GUJARAT TECHNOLOGICAL UNIVERSITY

English for Research Paper Writing
SUBJECT CODE: 3700001
SEMESTER: I/II

Type of course: Audit course

Prerequisite: -

Rationale: -

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (V)	PA (I)	
2	0	0	0	50	0	0	0	50

Content

Sl. No.	Topic	Teaching Hours	Module Weightage (%)
1.	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	4	17
2.	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction	4	17
3.	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check	4	17
4.	key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature	4	17
5.	skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions	4	16
6	useful phrases, how to ensure paper is as good as it could possibly be the first- time submission	4	16

Reference Books:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Course Outcome:

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

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title
4. Ensure the good quality of paper at very first-time submission

GUJARAT TECHNOLOGICAL UNIVERSITY

Disaster Management
SUBJECT CODE: 3700002
SEMESTER: I/II

Type of course: Audit course

Prerequisite: -

Rationale: -

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (V)	PA (I)	
2	0	0	0	50	0	0	0	50

Content

Sl. No.	Topic	Teaching Hours	Module Weightage (%)
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: 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.	4	16
6	**Disaster Mitigation**	4	16

	Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.		

Reference Books:

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

Course Outcome:

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

1. learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response
2. critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations
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

GUJARAT TECHNOLOGICAL UNIVERSITY
Master of Engineering
Subject Code - 3720001
Semester II
Subject Name: Mini Project with Seminar

Type of course: Core

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
0	0	4	2	0	0	0	100	100

Content:

A mini project requires comparatively less time than major projects. They are comparatively simpler and have shorter duration. Mini Project helps students to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. Mini Project can help them to boost their skills and widen their horizon of thinking. It will act like a beginners guide to undertake the major project/dissertation during the final year and will ensure preparedness of students to undertake major projects/dissertation. Students will be required to select the topic relevant to their specialization and that has value addition. Students will get an opportunity to work in actual industrial environment if they opt for internship. Based on the selected topic student will also prepare seminar report based on the literature survey

Mini Project will have mid semester presentation and end semester presentation. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available. End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions highlighting individuals' contribution. Continuous assessment of Mini Project at Mid Sem and End Sem will be monitored by the departmental committee.

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

1. Identify engineering problems reviewing available literature.
2. Study different techniques used to analyze complex systems.
3. Solve a live problem using software/analytical/computational tools and present solution by using his/her technique applying engineering principles.
4. Learn to write technical reports and develop skills to present and defend their work in front of technically qualified audience.

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721403

Construction & Contract Management

2nd SEMESTER

Type of Course: Core

Prerequisite: NIL

Rationale: students may be able:

1. To understand in detail the process of estimation of a project, procedure related to tenders for their execution, contractual conditions applicable, contract administration for successful execution and dispute resolution.
2. To impart the knowledge of legal issues related to contracts including Contract Act, Arbitration and Conciliation Act.
3. To get exposure of practical cases related to contract conditions and its implications in real projects

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.	% Weightage
1	**Estimation** Project cost estimation, rate analysis, overhead charges - Internationally adopted formulae, detailed estimation, productivity analysis, bidding models and bidding strategies. Owner's and contractor's estimate **Specifications** Definitions, relationship with drawings, necessity/purpose, advantages/ benefits, organization of specification, drafting/writing the specifications, types of specifications	12	36
2	**Tendering** Standard methods as followed by government organizations for tendering purposes, methods followed by contractor organizations for bidding Purposes, Bidding models and bidding strategies.	12	42
3	**Contracts Outline** Contracts, types of construction contracts, Evaluation of contract documents, need for documents, model forms of national and international contracts, roles and functions of participants to the contract, Interpretation of contract in case of inconsistency including case study.	12	22
	Total	**36**	**100**

Reference Book(s)

1. Kharb, K.S. "A Guide to Quantity Surveyors, Engineers Architects and Builders(Vol I: Taking off quantities, Abstracting & Billing; Vol II: Analysis of Prices)" Sushila Publications.
2. Keith Collier, "Construction Contracts" Reston Publishing Company, Inc, Reston,Verginia.
3. Patil, B.S., "Building and Engineering Contracts" Mrs. S.B. Patil, Pune.
4. John Murdoch & Will Hughes, Construction Contracts - Law and Management" Spon Press, Taylor & Francis Group.
5. Gajerai, G.T., "Law relating to Building and Engineering Contracts in India" Butterworths.
6. Govt of India, Central Public Works Department, "CPWD Works Manual 2003."
7. Govt of India, Central Public Works Department, "Analysis of Rates for Delhi (Vol 1 & 2)." and "Delhi Schedule of Rates."
8. Govt of India, Central Public Works Department, "CPWD 7/8: General Conditions of Contracts."
9. Govt of India, Military Engineer Services, "IAFW 2249: General Conditions of Contracts."

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Student should be able to estimate the project cost and prepare the technical specification of each item	34%
CO-2	Student should be able to prepare the tender document.	33%
CO-3	Student should be able to prepare the construction project contract	33%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721404

Project Risk Analysis and Mitigation Techniques

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale: Students would be able:

- To understand different aspects of risk associated with construction projects
- To know mitigation techniques available for construction projects
- To judge best fit mitigation technique for a specific risk under certain circumstances of construction project

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	**General** Importance of Risk, types of risks, quantifiable and unquantified risks, quantifiable and un-quantifiable risks, Micro, market, project level risk analysis approach	07
2	**Risk analysis and Management for projects (RAMP)** Identifying risk events. Probability distribution. Stages in Investment life- cycle; determination of NPV and its standard deviation for perfectly co- related, moderately co-related and un-correlated cash flows. Sensitivity analysis, scenario analysis simulation, decision tree analysis, risk profile method, certainly equivalent method; risk adjusted discount rate method, certainty index method, 3 point estimated method; use of risk prompts, use of Risk Assessment tables, details of RAMP process, utility of Grading of construction entities for reliable risk assessment.	16
3	**Risk Mitigation Techniques** Elimination, reducing, transferring, avoiding, absorbing or pooling. Residual risk, mitigation of unquantified risk. Coverage of risk through CIDC's MOU with the Actuarial Society of India through risk premium Such as (BIP) - Bidding Indemnity Policy (DIMO) - Delay in meeting obligation by client policy, (SOC) - Settlement of claims policy (LOP)- Loss of profit policy (TI). Transit Insurance policy (LOPCE), Loss of performance of construction equipment policy.	16

Reference Books:

1. Industrial Engineering and Management of manufacturing systems. Dr.Surendra Kumar, Satya Prakashan
2. RAMP Handbook by institution of Civil Engineers and the faculty and Institute of Actuaries- Thomas Telford publishing, London.
3. Construction Engineering and Management – Seetharaman
4. Projects Planning analysis selection implementation and Review - Prasanna Chandra
5. Project Risk Analysis and Management Guide by John Barlett, APM Publishing Ltd

Course Outcome:

Sr. No.	CO statement	Marks % weightage
CO-1	Students would able to comprehend risk assessment techniques	20%
CO-2	Students would able to apply various aspects of risk management	40%
CO-3	Students would able to identify risk events and apply risk mitigation techniques	40%

List of Tutorials:

Assignment work is based on above subjectcontents. Assignment work:

1) Net present Worth.
2) Perfectly co related, moderately co-relations & uncorrelated cash flows.
3) Scenario analysis
4) Sensitivity analysis
5) Risk Profile methods
6) Certainty Equivalent Method
7) Risk adjusted discount rate method
8) Certainty index method
9) 3 point estimated method
10) Use of risk assessment tables.

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721413

Construction Resource Management

2nd SEMESTER

Type of Course: Core

Prerequisite: NIL

Rationale: students may be able:

1. To study the management and control of various resources involved in construction.
2. To study the effect of resource planning, labour management, material and equipment, time management, and resource allocation and resource leveling in construction.

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.	% Weightage
1	RESOURCE PLANNING: Mapping of resources, Resource Planning, Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control, Types of resources, manpower, Equipment, Material, Money, Time.	6	18
2	LABOUR MANAGEMENT: Systems approach, Characteristics of resources, Utilization, measurement of actual resources required, Tools for measurement of resources, Labour, Classes of Labour, Cost of Labour, Labour schedule, optimum use Labour.	7	19
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.	7	19
4	TIME MANAGEMENT: Personnel time, Management and planning, managing time on the project, forecasting the future, Critical path measuring the changes and their effects – Cash flow and cost control.	7	19
5	RESOURCE ALLOCATION AND LEVELLING: Time-cost trade off, Computer application – Resource leveling, resource list, resource allocation, Resource loading, Cumulative cost – Value Management.	9	25
	Total	**36**	**100**

Reference Book(s)

- Andrew,D., Szilagg, "Hand Book of Engineering Management", 1982.
- Harvey, A., Levine, "Project Management using Micro Computers", Obsorne -McGraw Hill C.A.Publishing Co., Inc. 1988. Industry, Granda Publishing Ltd., 1980.
- James.A., Adrain, "Quantitative Methods in Construction Management", American Elsevier Publishing Co., Inc., 1973.
- Oxley Rand Poslcit, "Management Techniques applied to the Construction"

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Student may be able to apply the concept of resource planning	15%
CO-2	Students may be able to evaluate labour cost and time scheduling	25%
CO-3	Students may be able to analyse material and equipment handling	25%
CO-4	Students may be able to create the resource allocation and scheduling through computer application	35%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721414

Operation research in Construction Management

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale:

The course is design to provide fundamental knowledge of Operation Research in Construction Projects.

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
1	**Introduction** Introduction to Operation Research history, nature, scope and phases of Operation Research, Classification of Operation Research models.	03
2	**Decision Theory** Decision strategies - decision under certainty - decision under risk - decision under uncertainty - formulation - decision criterion and decision under competitive situation.	10
3	**Game Theory** Classification of games. Two - person, zero - sum games - formulation of pay off matrix - saddle points -games with pure strategies and mixed strategies - value of the game. Solution to 2 x 2 matrix, 2 x n matrix, m x 2 matrix and m x n pay-off matrix. Graphical method, algebraic method, linear programming methods. Guidelines to modeling an OR project.	10
4	**Linear Programming** General and standard forms of LPP, Formulation and solution methods - graphical solution - simplex method – dual simplex method, dynamic L.P, Transport and assignment models, Post - optimality analysis, Complications in LP problems and resolution, Queuing theory and waiting time - application to industries, Introduction to dynamic programming and network analysis, Monte - Carlo system simulations.	10
5	**Case Studies** Developing mathematical models related to construction projects, Solution to problems using QSB computer package.	06
	Total	**39**

Reference Book(s)

- Theory & Problem of Operations Research by Richard Bronson, Schaum's Outline Series – Mc Graw Hill Book Co., 1983
- Operations Research : An Introduction by Hamdy A. Taha – Maxwell Macmillan International Edition - IV Edition - 1989
- Operations Research for Management by G.V. Shenoy, U.K. Srivastav, S.C. Sharma - Wiley Eastern Limited - 1988
- Operations Research for Management by M.P. Gupta, J.K. Sharma-National Publishing House - 2nd Edition - 1987
- Operations Management by John O. Mcclain and Joseph Thomas - Prentice Hall of India Private Limited, New Delhi - 1987
- Quantitative Methods and Operations Research by R.C. Gupta - CBS Management Series - 1986
- Quantitative Techniques in Management by Vohra -Tata McGraw Hill Book Co.
- Principles of Construction Management – R. Pilcher -Tata McGraw Hill Book Co.

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Students would able to apply decision theory to construction project problems	33%
CO-2	Students would able to apply game theory and queuing theory to construction project situations	33%
CO-3	Students would able to apply linear programming and simulation concepts for operational issues of construction projects	34%

List of Tutorials:

1. Decision theory
2. Game theory
3. Formulation of LPP
4. Solution of LPP by graphical method, simplex method, big M method, 2^{nd} phase method
5. Sensitivity analysis
6. Transportation problems
7. Assignment problems
8. Nonlinear & dynamic programming problems.
9. Waiting line theory
10. Use of QSB computer package

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721413

Quality Control & Safety Management in Construction

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale: Students would be able:

- To understand the elements of quality planning and the implication
- To become aware of objectives and advantages of quality assurance
- To be exposed to means of quality control
- To study the relationship between quality and safety management

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
1	**Quality Management Systems** Types of organizations – Inspection, control and enforcement – Quality management systems and method – responsibilities and authorities in quality assurances and quality control –Architects, engineers, contractors and special consultants, quality circle	04
2	**Quality Policy** Quality policy – Objectives and methods in construction industry – Consumers satisfaction, economics – Time of completion – statistical tolerance – Taguchi's concept of quality – Codes and standards – Contract and construction programming – Inspection procedures – Processes and products – Total QA / QC programme and cost implication - ISO 9004 – Quality System Standards	08
3	**Quality 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. Histogram, Parcto diagram, Fishbonc diagram, quality control chart, testing required for quality control of construction material used in RCC work – destructive and Non Destructive Test, Application of Six Sigma tool to RCC work in building.	12
4	**Construction Safety** Occupational Safety, Health and Environment Management System, Bureau of Indian Standards on Safety and Health: 14489 –1998 and 15001- 2000, ILO and EPA Standards.	12

	SHE: Element of training cycle, Assessment of needs. Techniques of training, design and development of training programs, Training methods and strategies, types of training, Evaluation and review of training programs. Construction safety management: Role of various parties, duties and responsibilities of top management, site managers, supervisors etc., role of safety officers, responsibilities of general employees, safety committee, safety training, incentives and monitoring, writing safety manuals, preparing safety checklists and inspection reports. Safety in Construction Operations: Safety of accidents on various construction sites such as buildings, dams, tunnels, bridges, roads, etc. Preventions of accidents, safety measures, safety in use of construction equipment and electrical appliances.	
	Total	**39**

Reference Book(s)

- Construction inspection handbook – Quality assurance and quality control by James, J O Brian, Van Nostrand, New York
- Quality Planning and analysis by Juran Frank, J M and Gryna, Tata McGraw Hill
- ISO 9000 By Hutchins.G, Viva Books, New Delhi
- Productivity Improvement in Construction by Clarkson H Oglesby, Tata McGraw Hill
- The Management of Quality in Construction By John L Ashford, E & F, N Spon, New York
- Quality Improvement Techniques in Construction by Steven McCabe, Addison Wesley Longman Ltd, England.
- Construction safety manual published by National Safety Commission of India
- Construction safety Handbook – Davies V S Thomasin K, Thomas Telford, London
- ISI for safety in construction – Bureau of Indian standard
- Safety Management – Girimaldi and Simonds, AITBS, New Delhi

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Students would be able to apply concepts of quality management systems	20%
CO-2	Students would be able to comprehend quality policy and objectives of quality assurance and quality control	45%
CO-3	Students would be able to design construction processes to minimize safety hazards	35%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721416

Management Information System

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale:

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

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
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	07
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
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
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
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.	
	Total	**39**

Reference Book(s)

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

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Students would be able to comprehend types of Information Systems	25%
CO-2	Students would be able to schedule and control construction project in MIS environment	30%
CO-3	Students would be able to apply concepts of integrated construction management information	25%
CO-4	Students would be able to comprehend concepts of system audit	20%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721417

Advanced Concrete Technology

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale:

This course explores the materials science of concrete, and attempts to bring about the understanding of concrete behavior from a fundamental perspective. The course discusses the structure and properties of concrete making materials, mixture proportioning of high performance concrete, self-compacting concrete etc.

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
1	**Introduction:** Sustainable Development concept, Introduction of Recent advances in Concrete Technology, Sustainable Construction Practices: world scenario	03
2	**Supplementing Cement Materials (SCMs):** Review of types covering pulverized fuel ash, ground granulated blast furnaces slag and silica fume, Rice husk Ash, manufacture, physical characteristics, effects on properties of concretes. Admixtures: Plasticizers, Super plasticizers, retarder, accelerators, Curing compounds and their effects on properties of concrete. Epoxy resins and screeds for rehabilitation – Properties and Applications	08
3	**Concrete Mix Design** Review of methods and philosophies, mix design for special purposes **Ready Mixed Concrete** Types of plant, truck mixer efficiency, effects of prolonged agitation, quality control: acceptance and compliance	08
4	**Special Concretes:** High performance concrete, High Strength concrete, fiber reinforced concrete, Light weight concrete, High density and radiation shielding concrete, High volume fly ash concrete and self-compacting concrete, Ferro-cement concrete, Pumped Concrete, Roller Compacted Concrete, polymer concrete	06
5	**Sustainable Construction Concrete:** Green Concrete, Geo Polymer Concrete, Reactor Powder Concrete, Recycled concrete, Slag Cement and health assessment of concrete	06

6	**Durability of Concrete** Durability concept, pore structure and transport processes, corrosion resistance, fire resistance, frost damage, sulfate attack, alkali silica reaction, short term tests to assess long term behaviour.	08
	Total	**39**

Reference Book(s)

- Properties of Concrete by Neville A. M.
- Concrete Technology by Shetty M. S.
- Concrete Technology by Gambhir M. L.
- Concrete Technology by A.R. Santhakumar, IIT Madras
- Concrete Microstructure, Properties and material by P. Kumar Mehta & Paulo J M Monteiro
- Design of Concrete Mixes by Krishna Raju
- Progress in cement and concrete in series by S N Ghosh

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Understanding of supplementing cement materials	20%
CO-2	Concrete mix design for specific purposes	25%
CO-3	Understanding of special & sustainable concrete	30%
CO-4	Durability of concrete	20%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/

GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721418

Construction Law & Contract Administration

2nd SEMESTER

Type of Course: Elective

Prerequisite: NIL

Rationale: Students should be able:

- To understand the laws applicable to construction projects
- To understand forms of contracts and contract conditions
- To understand methodology of arbitration and conciliation

Teaching and Examination Scheme

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA(M)	Viva	PA (I)	
3	0	2	4	70	30	30	20	150

Course Contents

Sr.No.	Topics	Hrs.
1	**Introduction to Law** Introduction to law, Laws governing structure & Working of Construction Firms, definition of the contract as per the ACT, Valid, Voidable, Void contracts, objectives of the act, clauses 1to 75 of act, workmen's compensation act on construction projects	09
2	**Contract Conditions** Clarification by parties to contract, obligations and responsibilities of the parties, protection and indemnification, bonds and insurance, subsurface conditions, Negotiation, inspection of work, change of work, rejected work and deficiencies, FIDIC conditions.	09
3	**Contract Administration Management:** Contractual procedures - Technical sanction, Notice inviting tender, Multiple bids, Evaluation of bids, Pre-requisites in an agreement, various types of bonds, Proper record keeping in contract administering, Duties and responsibilities of parties, coordination between various agencies involved, providing data for interpretation of contract clauses, important site documents, Special aspects of contract management,	09
4	**Arbitration & Conciliation** Indian Arbitration and Conciliation Act 1996 Causes and resolution of disputes, settlement for claims and extra items, arbitration. Comparison Laws-Agreements, Appointment of Arbitrators, Conditions of Arbitrations, Powers and duties of Arbitrator, Enforcement of Award-costs. Conciliation and its provisions in the Act, Conduct of conciliation and arbitral preceding, grounds for challenge, procedure of appeal against the awards.	09

	Total	**36**

Reference Book(s)

- Explanation of Indian Contract Act by Mulla and Sanjeeva Rao, B.D. Virmani, B.T.Gajaria.
- Handbook of Contracts by Hudson.
- Construction Contracting by Clough Richarch, John Wiley & Sons, New York, 1986.
- Construction Contract Management by Prakash V.A., NICMAR, Bombay
- Estimating and Costing in Civil Engineering Theory and Practice by B.N.Dutta, UBS publishers, distributer's private limited.
- Laws Relating to Building and Engineering Contracts in India by Gajaria G.T., M.M.Tripathi Private Ltd., Bombay, 1982.
- Construction Contracts by Jimmie Hinze, McGraw Hill.
- Contracts and the Legal Environment for Engineers and Architects by Joseph T. Bockrath, McGraw Hill, 2000.
- The Indian Contract Act (9 of 1872), 1872- Bare act – Professional Book Publishers.
- The arbitration and conciliation Act, (1996), (26 of 1996), Profesional Book Publishers.
- FIDIC Document (1999)
- Dispute resolution board foundation manual – www.drbf.org

Course Outcome

Sr. No.	CO statement	Marks % weightage
CO-1	Students may comprehend legal issues related to contracts including Contract Act,	25%
CO-2	Student may be able to prepare contractual conditions	30%
CO-3	Student may be able to oversee for successful execution and dispute resolution.	25%
CO-4	Students should be able to comprehend Arbitration and Conciliation Act.	20%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**25**	**20**	**20**	**15**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above

List of Open Source Software/learning website: www.nptel.ac.in/courses/