative Field Work / Experimental Work

The M.Tech Construction Engineering and Management programme shall emphasize field-based learning, practical exposure, industry interaction, and application-oriented postgraduate education through collaborative field work, project studies, site visits, laboratory work, software training, seminars, and dissertation activities.

Students may participate in:

- Construction Site Visits
- Infrastructure Project Studies
- Case Studies of Live Projects
- Planning and Scheduling Exercises
- Quantity Estimation and Cost Analysis
- Quality and Safety Audits
- Material Testing and Laboratory Work
- Construction Equipment Studies
- Contract and Tender Document Analysis
- BIM and Digital Construction Exercises
- Research Projects
- Industry-Oriented Dissertation Work
- Technical Seminars and Workshops

The programme shall encourage experiential learning, research orientation, technical documentation, teamwork, leadership, professional communication, and practical problem-solving ability aligned with construction industry requirements.

11. Market Survey

11.1 Executive Summary

The construction and infrastructure sector continues to be one of the major contributors to economic development, urban growth, industrial expansion, and national progress. Growing demand for roads, buildings, bridges, housing, industrial infrastructure, water supply systems, smart cities, transportation systems, and sustainable infrastructure has created the need for technically skilled and professionally trained construction management professionals.

Industry interaction and academic analysis indicate that construction organizations require engineers who possess not only technical knowledge but also project planning, scheduling, cost control, quality management, safety management, contract administration, communication, leadership, and digital tool proficiency.

The M.Tech in Civil Engineering with specialization in Construction Engineering and Management is therefore relevant for addressing the growing demand for professionals capable of managing complex construction projects efficiently and responsibly.

11.2 Market Demand and Industry Trends

Major trends in the construction and infrastructure sector include:

- Growth of Infrastructure Projects
- Urbanization and Smart City Development
- Sustainable and Green Construction
- Use of Project Management Tools
- Building Information Modelling
- Digital Construction Technologies
- Quality and Safety Compliance
- Resource Optimization
- Public-Private Partnership Projects
- Infrastructure Asset Management

- Demand for Skilled Construction Managers

Industries are increasingly seeking professionals who can integrate technical knowledge with managerial competence, digital skills, and ethical decision-making.

11.3 Skill Gap Identified by Industry

Industry feedback generally highlights several gaps among engineering graduates entering the construction sector, including:

- Limited exposure to live construction project management
- Insufficient knowledge of planning and scheduling tools
- Weak understanding of contract administration
- Limited practical exposure to quantity estimation and cost control
- Insufficient awareness of safety and quality standards
- Limited understanding of construction equipment and site management
- Need for better communication and leadership skills
- Need for research-based and data-driven decision-making

The programme aims to bridge these gaps through advanced coursework, case studies, site exposure, software-based learning, dissertation work, and industry-oriented academic activities.

11.4 Employment Opportunities and Industry Support

Graduates of the programme shall have employment opportunities in construction industries, infrastructure development companies, project management consultancy firms, real estate organizations, government departments, public sector undertakings, quality control laboratories, research organizations, and academic institutions.

Industries may support the programme through:

- Internships
- Site Visits
- Expert Lectures

- Collaborative Projects
- Industry-Based Dissertation Work
- Skill Development Workshops
- Placement Support
- Consultancy and Research Collaboration

The programme is expected to contribute towards developing construction professionals equipped with advanced technical knowledge, project management competency, leadership qualities, sustainability awareness, and professional ethics.

12. Review and Revision of Regulation

The University reserves the right to interpret, modify, revise, amend, or update any provision, rule, regulation, curriculum structure, evaluation pattern, academic requirement, or operational guideline related to the B.Tech Civil Engineering programme from time to time in accordance with University regulations, statutory requirements, technological advancements, industry needs, accreditation requirements, and academic developments.

In case of any ambiguity or dispute regarding interpretation of any provision of this manual, the decision of the University or Competent Authority shall be final and binding on all stakeholders.

Any amendments, additions, or revisions approved by the appropriate academic or statutory bodies of the University shall automatically become applicable to the programme.

Annexure I: Detail Syllabus

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 10000151	Subject Title: Research Methodology and IPR
Pre-requisite: None	

SEMESTER-I

Course Objective:

1. The course is design to orient the students to the scientific methodology of research and presenting their thesis.
2. Research constitutes primarily of literature review, giving critical comments on the literature reviewed and identifying the gap, problem formulation, modeling in either an analytical or experimental set up, validating the model and solving the problem set by the students for themselves.
3. At the end, student should be able to present and defend the solution he/she has found, in a simple and easy manner.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
1	1	2	3	0	0	80	20	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Phases of Research: What is expected of you? Identification of broad research area, literature review, identify research gap, formulate problem statement, validation, report writing, Research ethics	02	NA
2	Finding Good literature: Sources of literature, finding information, identify main ideas in scholarly literature, write notes to organize your ideas, identification of research gap, identification of research objectives	04	NA
3	Basics of Research Design: Qualitative, quantitative and mix methods, experimental research, uncertainty analysis	04	NA
4	Intellectual Properties: Forms of IP, National IP policy 2016, International Scenario, patent rights, Information Technology and IPR	05	NA

Course Outcome:

Sr. No.	CO Statement
CO-1	Explain various phases of research and research ethics.
CO-2	Explain a quality literature review, research gap and objectives
CO-3	Identify an original and relevant problem and identify methods to find its solution
CO-4	Identify the model(s) developed for the research area.
CO-5	Relate IPR protection for further research and better products

TEXTBOOKS:

1. Research Methodology: Methods and Techniques by C. R. Kothari, Vishwa Prakashan
2. Research methodology: an introduction for science and Engineering students by Stuart Melville and Wayne Goddard.
3. Research Methodology: A Step-by-Step Guide for beginners by Ranjit Kumar, SAGE Publications Pvt. Ltd.

REFERENCES:

1. Research Design: Qualitative, Quantitative and Methods Approaches by John W. Creswell, SAGE Publications Pvt. Ltd.
2. Intellectual Property Rights: Protection and Management by Nithyananda K V., Cengage Learning India Private Limited.

Open e-Resource:

1. https://onlinecourses.nptel.ac.in/noc22_hs59/
2. <https://archive.nptel.ac.in/courses/110/105/110105139/>
3. https://onlinecourses.swayam2.ac.in/cec20_hs18/preview
4. https://www.wipo.int/academy/en/courses/distance_learning/

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 10000152	Subject Title: Disaster Management
Pre-requisite: None	

SEMESTER-I

Course Objective:

1. To provide students with a framework that will help them choose the appropriate
2. descriptive statistics in various data analysis situations.
3. To analyse distributions and relationships of real-time data.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	0	0	0	0	50	0	0	50

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	4	17	
2	Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts	4	17	
3	Disaster Prone Areas In India Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post Disaster Diseases And Epidemics	4	17	
4	Disaster Preparedness And Management Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness	4	17	
5	Risk Assessment Disaster Risk:	4	16	

	Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival.		
6	Disaster Mitigation Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non Structural Mitigation, Programs Of Disaster Mitigation In India.	4	16

Course Outcome:

Sr. No.	CO Statement
CO-1	Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
CO-2	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
CO-3	Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
CO-4	Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

TEXTBOOKS:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "New Royal book Company.
2. Sahni, PardeepEt.Al. (Eds.), "Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.

REFERENCES:

1. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., New Delhi.

Open e-Resource:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 101930101	Subject Title: Construction Equipment
Pre-requisite: None	

SEMESTER-I

Course Objective:

- To study and understand the various types of equipments used for earthwork, tunneling, drilling, blasting, dewatering, material handling conveyors and its applications in construction projects.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	CONSTRUCTION EQUIPMENTS AND MANAGEMENT: Identification – Planning of equipment – Selection of Equipment - Equipment Management in Projects - Maintenance Management – Equipment cost – Operating cost – Cost Control of Equipment - Depreciation Analysis – Replacement of Equipment- Replacement Analysis - Safety Management.	09	20	
2	EQUIPMENT FOR EARTHWORK: Fundamentals of Earth Work Operations - Earth Moving Operations - Types of Earth Work Equipment - Tractors, Motor Graders, Scrapers, Front end Waders – Dozer, Excavators, Rippers, Loaders, trucks and hauling equipment, Compacting Equipment, Finishing equipment.	09	25	
3	OTHER CONSTRUCTION EQUIPMENT: Equipment for Dredging, Trenching, Drag line and clamshells, Tunneling – Equipment for Drilling and Blasting - Pile driving Equipment - Erection Equipment - Crane, Mobile crane - Types of pumps used in Construction - Equipment for Dewatering and Grouting – Equipment for Demolition.	09	25	
4	ASPHALT AND CONCRETE PLANTS: Aggregate production- Different Crushers – Feeders - Screening Equipment - Handling Equipment- Batching and Mixing Equipment - Pumping Equipment	09	20	

	– Ready mix concrete equipment, Concrete pouring equipment. Asphalt Plant, Asphalt Pavers, Asphalt compacting Equipment.		
5	MATERIALS HANDLING EQUIPMENT: Forklifts and related equipment - Portable Material Bins – Material Handling Conveyors – Material Handling Cranes- Industrial Trucks.	09	10

Course Outcome:

Sr. No.	CO Statement
CO-1	Select construction equipment appropriate to tasks.
CO-2	Evaluate equipment ownership and operating costs.
CO-3	Estimate and schedule activities using equipment productivity and cost data.
CO-4	Apply contemporary techniques pertaining to construction methods, equipment usage and management

TEXTBOOKS:

1. Construction Planning, Equipment, and Methods, Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt and AviadShapira, McGraw-Hill Education, 2018, Ninth Edition. Department of Civil Engineering M Tech (CTM) Scheme and Syllabi w.e.f. 2021-22
2. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
3. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.

REFERENCES:

1. Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 1988.
2. Dr.Mahesh Varma, "Construction Equipment and its planning and Application", Metropolitan Book Company, New Delhi. 1983.
3. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", McGraw Hill, Singapore, 2006.
4. Sharma S.C. "Construction Equipment and Management", Khanna Publishers, New Delhi, 1988.

Open e-Resource:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 101930102	Subject Title: Modern Construction Materials
Pre-requisite: None	

SEMESTER-I

Course Objective:

- To study and understand the properties of modern construction materials used in construction such as special concretes, metals, composites, water proofing compounds, non weathering materials, and smart materials.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	SPECIAL CONCRETES: Concretes, Behaviour of concretes – Properties and Advantages of High Strength and High Performance Concrete – Properties and Applications of Fibre Reinforced Concrete, Self compacting concrete, Alternate Materials to concrete on high performance & high Strength concrete.	09	20	
2	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	09	25	
3	COMPOSITES: Types of Plastics – Properties & Manufacturing process – Advantages of Reinforced polymers – Types of FRP – FRP on different structural elements – Applications of FRP	09	25	
4	OTHER MATERIALS: Types and properties of Water Proofing Compounds – Types of Non-weathering Materials and its uses – Types of Flooring and Facade Materials and its application.	09	20	
5	SMART AND INTELLIGENT MATERIALS:	09	10	

	Types & Differences between Smart and Intelligent Materials – Special features –Case studies showing the applications of smart & Intelligent Materials.		
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Course Outcome:

Sr. No.	CO Statement
CO-1	On completion of this course the students will have the knowledge of modern construction materials to be used in the field.
CO-2	Evaluate equipment ownership and operating costs.
CO-3	Estimate and schedule activities using equipment productivity and cost data.
CO-4	Apply contemporary techniques pertaining to construction methods, equipment usage and management

TEXTBOOKS:

1. Construction Planning, Equipment, and Methods, Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt and AviadShapira, McGraw-Hill Education, 2018, Ninth Edition. Department of Civil Engineering M Tech (CTM) Scheme and Syllabi w.e.f. 2021-22
2. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
3. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.

REFERENCES:

1. ACI Report 440.2R-02, "Guide for the design and construction of externally bonded RP systems for strengthening concrete structures", American Concrete Institute, 2002.
2. Aitkens, "High Performance Concrete", McGraw Hill, 1999
3. Ashby, M.F. and Jones.D.R.H.H. "Engineering Materials 1: An introduction to Properties, applications and designs", Elsevier Publications, 2005.
4. Deucher, K.N, Korfiatis, G.P and Ezeldin, A.S, "Materials for civil and Highway Engineers", Prentice Hall Inc., 1998.
5. Mamlouk, M.S. and Zaniewski, J.P., "Materials for Civil and Construction Engineers", Prentice Hall Inc., 1999.
6. Santhakumar.A.R., "Concrete Technology", Oxford University press, New
7. Shan Somayaji, "Civil Engineering Materials", Prentice Hall Inc., 2001
8. Shetty M.S, "Concrete Technology: Theory and Practice", S.Chand & Company Ltd., 2005.

Open e-Resource:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 101930103	Subject Title: Project Formulation and Appraisal
Pre-requisite: None	

SEMESTER-I

Course Objective:

1. To make students taking this course be able to understand about the project formulation
2. To be able to work out the costing of construction projects
3. To understand the project be able to do the appraisal of Projects with the inherent risks
4. To find effective options for develop the finance model of Project through its life cycle
5. To identify areas where private sector participation can be motivated

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	PROJECT FORMULATION: Project – Concepts – Capital investments - Generation and Screening of Project Ideas - Project identification – Preliminary Analysis, Market, Technical, Financial, Economic and Ecological - Pre- Feasibility Report and its Clearance, Project Estimates and Techno-Economic Feasibility Report, Detailed Project Report – Different Project Clearances required.	12	30	
2	PROJECT COSTING: Project Cash Flows – Time Value of Money – Cost of Capital.	05	05	
3	PROJECT APPRAISAL: NPV – BCR – IRR – ARR – Urgency – Pay Back Period – Assessment of Various Methods – Indian Practice of Investment Appraisal – International Practice of Appraisal – Analysis of Risk – Different Methods – Selection of a Project and Risk Analysis in Practice.	12	30	
4	PROJECT FINANCING: Project Financing – Means of Finance – Financial Institutions – Special Schemes – Key Financial Indicators – Ratios..	04	05	
5	PRIVATE SECTOR PARTICIPATION:	12	30	

	Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Scope of Technology Transfer		
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Course Outcome:

Sr. No.	CO Statement
CO-1	Explain the aspects to be considered when evolving the project life cycle
CO-2	Appreciate the various steps and FEED studies, Identify the factors that will impact the time value of money
CO-3	Prevent losses in project because of smart identification of factors that affect operational expenses during formulation of the project
CO-4	Relate various risks when appraisal of a project at various stages
CO-5	Gain understanding of the various factors that affect the financing structure of a project and identify suitable financing models and financing agencies
CO-6	Understand implication of various infrastructure development models, Be aware of practice of industry

TEXTBOOKS:

1. Construction Planning, Equipment, and Methods, Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt and Aviad Shapira, McGraw-Hill Education, 2018, Ninth Edition. Department of Civil Engineering M Tech (CTM) Scheme and Syllabi w.e.f. 2021-22
2. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
3. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.
4. Prasanna Chandra, (2014), Projects -Planning Analysis Selection Implementation & Review, Fourth Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.

REFERENCES:

1. ACI Report 440.2R-02, "Guide for the design and construction of externally bonded RP systems for strengthening concrete structures", American Concrete Institute, 2002.
2. Aitkens, "High Performance Concrete", McGraw Hill, 1999
3. Ashby, M.F. and Jones.D.R.H.H. "Engineering Materials 1: An introduction to Properties, applications and designs", Elsevier Publications, 2005.
4. Deucher, K.N, Korfiatis, G.P and Ezeldin, A.S, "Materials for civil and Highway Engineers", Prentice Hall Inc., 1998.
5. Mamlouk, M.S. and Zaniewski, J.P., "Materials for Civil and Construction Engineers", Prentice Hall Inc., 1999.
6. Santhakumar.A.R., "Concrete Technology", Oxford University press, New
7. Shan Somayaji, "Civil Engineering Materials", Prentice Hall Inc., 2001
8. Shetty M.S, "Concrete Technology: Theory and Practice", S.Chand & Company Ltd., 2005.

**Open e-Resource:**

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Subject Code: 101930111	Subject Title: Construction Project Management
Pre-requisite: General Concept of Construction Practices and Civil Engineering.	

SEMESTER-I

Course Objective:

1. To study and comprehend the principles of planning, scheduling, and controlling the costs and quality associated with construction projects.
2. This includes ensuring safety throughout the construction process, organizing project information efficiently, and utilizing it effectively.
3. By understanding these concepts, one can manage construction projects more successfully, maintaining high standards and meeting deadlines.
4. Additionally, it involves analyzing the methodologies for coordinating various construction activities to ensure seamless project execution.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Construction Projects and its Management Construction projects & their features, Requirements and types of a project organization, Management of Construction project and its purpose. Construction Project Management –Project Life cycle from Pre-Contract to Closure, Initiation, Planning, Execution, Monitoring & control and closing, factors influencing project performance, Project Team and their roles, Iron triangle Project Scope, Time& cost, Project Strategy, Project Feasibility.	10	15
2	Construction Project Planning Planning Development of Construction Plans, Need of sound Planning, Scheduling, principles and techniques, Work Tasks, Defining precedence relationships among activities, Estimating activity durations, Identifying the resource and estimation of resource requirements for the work activities.	09	15
3	Construction Project Scheduling Scheduling and Monitoring	14	40

	Critical Path Method, Scheduling Calculations of Event time/Activity time, Critical activities and critical paths, Activity floats , Float ,AOA and AON Networks, , Time grid diagrams & resource allocation, Project updating, Time-cost optimization of networks, Cost control and monitoring using CPM networks, Network scheduling with limited resources, resource allocation, smoothing and levelling, updating the network, risk of schedule delays, missing milestone deliverables and its impact.		
4	Construction Project Planning & Scheduling Techniques Work Breakdown Structure, CPM, PERT & GERT, LOB & LADDER Networks, Precedence Networks, Computer Application for scheduling and planning, Introduction of Primavera and Microsoft Project software and Worksheet based project planning and scheduling.	12	30

Course Outcome:

Sr. No.	CO Statement
CO-1	Understand the concept of planning, scheduling, cost and quality control during construction, organization and use of project information necessary for construction project.
CO-2	Apply the principles of planning, scheduling and management for construction activities and entire construction project for effective and measurable outcomes.
CO-3	Demonstrate an ability to develop the various components of project controls including planning, scheduling, cost and resource management.

TEXTBOOKS:

1. Calin M. Popescu, Chotchai Charoenngam, "Project Planning, Scheduling and Control in Construction: An Encyclopaedia of terms and Applications", Wiley, New York, 1995.
2. Chitkara, K.K. "Construction Project Management: Planning, Scheduling and Control", McGraw-Hill Publishing Company, New Delhi, 1998.
3. Harris, F, McCaffer, R and Edum-Fotwe, F (2006) Modern Construction Management, sixth edition, Blackwell Publishers.
4. Jha, K N (2011) Construction Project Management, First Edition, Pearson Publishers.

REFERENCES:

1. Knutson, K, Schexnayder, C J, Fiori, C. and Mayo, R E (2013) Construction Management Fundamentals, MCGraw Hill Publishers.
2. Mubarak, S (2010) Construction project scheduling and control, second edition, John Wiley and sons.
3. Willis, E. M., "Scheduling Construction Projects", John Wiley & Sons, 1986.

Open e-Resource:

1. Microsoft Project
2. Primavera
3. www.nptel.iitm.ac.in/courses/

List of :Practicals:

1. Work breakdown structure (WBS)
2. Development of Activity logical Relations
3. Bar charts & Milestone Chart
4. CPM network developments (AOA & AON)
5. CPM network analysis (Event times/activity times/floats)
6. Project updating
7. Project crashing (time-cost optimization)
8. PERT network analysis
9. Line of Balance Method (LOB)
10. Software Based Work Assignment (To be issued at the beginning and to be developed throughout)



GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management
Semester: I

Subject Code: 101930111	Subject Title: Construction Personnel Management
Pre-requisite: None	

Course Objective:

1. To study the various aspects of manpower management such as man power planning, organization, human relations, welfare and development methods in construction.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	MANPOWER PLANNING: Manpower Planning process , Organising, Staffing, directing, and controlling – Estimation, manpower requirement – Factors influencing supply and demand of human resources – Role of HR manager – Personnel Principles.	09	20
2	ORGANISATION: Requirement of Organisation – Organisation structure – Organisation Hierarchical charts – Staffing Plan - Development and Operation of human resources - Managerial Staffing – Recruitment – Selection strategies – Placement and Training.	09	20
3	MANPOWER PLANNING: Manpower Planning process , Organising, Staffing, directing, and controlling – Estimation, manpower requirement –	09	20



	Factors influencing supply and demand of human resources – Role of HR manager – Personnel Principles.		
4	WELFARE MEASURES: Compensation – Safety and health – GPF – EPF – Group Insurance – Housing - Pension – Laws related to welfare measures.	09	20
5	MANAGEMENT AND DEVELOPMENT METHODS: Wages and Salary, Employee benefits, Employee appraisal and assessment – Employee services – Safety and Health Management – Special Human resource problems – Productivity in human resources – Innovative approach to designing and managing organization – Managing New Technologies – Total Quality Management – Concept of quality of work life – Levels of change in the organizational Development – Requirements of organizational Development – System design and methods for automation and management of operations – Developing policies, practices and establishing process pattern – Competency upgradation and their assessment – New methods of training and development – Performance Management.	09	20

Course Outcome:

Sr. No.	CO Statement
CO-1	On completion of this course the students will know various processes in manpower planning, organizational and welfare measures.
CO-2	Identify various construction techniques and their limitations.
CO-3	Analyze productivity and economics in construction techniques.
CO-4	Comprehend modular construction practices
CO-5	Comprehend modular construction practices
CO-6	Identify various construction techniques and their limitations.

List of Textbooks:

1. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
2. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.

List of Reference Books:

1. Title: The Complete Standard Handbook of Construction Personnel Management Author: Carleton Counter II and Jill Justice Coutler, Prentice-Hall, Inc., 1989.
2. Title: Justin Gooderi Longenecker, Management Author: Charles D Pringle: CE Merrill Publishing.
3. Title: Human Relations and Organisational Behaviour Author: Dwivedi R.S. Publisher: Macmillan India Ltd.
4. Title: Personnel Management Author: Memoria, C.B M Publisher: , Himalaya Publishing.





GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management
Semester: I

Subject Code: 101930113	Subject Title: Design of Energy Efficient Buildings
Pre-requisite: None	

Course Objective:

1. To study the design of energy efficient buildings which balances all aspects of energy, lighting, space conditioning and ventilation by providing a mix of passive solar design strategies and to learn the use of materials with low embodied energy.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	INTRODUCTION: Climate adapted and climate rejecting buildings – Heat Transfer – Measuring Conduction – Thermal Storage – Measurement of Radiation – The Green house Effect – Convection – Measuring latent and sensible heat – Psychrometry Chart – Thermal Comfort – Microclimate, Site Planning and Development – Temperature – Humidity – Wind – Optimum Site Locations – Sun Path Diagrams – Sun Protection – Types of Shading Devices – Design responses to energy conservation strategies.	09	20



2	PASSIVE SOLAR HEATING AND COOLING: General Principles of passive Solar Heating – Key Design Elements – Sunspace – Direct gain – Trombe Walls, Water Walls – Convective Air loops – Concepts – Case Studies – General Principles of Passive Cooling – Ventilation – Principles – Case studies – Courtyards – Roof Ponds – Cool Pools – Predicting ventilation in buildings – Window Ventilation Calculations – Room Organization Strategies for Cross and Stack Ventilation – Radiation – Evaporation and dehumidification – Wind Catchers – Mass Effect – Zoning – Load Control – Air Filtration and odor removal.	09	20
3	DAYLIGHTING AND ELECTRICAL LIGHTING: Materials, components and details – Insulation – Optical materials – Radiant Barriers – Glazing materials – Glazing Spectral Response – Day lighting – Sources and concepts – Building Design Strategies – Case Studies – Daylight apertures – Light Shelves – Codal requirements – Day lighting design – Electric Lighting – Light Distribution – Electric Lighting control for day lighted buildings – Switching controls – Coefficient of utilization – Electric Task Lighting – Electric Light Zones – Power Adjustment Factors.	09	20
4	HEAT CONTROL AND VENTILATION: Hourly Solar radiation – Heat insulation – Terminology – Requirements – Heat transmission through building sections – Thermal performance of Building sections – Orientation of buildings – Building characteristics for various climates – Thermal Design of buildings – Influence of Design Parameters – Mechanical controls – Examples. Ventilation – Requirements – Minimum standards for ventilation – Ventilation Design – Energy Conservation in Ventilating systems – Design for Natural Ventilation – Calculation of probable indoor wind speed.	09	20
5	DESIGN FOR CLIMATIC ZONES: Energy efficiency – An Overview of Design Concepts and Architectural Interventions – Embodied Energy – Low Embodied Energy Materials – Passive Downdraft Evaporative Cooling – Design of Energy Efficient Buildings for Various Zones – Cold and cloudy – Cold and sunny – Composite – Hot and dry – Moderate – Warm and humid – Case studies of residences, office buildings and other buildings in each zones – Commonly used software packages in energy efficient building analysis and design - Energy Audit – Certification.	09	20

Course Outcome:

Sr. No.	CO Statement
CO-1	On completion of this course the students will be able to know various components which makes the building energy efficient such as lighting, space conditioning, heat control and energy efficient.



CO-2	Identify various construction techniques and their limitations.
CO-3	Analyze productivity and economics in construction techniques.
CO-4	Comprehend modular construction practices

List of Textbooks:

1. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
2. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.

List of Reference Books:

1. Title: Sun, Wind and Light - Architectural Design Strategies Author: Brown, G.Z. and DeKay, M. Coutler, John Wiley and Sons Inc.
2. Title: Energy - Efficient Buildings Author: Majumdar, M (Ed) : Tata Energy Research Institute, Ministry of Non Conventional Energy Sources.
3. Title: Human Relations and Organisational Behaviour Author: Dwivedi R.S. Publisher: Macmillian India Ltd.
4. Title: Personnel Managemen Author: Memoria,C.B M Publisher: , Himalaya Publishing.



GANDHINAGAR INSTITUTE OF TECHNOLOGY

M. TECH. 2nd SEMESTER

CIVIL ENGINEERING-CONSTRUCTION ENGINEERING & MANAGEMENT

DOC NO: 4061

Subject Code: 10000251	Subject Title: Technical Writing (Audit Course)
Pre-requisite: Basic Language Skills	

Course Objective:

- Technical Writing focuses on planning and preparation of word choices and sentences and focuses on vocabulary building and helps them to be an effective communicator.
- Students will be able to produce a set of documents related to writing in the workplace and will be able to improve their ability to write clearly and accurately.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	0	0	0	0	50	0	0	50

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Planning and Preparation, Word Order, Breaking up long sentences, Structuring	4	10	
2	Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	4	10	
3	Sections of a paper – Title, abstract, introduction, etc. review of the literature, writing - methods, results, discussion, conclusions and final check	6	20	
4	Organization of technical report: Title, Authors, Affiliation, Abstract,	4	20	
5	Three pass reading. Effective communication– Teacher/Student perspective. Listening – Hearing Vs. Listening. Notes Taking. Elevator Pitch. Technical writing.	4	20	
6	Useful phrases and punctuation, in-text citation and bibliography– MLA/APA styles	4	20	

Course Outcome: After completion of this course, student will be able to

- Understand how to improve your writing skills and level of readability.
- Learn about what to write in each section.
- learn various skills necessary that are necessary for doing research.
- Ensure the good quality of paper at very first-time submission.

List of References:



1. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011
2. Day R, How to Write and Publish a Scientific Paper, Cambridge University Press ,2006
3. Raman, Meenakshi and Sangeeta Sharma, “Technical Communication: Principle and Practice”, Oxford University Press.
4. Goldbort R. Writing for Science, Yale University Press, 2006

Open e-Resource:

1. <https://nptel.ac.in/courses/109107172>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management
Semester II

DOC NO: 4061

Subject Code: 101930201	Subject Title: Advanced Construction Engineering and Computing Techniques Laboratory
Pre-requisite: None	

Course Objective:

1. To provide students with a framework that will help them choose the appropriate
2. descriptive statistics in various data analysis situations.
3. To analyse distributions and relationships of real-time data.
4. To apply estimation and testing methods to make inference and modelling techniques for
5. decision making using various techniques including multivariate analysis.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	4	2	0	0	80	20	100

ADVANCED CONSTRUCTION ENGINEERING LABORATORY				
Sr. No.	LIST OF EXPERIMENTS	Total Hours	Weight (%)	
1	Mix design of concrete as per IS, ACI & BS methods for high performance concrete.	2	20	
2	Flow Characteristics of Self Compacting concrete.	2	20	
3	Effect of minerals and chemical admixtures in concrete at fresh and hardened state with relevance to workability, strength and durability.	2	20	
4	NDT on hardened concrete - UPV, Rebound hammer and core test.	2	20	
5	Permeability tests on hardened concrete – Demonstration	2	20	

ADVANCED COMPUTING TECHNIQUES LABORATORY			
Sr. No.	LIST OF EXPERIMENTS	Total Hours	Weight (%)
1	Quantity takeoff, Preparation and delivery of the bid or proposal of an engineering construction project.	2	20
2	Design of a simple equipment information system for a construction project.	2	20
3	Scheduling of a small construction project using Primavera scheduling systems including reports and tracking.	2	20
4	Scheduling of a small construction project using tools like MS project scheduling systems including reports and tracking.	2	20
5	Simulation models for project risk analysis.	2	20

Course Outcome:

Sr. No.	CO Statement
CO-1	On completion of this laboratory course students will be able to test the concrete mixes designed as per IS, ACI and BS methods.
CO-2	Students will also be able to know various tests on hardened concrete.
CO-3	On completion of this laboratory course the students will be able to do the scheduling of constructions projects using tools primavera and MS projects.

TEXTBOOKS:

1. Construction Planning, Equipment, and Methods, Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt and AviadShapira, McGraw-Hill Education, 2018, Ninth Edition. Department of Civil Engineering M Tech (CTM) Scheme and Syllabi w.e.f. 2021-22
2. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.
3. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.
4. Prasanna Chandra, (2014), Projects -Planning Analysis Selection Implementation & Review, Fourth Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.

REFERENCES:

1. ACI Report 440.2R-02, "Guide for the design and construction of externally bonded RP systems for strengthening concrete structures", American Concrete Institute, 2002.
2. Aitkens, "High Performance Concrete", McGraw Hill, 1999
3. Ashby, M.F. and Jones.D.R.H.H. "Engineering Materials 1: An introduction to Properties, applications and designs", Elsevier Publications, 2005.
4. Deucher, K.N, Korfiatis, G.P and Ezeldin, A.S, "Materials for civil and Highway Engineers", Prentice Hall Inc., 1998.

5. Mamlouk, M.S. and Zaniewski, J.P., "Materials for Civil and Construction Engineers", Prentice Hall Inc., 1999.
6. Santhakumar.A.R., "Concrete Technology", Oxford University press, New
7. Shan Somayaji, "Civil Engineering Materials", Prentice Hall Inc., 2001
8. Shetty M.S, "Concrete Technology: Theory and Practice", S.Chand & Company Ltd., 2005.

Open e-Resource:

1. <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management
Semester II

Subject Code: 101930202	Subject Title: Advanced Construction Techniques
Pre-requisite: None	

Course Objective:

- To study and understand the latest construction techniques applied to engineering construction for sub structure, super structure, special structures, rehabilitation and strengthening techniques and demolition techniques.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	SUB STRUCTURE CONSTRUCTION: Box jacking - Pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - Piling techniques - Driving well and caisson - sinking cofferdam - cable anchoring and grouting - Driving diaphragm walls, Sheet piles - Laying operations for built up offshore system - Shoring for deep cutting - Large reservoir construction - well points - Dewatering for underground open excavation.	12	25

2	SUPER STRUCTURE 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 – Erection techniques of tall structures, Large span structures – launching techniques for heavy decks – in-	12	25
	situ prestressing in high rise structures, Post tensioning of slab- aerial transporting – Handling and erecting lightweight components on tall structures.		
3	CONSTRUCTION OF SPECIAL STRUCTURES: Erection of lattice towers - Rigging of transmission line structures – Construction sequence in cooling towers, Silos, chimney, sky scrapers - Bow string bridges, Cable stayed bridges – Launching and pushing of box decks – Construction of jetties and break water structures – Construction sequence and methods in domes – Support structure for heavy equipment and machinery in heavy industries – Erection of articulated structures and space decks.	12	25
4	REHABILITATION AND STRENGTHENING TECHNIQUES: Seismic retrofitting - Strengthening of beams - Strengthening of columns - Strengthening of slab - Strengthening of masonry wall, Protection methods of structures, Mud jacking and grouting for foundation – Micro piling and underpinning for strengthening floor and shallow profile - Sub grade water proofing, Soil Stabilization techniques	05	20
5	DEMOLITION: Demolition Techniques, Demolition by Machines, Demolition by Explosives, Advanced techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety precaution in Demolition and Dismantling.	04	05

Course Outcome:

Sr. No.	CO Statement
CO-1	Identify various construction techniques and their limitations.
CO-2	Analyze productivity and economics in construction techniques.
CO-3	Comprehend modular construction practices
CO-4	Comprehend modular construction practices

TEXTBOOKS:

1. Construction Planning, Equipment, and Methods, Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt and AviadShapira, McGraw-Hill Education, 2018, Ninth Edition. Department of Civil Engineering M Tech (CTM) Scheme and Syllabi w.e.f. 2021-22
2. Construction Equipment and Management, S. C. Sharma, Khanna Publishing, 2019, First Edition.

3. Fundamentals of Building Construction: Materials and Methods, Edward Allen and Joseph Iano, Wiley, 2019, Seventh Edition.
4. Prasanna Chandra, (2014), Projects -Planning Analysis Selection Implementation & Review, Fourth Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.

REFERENCES:

1. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984
2. Patrick Powers. J., "Construction Dewatering: New Methods and Applications", John Wiley & Sons, 1992.
3. Peter.H.Emmons, "Concrete repair and maintenance illustrated", Galgotia Publications Pvt. Ltd., 2001.Press, 2008.
4. Robertwade Brown, "Practical foundation engineering hand book", McGraw Hill Publications, 1995.
5. Sankar, S.K. and Saraswati, S., "Construction Technology", Oxford University.

Open e-Resource:

- 1 . <https://nptel.ac.in/courses/105/103/105103093/>
2. https://onlinecourses.nptel.ac.in/noc19_ce30/preview
3. <https://www.pmi.org.in>
4. <https://www.pma-india.org>

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Semester II

Subject Code: 101930203	Subject Title: Construction Planning, Scheduling and Control
Pre-requisite: None	

Course Objective:

- Understand the various management techniques for successful completion of construction projects
- Understand the effect of management for project organization.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Introduction: Construction Projects- Concept, Project Categories, Characteristic of projects, project life cycle phase. Project Management- Project Management Function, Role of Project Manager. Organizing For Construction - Principles of organization, type of organization structure	12	25	
2	Project Feasibility Reports: Introduction, Significance in feasibility report- Technical analysis, financial analysis, Economic analysis, Ecological analysis, Flow diagram for feasibility study of a project. Project planning Scope: Planning Process, Objectives, Types of Project plans, Resource Planning Process.	12	25	

3	Bar Charts, Work Breakdown Structure, Time estimates, Applications of CPM and PERT A-O-N Network-Logic and Precedence diagrams, advantages, Drawing A-O-N network from A-O-A network and related problems	12	20
4	Time Cost relationship: Direct and indirect cost, step in optimization of cost, related problem. Allocation of resources: Histogram, Resource smoothening, Resource leveling and related problem. Project updating using CPM network and related numerical problems.	05	20
5	Scheduling, Monitoring and Updating. Line of Balance Scheduling. Resource Planning-Leveling and Allocation. Introduction to Building Information Model (BIM).	04	10

Course Outcome:

Sr. No.	CO Statement
CO-1	Apply knowledge of Construction Management on construction projects.
CO-2	Analyze project scheduling using various techniques.

TEXTBOOKS:

1. Chitkara, K.K. “Construction Project Management: Planning, Scheduling and Control”, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2. Choudhury S , “Project Management”, McGraw-Hill Publishing Company, New Delhi, 1988.
3. Srinath L.S, “PERT and CPM”, East West Press Pvt Ltd New Delhi.
4. Current Literature

REFERENCES:

1. Frank Harris and Roland McCaffer, “Modern Construction Management”- 4th Ed Blackwell Science Ltd.
2. Chris Hendrickson and Tung Au, “Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders”, Prentice Hall, Pittsburgh, 2000.

Open e-Resource:

1. <https://nptel.ac.in/courses/105106149>



GANDHINAGAR UNIVERSITY

(Established and Incorporated Under Gujarat Private Universities Act 2009, Amendment: Guj. Act No. 7 of 2022)

GANDHINAGAR INSTITUTE OF TECHNOLOGY

Master of Technology – Construction Engineering & Management Semester II

DOC NO: 4061

Subject Code: 101930204	Subject Title: Research Review & Seminar
Pre-requisite: Zeal to learn	

Course Objective:

- To Learn and present the research in public to a general audience.
- Students would receive regular feedback and advice on their research projects in specific field.
- The progress of our students would be regularly monitored and they would receive formal, regular feedback.
- A high rate of participation in such a visible research-oriented activity could help build the intellectual "atmosphere" of the department.
- Increased knowledge of one another's research would facilitate intergroup interactions.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	6	3	0	0	0	100	100

Content:

This course will help the scholars for their dissertation phase by motivation and encouraging in quality research. Research review will help them to boost their skills and widen their horizon of thinking for the domain. Research review and seminar is a hands-on course designed to impart soft skills by the foundational methods and techniques for academic research in construction technology and management. Scholars will examine to the main components of a research framework i.e., problem definition, research design, data collection, ethical issues in research, report writing, and presentation. Once equipped with this knowledge, scholars would be well-placed to conduct disciplined research in field of construction technology and management. In addition to their application in an academic setting, many of the methodologies discussed in this course would be similar to those deployed in professional research environments. The details of course includes sampling techniques, research designs and techniques of analysis which will be helpful in designing of components and performing experiments in areas of construction technology and management. Students will have a semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the latest literature available. End semester presentation should be done along with the report and the methodology adopted.



GANDHINAGAR UNIVERSITY

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involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution

Course Outcome:

At the end of the course, the student will be able to:

1. To develop understanding of the basic framework of research review process and able to write technical report.
2. To identify various sources of information for literature review and data collection.
3. Study and develop elicit, analyze, and document skills in the form of a requirements specification.
4. Evaluate traceability between requirements, design, and implementation artefacts for the research work.
5. Develop skills to present and defend their work in front of a technically qualified audience.

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

SEMESTER II

Subject Code: 101930206	Subject Title: Economics and Finance Management in Construction
Pre-requisite: None	

Course Objective:

This course bring about an exposure to construction economics, financing and accounting methods and their usefulness in controlling construction projects.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Engineering Economics: Basic principles – Time value of money, Quantifying alternatives for decision making, Cash flow diagrams, Equivalence- Single payment in the future (P/F, F/P), Present payment compared to uniform series payments (P/A, A/P), Future payment compared to uniform series payments (F/A, A/F), Arithmetic gradient, Geometric gradient.	11	25
2	Comparison of Alternatives: Present, future and annual worth method of comparing alternatives, Rate of return, Incremental rate of return, Break-even comparisons, Capitalized cost analysis, Benefit-cost analysis.	11	25
3	Accounting Process: Depreciation, Inflation and Taxes: Depreciation, Inflation, Taxes.	04	10

4	Equipment Economics: Equipment costs, Ownership and operating costs, Buy/Rent/Lease options, Replacement analysis.	06	15
5	Cost Estimating: Types of Estimates, Approximate estimates – Unit estimate, Factor estimate, Cost indexes, Parametric estimate, Life cycle cost.	04	10
6	Financial Management: Construction accounting, Chart of Accounts, Financial statements – Profit and loss, Balance sheets, Financial ratios, Working capital management.	06	15

Course Outcome:

Sr. No.	CO Statement
CO-1	Prepare income, profit and loss statements and implement construction accounting
CO-2	Evaluate construction project economics, cost-benefit analysis and breakeven analysis.
CO-3	Analyze and evaluate construction risks and uncertainties.
CO-4	Understand the impact of inflation, taxation, depreciation, Financial planning, working capital management, budgeting and control, economic basis for replacement.

REFERENCES:

- Blank, L. T. and Tarquin, A. J., “Engineering Economy”, Fourth Edition, WCB/McGraw-Hill, 1998.
- Bose, D. C., “Fundamentals of Financial management”, 2nd ed., PHI, New Delhi, 2010.
- Boyer, C. B. and Merzbach, U. C., “A History of Mathematics”, 2nd ed., John Wiley & Sons, New York, 1989.
- Gould, F. E., “Managing the Construction Process”, 2nd ed., Prentice Hall, Upper Saddle River, New Jersey, 2002.
- Gransberg, D. G., Popescu, C. M. and Ryan, R. C., “Construction Equipment Management for Engineers, Estimators, and Owners, CRC/Taylor & Francis, Boca Raton, 2006.
- Harris, F. , McCaffer, R. and Edum-Fotwe, F., “Modern Construction Management”, 6th ed., Blackwell Publishing, 2006.
- Jha, K. N., “Construction Project Management, Theory and Practice”, Pearson, New Delhi, 2011.
- Newnan, D. G., Eschenbach, T. G. and Lavelle, J. P., “Engineering Economic Analysis”, Indian Edition, Oxford University Press, 2010.

Open e-Resource:

- <http://www.nptel.ac.in/courses/>

List of Suggested Experiments/ Tutorials:

- Tutorial work shall consist of presentations/problems / preparation of learning material based on the above topics.

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

SEMESTER II

Subject Code: 101930207	Subject Title: Management Information Systems
Pre-requisite: None	

Course Objective:

This course is designed to provide a broad overview of the issues technology and general managers face when managing information systems.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Introduction to MIS: The Need for Information Systems: Digital Convergence and the changing Business Environment; Information and Knowledge Economy; Contemporary Approach to IS and Management Challenges Dissemination of Information, History of Management Information Systems, Advantages and Disadvantages, Management information systems in construction industry, Types of Information Systems in the Organization; Information Technology and Strategy	08	20
2	Application of MIS in project management: Computerized project management systems, use of automated programs for planning, scheduling, estimating and controlling construction projects, data processing and applications in pricing.	08	20

3	Application of MIS in Construction Industry: Tendering, scheduling and cost control system, simulation of construction operations, internet technology, web applications in construction, use of project planner software.	08	20
4	Integrated construction Management Information: System-Project Management Information System-Functional Areas, Finance, Marketing, Production, Personnel-Levels, DSS, EIS, ESS & MIS - Comparison, Concepts and Knowledge Representation-Managing International Information System.	08	20
5	System Audit: System. Software Engineering Qualities-Design-Production, Service, Software Specification, Software metrics, Software Quality assurance-Systems Methodology-Objectives-Time and Logic, Knowledge and Human Dimension- Software Life Cycle Models-Verification and Validation.	08	20

Course Outcome:

Sr. No.	CO Statement
CO-1	Students would be able to comprehend types of Information Systems.
CO-2	Students would be able to schedule and control construction project in MIS environment.
CO-3	Students would be able to apply concepts of integrated construction management information.
CO-4	Students would be able to comprehend concepts of system audit.

REFERENCES:

1. Management Information Systems – Organization and Technology by Kenneth C Laudon and Jane Price Laudon, Prentice Hall, 1996.
2. Management Information System: Conceptual Foundations by Gordon B. Davis, Structure and Development, McGraw Hill, 1974.
3. Case Series for Management Information Systems by Joyce J Elam, Simon and Schuster, Custom Publishing, 1996.
4. Decision Support for managers by Ralph H Sprague and Huge J Watson, Prentice Hall, 1996.
5. Software Quality assurance and Management by Michael W Evans and John J Marciniah, John Wiley And Sons , 1987.
6. Measuring Software Design Quality by Card and Glass, Prentice Hall, 1990.
7. Management Information Systems by Sadagopan S., Phi Learning, 1997
8. Corporate Information Strategy and Management: Text and Cases by Applegate, Lynda M., et al

Open e-Resource:

1. <http://www.nptel.ac.in/courses/>

List of Suggested Experiments/ Tutorials:

1. Tutorial work shall consist of presentations/problems / preparation of learning material based on the above topics.

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Semester II

Subject Code: 101930208	Subject Title: Project Safety Management
Pre-requisite: None	

Course Objective:

- Understand the elements of quality planning and the implication.
- Become aware of objectives and advantage of quality assurance.
- Study the relationship between quality and safety management.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Construction Organization Types of organization, inspection, control and enforcement, quality management systems and method, responsibilities and authorities in quality assurance and quality control; architects, engineers, contractors, and consultants, quality circle	10	25
2	Safety and Health in Construction Safety and accidents in construction projects, theories of accident causation, health and illness related with construction works, cost of construction injuries, safety risk analysis and control, personal protective equipment, occupational and safety hazard assessment, legal implications, OSH Management System	10	25

3	Safety Programme and Contractual obligations Problem areas in construction safety, elements of an effective safety programme, job site safety assessment, safety meetings, and safety incentives Safety in construction contracts, substance abuse, safety record keeping.	11	25
4	Decision for Safety 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 and workers compensation	11	25

Course Outcome:

Sr. No.	CO Statement
CO-1	Understand different aspects of quality and related tools.
CO-2	Importance of safety and health in construction
CO-3	Understand importance of various aspects of safety during execution of construction activities
CO-4	Apply to principles and theories of safety to construction projects.

TEXTBOOKS/ REFERENCES:

1. Yang, K. and El-Haik, B S (2009). Design for Six Sigma, Tata McGraw Hill.
2. McCabe, S (1998) Quality improvement techniques in construction, Pearson Education.
3. Rumane, A R (2011) Quality management in construction projects, CRC Press, T&F.
4. Rumane, A R (2013) Quality tools for managing construction projects, CRC Press, T&F.
5. Juran J M and Gryna, F M (1993) Quality Planning and Analysis: From Product Development through Use, 3 rd Edition, and Tata McGraw Hill.
6. Levitt, R E and Samelson, Nancy Morse (1993) Construction Safety Management 2nd Edition, Wiley Publisher.
7. Goetsch. David L (2014) Occupational Safety and Health for Technologists, Engineers and Managers, 8th Edition, New Jersey: Pearson. Edu. Inc.
8. Hinzle, J W (1997) Construction safety, Prentice Hall.
9. MacCollum, D V (1995) Construction safety planning, John Wiley & sons.
10. MacCollum, D V (2007) Construction safety engineering principles - designing and managing safer job sites, Tata McGraw Hill.
11. Holt, A S J (2005) Principles of construction safety, Blackwell Publishers.

Open e-Resource:

- 1 <https://archive.nptel.ac.in/courses/105/102/105102206/>



GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology - Construction Engineering & Management
Semester II

Subject Code: 101930209	Subject Title: Quality Control and Assurance in Construction
Pre-requisite: None	

Course Objectives:

- To equip students with the knowledge and skills necessary to implement effective quality control and assurance practices in construction projects, ensuring compliance with standards and enhancing project performance.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Construction Organization: Types of Organization-Inspection, Control and enforcement-Quality Management Systems and Method- Responsibilities and authorities in Quality assurance and Quality control of Architects, Engineers, Contractors, and Consultants,	8	10
2	Quality Management: Quality policy, Objectives and methods in construction industry- Consumer satisfaction-Ergonomics-Time of Completion-Statistical Tolerance-Taguchi's concept of quality-Codes and standards-Documents-Contract and construction programming-Inspection procedures-Processes and products-Total QA / QC Programme and cost implication	8	20
3	Quality Assurance and Control: Objectives-Regularity agent-Owner, Design, Contract And Construction Oriented Objectives, Methods-Techniques and Needs Of QA/QC-Different Aspects of Quality-Appraisals, Factors Influencing Construction Quality-Critical, Major Failure Aspects And Failure Mode Analysis. Standardization: Selection Of New Materials-Influence Of Drawings, Detailing And Specification Based On Codal Provisions	12	25



4	Construction Accidents: Injury And Accidents-Definitions-Unsafe Act -Unsafe Condition- Causes, Investigations And Prevention Of Accidents, Hazards, Type Of Industrial Hazards-Nature, Causes And Control Measures, Hazard Identifications And Control Techniques -HAZOP, FMEA, FMECA. Cost of Construction Injuries-Legal Implications Safety Programmes: Introduction to the Concept of Safety- Need- Safety Provisions in the Factory Act-Laws related to the Industrial Safety-Measurement Of Safety Performance, Safety Audit, Problem Areas In Construction Safety-Elements of an Effective and Safety Programme-Job site Safety assessment- Safety Meetings-Safety Incentives	10	25
5	Safety Organization: Safety Policy, Safety Record Keeping, 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	8	20

Course outcomes:

After successful completion of course the students should be able to:

1. Apply Concepts Of Quality And Assurance And Control Techniques In Construction.
2. Develop Quality Management Systems.
3. Perform Occupational & Safety Hazard Assessment.
4. To Prepare Safety And Health Programs.
5. Develop Safety Culture in Construction firms

Reference Books:

1. James, J.O Brien, "*Construction Inspection Handbook - Quality Assurance and Quality Control* ", Van Nostrand, New York, 1989.
2. Kwaku A., Tenah and Jose M.Guevera, "*Fundamental of Construction Management and Organization* ", Prentice Hall of India, 1995.
3. Juran Frank, J.M. and Gryna, F.M. "*Quality planning and Analysis* ", Tata McGraw Hill, 1982.
4. Hutchins. G., "*ISO 9000* ", Viva Books, NewDelhi, 1993.
5. Clarkson H. Oglesby, "*Productivity Improvement in Construction* ", McGraw Hill 1989.
6. John L.Ashford, "*The Management of Quality in Construction* ", E & F.N Spon, New York, 1989.
7. Steven McCabe, "*Quality Improvement Techniques in Construction* ", Addisson Wesley Longman Ltd., England, 1998.
8. Jimmy W.Hinze, "*Construction Safety* ", Prentice Hall Inc., 1997.
9. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, "*Construction Safety and Health Management*", Prentice Hall Inc., 2001.

NPTEL/MOOCs:

1. <https://www.coursera.org/specializations/construction-management>
2. <https://nptel.ac.in/courses/105103206>
3. <https://archive.nptel.ac.in/courses/112/102/112102106/>



GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology - Construction Engineering & Management
Semester-II

Subject Code: 101930210	Subject Title: Quantitative techniques in management
Pre-requisite: Basic Mathematics	

Course Objective:

1. To develop Basic skills for quantitative application in business situations.
2. To familiarise students with statistical tools and their applications.
3. To enable students to use statistical software applications to solve business problems.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Mathematics: Elements of Calculus – Functions; concept of limit and continuity, Differentiation; Partial Differentiation; Maxima and Minima of a single variable, two variables and n-variables; Constrained maximization under inequality constraints –'Khun – Tucker' approach. Application of Calculus to management Problems.	10	25
2	Matrix Algebra: Addition, subtraction, and multiplication of matrices; Concept of Determinants and Cramer's Rule; Transposed and Adjoint matrix; Inverse and Rank of a matrix; Application of Matrices to the solution of simultaneous equations and management situations. Algebra: Algebra of sets. Statistics: Measures of Central tendency and dispersions.	10	25
3	Introduction to Probability, Methods of assigning Probability, Structure of Probability, Marginal, Joint and Conditional Probabilities, Addition laws, Multiplication Laws, Probability distributions; Binomial, Poisson, Exponential	11	25



	and Normal Distributions. Correlation- concept, Karl Pearson's correlation coefficient and Spearman's rank correlation.		
4	Introduction to Simple linear regression analysis, determining the lines of regression, Multiple Linear Regression Analysis, Coefficient of determination. Assumptions of Multiple Linear Regression Analysis. Time-series Analysis – Introduction to forecasting, Smoothing techniques. Testing Hypothesis, One sample test, two-sample test, ANOVA, Non-Parametric tests. Statistical software applications.	11	25

Course Outcome:

Sr. No.	CO statement
CO-1	Apply basic mathematics for solving relevant business problems.
CO-2	Select appropriate statistical techniques to summarize and analyze statistical data to solve practical business-related problems.
CO-3	Interpret the relevance of statistical findings for decision making.
CO-4	Communicate the results of statistical analysis in the context of a business problem.
CO-5	Enhance employability.

List of Reference Books:

1. Richard I. Levin and David S. Rubin, Statistics for Management, Pearson publications, latest edition.
2. Ken Black, Business Statistics: Contemporary Decision Making, Wiley publications, latest edition.
3. Naval Bajpai, Business Statistics, Pearson Publications, Latest Edition.
4. Styne and Foster, Statistics for Business: Decision making and analysis Pearson Publications, latest edition.
5. R.S Bhardwaj, Business Mathematics Excel Books. New Delhi, Latest Edition.
6. Sancheti, D.C. and Kapoor, V.K., Business Mathematics S. Chand & Sons, the latest edition.

Open e-Resource:

<https://nptel.ac.in/courses/110/107/110107114/>

List of Suggested Experiments/ Tutorials:

1. Tutorial work shall consist of presentations/problems / preparation of learning material based on the above topics.

GANDHINAGAR INSTITUTE OF TECHNOLOGY
Master of Technology – Construction Engineering & Management

Semester II

Subject Code: 101930211	Subject Title: Resource Management and Control in Construction
Pre-requisite: Basic understanding of construction technology, planning, and project management principles.	

Course Objective:

- To provide students with comprehensive knowledge and practical skills for effective planning, procurement, utilization, measurement, scheduling, allocation, and control of construction resources including manpower, materials, equipment, time, and cost ensuring efficient and optimized management of construction projects.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	0	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	RESOURCE PLANNING: Resource Planning, Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control, Types of resources, manpower, Equipment, Material, Money, Time.	9	20
2	RESOURCE MANAGEMENT AND UTILISATION: Systems approach in resource management, Characteristics of resources, Resources, Utilization, measurement of actual resources required, Tools for measurement of resources, Labour, Classes of Labour, Cost of Labour, Labour schedule, optimum use Labour.	9	20

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3	MATERIALS AND EQUIPMENT: Material: Time of purchase, quantity of material, sources, Transportation, Delivery and Distribution. Equipment: Planning and selecting by optimistic choice with respect to cost, Time, Source and handling.	9	20
4	TIME: Personnel time, Management and planning, managing time on the project, forecasting the future, Critical path measuring the changes and their effects. Cost control: Cash flow and cost control, objectives of cost, Time and quality.	9	20
5	RESOURCE ALLOCATION AND LEVELLING: Time-cost trade of, Computer application in resource leveling examples, resource list, resource allocation graph, Resource loading, Cumulative cost ETC - Value Management.	9	20

Course Outcome:

Sr. No.	CO Statement
CO-1	Understand and apply principles of resource planning, including procurement, identification, and scheduling of materials, manpower, equipment, money, and time.
CO-2	Analyze and implement systems approaches for effective resource management and utilization, including measurement and optimization of labour resources.
CO-3	Plan and manage materials and equipment requirements, considering procurement timing, sourcing, transportation, and cost-effective equipment selection.
CO-4	Develop skills to manage project time effectively using techniques such as critical path method, forecasting, and applying cost control measures.
CO-5	Apply concepts of resource allocation and leveling, including computer-based tools, to optimize time-cost trade-offs and achieve efficient project execution.

List of Tutorials:

1. Introduction to Resource Planning and Types of Construction Resources
2. Resource Procurement and Identification Techniques
3. Labour Management: Classification, Scheduling, and Optimum Utilization
4. Planning and Management of Materials and Equipment in Construction
5. Time Management and Critical Path Method in Construction Projects
6. Cost Control, Cash Flow, and Quality-Time-Cost Relationship
7. Resource Allocation, Leveling, and Computer Applications in Construction

REFERENCES & TEXTBOOKS:

1. Andrew,D., Szilagg, Hand Book of Engineering Management, 1982.

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2. Glenn, A., Sea's and Reichard.H Clough, Construction Project Management, John Wiley and Sons, Inc. 1979.
3. Harvey, A., Levine, Project Management using Micro Computers, Osborne-McGrawHill C.A. Publishing Co., Inc. 1988.
4. James.A., Adrain ,Quantitative Methods in Construction Management, American Elsevier Publishing Co., Inc., 1973.

Open e-Resource:

1. <https://nptel.ac.in/courses>



GANDHINAGAR INSTITUTE OF TECHNOLOGY

Master of Technology Construction Technology & Management

Subject Code: 101930301	Subject Title: Internal Review-1
Pre-requisite: --	

Course Objective:

1. Initiate independent research through systematic literature review.
2. Identify research problems and formulate a relevant dissertation topic.
3. Align topics with emerging research trends in the respective field.
4. Conduct in-depth analysis and review of existing methods.
5. Establish a structured research foundation for further dissertation development.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	4	2	0	0	0	100	100

Course Outcomes (COs):

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

1. Understand the chosen research topic and define its relevance and associated challenges.
2. Identify and interpret quality literature from reputed journals to validate the problem statement.
3. Conduct a comparative review of existing methods and highlight research gaps or scope for improvement.
4. Evaluate previous approaches using relevant datasets and appropriate performance metrics.
5. Propose a hypothesis or research direction with suitable algorithms, methods, or modeling approaches.

Course Structure and Work Plan

- Week 1–2: Finalization of research domain and title approval in consultation with guide.
- Week 3–5: Extensive literature survey (minimum 20 papers, including 10 recent journal articles).
- Week 6–8: Identification of research gaps and statement of problem.
- Week 9–11: Comparative analysis of existing methodologies.
- Week 12–14: Initial data collection, feasibility study or conceptual framework.
- Week 15–16: Preparation of draft report and internal presentation.

Deliverables:

1. Synopsis/Concept note approved by faculty guide
2. Literature review summary with annotated bibliography
3. Problem statement and research objectives
4. Comparative analysis table or benchmarking matrix
5. Internal presentation before a departmental review panel
6. Progress report (typed and signed by guide)


Evaluation Components:

Component	Weightage (Marks)
Literature Review Quality	15
Clarity of Problem Statement	10
Identification of Research Gap	10
Comparative Analysis / Review Matrix	10
Presentation and Communication	15
Viva by Panel / Review Committee	40
Total	100



GANDHINAGAR INSTITUTE OF TECHNOLOGY

Master of Technology Construction Technology & Management

Subject Code: 101930302	Subject Title: Dissertation Phase-1
Pre-requisite: --	

Course Objective:

1. To enable students to independently identify, analyze, and define a research problem in their chosen engineering domain, applying relevant analytical and/or experimental methodologies.
2. To conduct a comprehensive literature review, establish research objectives, define the scope, and outline the preliminary work for the dissertation project.
3. To facilitate the development of a structured research report, documenting the findings, methodology, and analysis, while proposing solutions and future work based on the project's results.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	28	14	0	0	100	0	100

Course Outcomes (COs):

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

1. Choose a domain of project work related to their engineering specialization.
2. Discover appropriate literature and define the objectives & scope of the project work.
3. Solve the designated problem through analysis, design, and/or experimentation.
4. Create and discuss the project report.

Syllabus:

The Dissertation Phase-1 is designed to train students in independently analyzing and addressing problems in their engineering field. The project may involve analytical and/or experimental work, focusing on the latest advancements in the chosen engineering domain.

The project report should include:

- Objective of study and scope of work.
- Critical literature review related to the project.
- Preliminary work conducted in the domain, including analytical and/or experimental components.



GANDHINAGAR INSTITUTE OF TECHNOLOGY

Master of Technology Construction Technology & Management

Subject Code: 101930401	Subject Title: Internal Review-2
Pre-requisite: --	

Course Objective:

1. Initiate students into independent research with a focus on data collection, evaluation, and hypothesis testing.
2. Guide students in applying methodologies, validating solutions, and evaluating performance.
3. Enable students to communicate research outcomes effectively.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	4	2	0	0	0	100	100

Course Outcomes (COs):

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

1. Apply ethical standards in data collection and analysis.
2. Test and validate hypotheses using qualitative/quantitative methods.
3. Evaluate methodologies and solutions using performance metrics.
4. Analyze experimental data and derive meaningful conclusions.
5. Present and communicate research outcomes clearly.

Course Structure and Work Plan

- Week 1–2: Complete data collection and hypothesis testing.
- Week 3–6: Validate methodology and perform comparative analysis.
- Week 7–9: Analyze experimental data and finalize conclusions.
- Week 10–12: Prepare final report and presentation.

Deliverables:

1. Final Research Report: Document methodology, analysis, results.
2. Presentation Slides: Showcase research findings and methodology.
3. Experimental Data: Include experiments, analysis, and performance evaluation.
4. Internal Presentation: Final presentation for internal review.

Evaluation Components:

Component	Weightage (Marks)
Literature Review & Problem Statement	20
Hypothesis & Methodology Validation	25
Experimental Work & Data Analysis	30



Final Report & Presentation	25
Total	100



GANDHINAGAR INSTITUTE OF TECHNOLOGY

Master of Technology Construction Technology & Management

Subject Code: 101930402	Subject Title: Dissertation Phase-2
Pre-requisite: --	

Course Objective:

1. Independently execute the identified research problem, applying advanced analytical and experimental methodologies.
2. Design a comprehensive experimental or simulation setup to validate the research hypothesis.
3. Complete a detailed analysis of the results, interpret the findings, and propose future work based on the outcomes.
4. Prepare a final dissertation report summarizing the work conducted, methodologies used, and outcomes achieved.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
0	0	28	14	0	0	100	0	100

Course Outcomes (COs):

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

1. Select and define a research problem relevant to their field of specialization.
2. Conduct a thorough literature review and establish clear research objectives and scope.
3. Apply suitable analytical, design, or experimental methods to solve the research problem.
4. Compile a comprehensive project report detailing methodology, analysis, conclusions, and recommendations.

Syllabus:

This phase of the dissertation is a continuation of Dissertation Phase-1, where students will:

- Carry forward the preliminary work from Phase-1, refining the problem statement, objectives, and scope.
- Implement advanced methodologies for research, including data collection, modeling, simulation, or experimental setup.
- Analyze data from experiments or simulations and interpret the results within the context of the research problem.
- Propose solutions based on the findings, along with future work recommendations.
- Document the entire research process in a structured dissertation report.