

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

SR. No.	SUBJECT	TEACHING SCHEME(HOURS)			CREDITS
		THEORY	TUTORIAL	PRACTICAL	
714901	Construction Project Management-I	4	2	0	5
714902	Advanced Construction Techniques	3	2	0	4
710001	Communication & Research Skill	2	2	0	3
714903	Application of Statistical Techniques & Numerical Methods	3	2	0	4
	Int. Elective-1	3	2	0	4
	Major Elective-1	4	2	0	5
	TOTAL				25

Sr. No.	Int. Elective-1
711404	Disaster Management
714904	Energy System Planning & Management

Sr. No.	Major Elective - I
714905	Total Quality Management for Construction Projects
714906	Project Risk Analysis & Mitigation Practices

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Semester I

Subject Name: Construction Project Management-I

Subject Code: 714901

Sr_No	Content
1.	Project Life Cycle Approach Construction industry and its segments, construction project development life cycle ,Various phases of Construction project – Pre-Project phase, Planning and design phase , Contractor selection phase , Project mobilization phase , Project operation phase ,Project completion, Causes of project failure
2.	Project Organization Formal and informal organization, Requirements of a project organization, Organization structure matrix, determination of suitable organization structure for proposed project.
3.	Project Planning of Construction Plan Development, Time planning and work scheduling, Resource Planning, Work Breakdown Structure (WBS) and its levels- Definition, Duties/role of Project manager in work break down structuring, Hierarchy in WBS, Project and Functionally oriented WBS, Integration of WBS and organization structure.
4.	Project Appraisal Infrastructure projects and their feasibility – Technical, Financial and Market Ownership & Private sector participation in Infrastructure environmental Development Projects-BOT,BOLT,BOOT – BOT,BOLT,BOOT
5.	Project Cost and Quality Control Cost Control -Direct and indirect cost, Control cycle and controlling factors ,Line of Balance (LOB),Project management and control cycle ,Strategic and cost programming ,cost planning ,cash flow , cost reduction at various stages of construction project , control curve, cost slope concept, Normal and Crash cost, cost overrun and time overrun and their controlling Quality Control- objectives of QA/QC, Techniques of Quality assurance

Tutorials:-

1. Assignment work is based on above subject contents.

Reference:

1. The Management of construction, Bennet F.L, Butterworth Publication (Elsevier)
2. Chitkara, K.K. " Construction Project Management Planning ", Scheduling and Control, Tata McGraw Hill Publishing Co., New Delhi, 1998
3. Construction Management Fundamentals, Knutson, Fiori and Mayo
4. Construction Planning and Technology , Gupta Rajiv, CBS Publication
5. Fundamentals Network Analysis & Synthesis , Pandey S.K., S.Chand Publication
6. Construction Project Management, Jha Neeraj Kumar, Pearson Publication
7. Projects-Planning Analysis Selection Implementation & Review , Prasanna Chandra,, Tata McGraw Hill Publishing Co., Ltd., New Delhi

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

Subject Name: Advanced Construction Techniques

Subject Code: 714902

Sr_No	Content
1.	Modular coordination Basics of modular co-ordination, Advantages of modular coordination, Recent Trend of Construction technology
2.	Sub structure construction Under Water Construction of diaphragm walls and basement , Tunneling techniques - Tunnel technique by Advance Planning & Equipments in Geologically adverse condition, , piling techniques, driving well and caisson , Box jacking , Pipe Jacking , cofferdam sinking, cable anchoring and grouting , Large reservoir construction with membranes and Earth system, well points , Dewatering , Underground open excavation and stand by plant provisions
3.	Super structure construction Concrete paving technology , construction techniques for continuous concreting operation in Tall buildings , Vacuum Dewatering of concrete flooring , Launching Techniques, Launching techniques for heavy decks in situ pre-stressing in high rise structures, erection of laticetoweras and rigging of transmission line structures , Construction sequences in cooling towers, Silos Chimney, Sky scrapers, bow string bridges, cable stayed bridges , Support structure for heavy Equipment and conveyor and machinery in heavy industries, erection of braced domes and space decks
4.	Repair construction Mud jacking grout, strengthening by Micropiling, Sheet pile protection for pipeline laying, screw, sub grade water proofing under pining advanced techniques and sequence in demolition and dismantling, anchors
5.	Preferable Site visits (Minimum Four): • Special temporary structures (scaffolds, formworks) • Hot mix plants, paving operations. • Dewatering techniques. • Advanced construction techniques • Batching mixing plants • RMC Plant • Construction sites of Bridge/ Fly over Bridge/Sub way /Dams & Reservoir /Concrete Road/Industrial Construction/ construction of water & wastewater treatment plants/ canal structures

Tutorials:-

1. Assignment work is based on above subject contents.

References:

1. Practical foundation engineering hand book, RobertwadeBrown ,McGraw Hill Publications,
2. Construction Dewatering: New Methods and Applications , Patrick Powers. J., John Wiley & Sons.
2. Advanced Construction Techniques , Roy Chudley&Roger Greeno, Pearson Prentice Hall
3. Construction Planning, Equipment & Method,Peurifoy ,TataMcGraw Hall Pub.
4. Construction Technology, Sankar S, Saraswati S, Oxford University Press
5. Concrete Technology: Theory and Practice,M.S. Shetty,S.Chand Pub.
5. **Prescribed Web reference according to subject matters.**

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

Subject Name: Application of Statistical Techniques & Numerical Methods

Subject Code: 714903

Sr_No	Content
1	Probability theory and its importance Definition of probability, Rules of Probability, The Baye's theorem. Random variable. Probability distribution. Mean or Expectation of Random variable. Properties of Mean of Expectation.
2	Theoretical probability Distributions Binomial Distribution, Poisson Distribution. Normal Distribution, Exponential Distribution, Beta, Gamma.
3	Sampling and sampling distribution Probability samples, Non-probability samples, Random sampling, Other sampling schemes, sampling distribution and standard error, some Sampling and Quality control. Use of concepts of standard deviation, coefficient of variance, ranges in quality control of concreting and similar such activities.
4	Correlation and Regression and Multivariate Analysis Bivariate Frequency Distribution Scatter Diagram, Correlation Analysis, Multiple Regression Analysis-Non linear Regression, Use of regression analysis in resources management, Parameter estimation, moment method, maximum likelihood, interval estimated. Hypothesis Testing, Significance Intervals.
5	Numerical integration Linear algebra ,numerical analysis, Matrices, Romberg Integration ,Newton-cotes integration (Trapezoidal and Simpson rules) ,Gaussian Quadrature, Adaptive Quadrature, improper integral, Case studies of numerical integration and differentiation
6	Matrix factorization Factorization by Cholesky, QR factorization, Lufactorization and Gaussian elimination, partial pivoting, error Analysis, solving full systems by factorization.
7	Ordinary Differential Equation Euler's method, Runge-Kutta Methods , Adaptive Runge-Kutta Methods
8	Matlab / Microsoft Excel:- Application tools for Analysis

Tutorials:-

1. Assignment work on
 - Probability distribution
 - Sampling distribution
 - Correlation
 - Regression analysis
 - Multivariate analysis
 - Hypothetical testing
2. Solving the prescribed problems of with MATLAB / Excel Application

Reference:

1. Probability and Statistics for Engineers –Miller, Freund-Hall, Prentice India Ltd.
2. Probability and Statistics for Engineers –Johnson Richard, Prentice India Ltd.
3. Introduction to Probability & Statistics for Engineers & Scientists-Ross Sheldon ,Elsevier Pub
4. Sampling techniques-Cochran, Wiley Series.,
5. Statistics-Concepts and Controversies-David S. Moore-Freeman Company, New York.
6. MATLAB an Introduction with Application, Gilat Amos. Willey Pub.
7. Getting Started with MATLAB-PratapRudra -Oxfor Pub
8. Mastering MATLAB 7 –Hanselman-Pearson
9. Programming in MATLAB for Engineerie-Chapman S.J.-Cengage Pub.
10. Effective Technical Communication -Rizvi Ashraf-Tata McGraw Hill Pub.
11. Numarical Methods -Balagurusamy E- Tata McGraw Hill Pub.
12. Numarical Methods-Jain M.K.-New Age Pub.
13. Numerical Methods for Engineers-Chapra Steven- Tata McGraw Hill Pub.
14. Computer Oriented Numerical Methods-Rajaraman V.-PHI Pub.

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

Subject Name: Energy System Planning & Management (Inst. Elective- I)

Subject Code: 714904

Sr_No	Content
1	Energy Calculations Fundamental equations, units, conversion factors.
2	Introduction to Energy Management Energy conservation, Energy conservation opportunities, National Energy strategies and Plan.
3	Introduction to Energy Sources Renewable (Wind, Solar and Tidal) & Non Renewable (Coal, Hydro, Gas, Diesel and Nuclear);generation principle, future scenario in India.
4	Electrical Power Organization Principle of power station design, Load curves, Demand Factor, Maximum Demand, Average Demand, Diversity of Load, Diversity Factor, Plant Factor, Capacity Factor, Load Duration Curve, Numericals.

Tutorials:-

1. Assignment work is based on above subject contents.

References:

1. Energy management handbook. Wayne C. Turner., Stevadofy
- 2 A text book of energy technology. Vedamsebooks Pvt. Ltd. New Delhi.
- 3 Non conventional Energy sources. G.D. Rai. Khanna publisher. New Delhi.
- 4 Handbook of energy Audit & environment. Y.P.Abbbi, Shashank Jain.,TERI book store.
- 5 Solar energy by S. P. Sukhatme. Tata McGraw Hill. New Delhi.
6. Electrical Power, S L UppalKhanna publisher. New Delhi.

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

Subject Name: Total Quality Management for Construction Projects(Major Elective I)

Subject Code: 714905

Sr_No	Content
1	Concepts Definition of Quality , Dimension of Quality , Quality control, Quality Assurance, Quality Management and Total Quality Management (TQM) Quality cost analysis, Quality Planning, Quality council, Quality statements, strategic planning,
2	TQM Principles Customer satisfaction ,Customers perception of quality, customer complaints, Customer retention, Employee involvement , Motivation , Recognition and reward , performance appraisal , continuous process improvement, supplier selection and supplier rating, Performance measures
3	Statistical process control Seven Quality tools, Statistical fundamentals , Central tendency and dispersion ,population and sampling , normal curve, control charts for variables and attributes, Concept of six sigma,
4	TQM Tools Benchmarking , Benchmarking process, Quality function deployment , QFD Process,benefits,Taguchi Quality Loss function , Total Productive Maintenance, FMEA and its stages
5	Quality System Need of Quality systems , ISO 9000:2000 Quality System,Implementation of Quality System,Quality Auditing,
6	Applications in construction management Quality in foundations and structural work, Concreting, building facilities, waste recycling ,Human resource

Tutorials/Assignments :

- Preparation of reports on any Four as prescribed by faculty :
 1. Study of ISO 9000, ISO 14000 standards and certification procedures.
 2. Study of quality standards related to construction materials
 3. Study of BIS and other standards
 4. Inspections of incoming materials and machineries.
 5. Preparations of quality manuals check lists and inspection reports
 6. Study on quality assurance system.

References:

1. Quality Management : Concept and Task, Narayan V., New Age Pub.
2. Total Quality Management ,Faigenbaum A.V., Mc-Graw Hill Pub.
3. Construction Inspection Handbook - Quality Assurance and Quality Control ", James. J.O Brian,
" Van Nostrand, New York
4. Fundamental of Construction Management and Organization , Kwaku A., Tenah and Jose
M.Guevera,
Prentice Hall of India
5. Quality planning and Analysis, Juran Frank, J.M. and Gryna, F.M., Tata McGraw Hill

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. (Civil) (Construction Management)

Semester I

Subject Name: Project Risk Analysis & Mitigation Practices (Major Elective I)

Subject Code: 714906

Sr_No	Content
1	General Importance of Risk, types of risks, quantifiable and unquantified risks
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.
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.

Tutorials:-

1. Assignment work is based on above subject contents.

References :

1. Industrial Engineering and Management of manufacturing systems.-Dr.Surendra Kumar SatyaPrakashan
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. **Prescribed Web reference**