

# 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
L	T	P		Theory Marks		Practical Marks		
				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

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**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
L	T	P		Theory Marks		Practical Marks		
				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.	<b>Introduction</b> Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	4	17
2.	<b>Repercussions Of Disasters And Hazards:</b> 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.	<b>Disaster Prone Areas In India</b> 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.	<b>Disaster Preparedness And Management</b> 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.	<b>Risk Assessment</b> 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	<b>Disaster Mitigation</b>	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.		
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**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

RESEARCH AND IPR

M.E. SEMESTER: I

## Rationale:

### To the Student:

The purpose of this subject is to orient the students to the scientific methodology of research and presenting their thesis. 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 you set for yourself.

At the end, student should be able to present and defend the solution he/she has found, in a simple and easy manner. Communicating the research outcomes, is an art wherein, you do not want to either undermine or over emphasise the content, within the short time limit given for such presentations. The balance of critical technicality and overall outcomes is the key to an effective presentation. The language, content and articulation should be such as to convey in a unified manner, the gist of your work.

### To the Teacher:

It is envisaged that the teacher will discuss actual case studies to make the student understand the concepts of demonstration of examples during theory. Theory classes will be used to explain each of the concepts in Module 1 and 2. This syllabus is based on the model AICTE course prescribed in May2018.

## Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (V)	PA (I)	
1	0	2	2	0	0	80	20	100

## Content:

	<b>Module 1 Starting Research</b>	<b>Teaching Hrs</b>
<b>1.1</b>	<b>Find what is expected of you</b>	
	Identify specific requirements for evaluation/review and what constitutes completion of your work	
	Find where the source is available	
	Establish proper methods for finding the relevant material from the source.	
<b>1.2</b>	<b>Analyse the question</b>	
	Identify key areas in your field	
	Determine the nature and extension of papers that you should read	
<b>1.3</b>	<b>Identify the gaps</b>	

	Learn to Critique existing knowledge and how to find the gap	
<b>1.4</b>	<b>Formulate the Problem Statement</b>	
	Understand what should be the key aspects of your problem statement	
	Examples of effective and ineffective Titles	
<b>1.5</b>	<b>Validation</b>	
	Identify problem and experimental/theoretical data for comparison with your model	
	Learn how to extrapolate/scale data for validation	
	Find what is acceptable level of error and justification thereof	
	<b>Module 2 Finding Good Literature</b>	
<b>2.1</b>	<b>Decide which sources you will need</b>	
	Differentiate between journals, conferences, books, magazines and their quality	
	Understand how to establish their quality and authenticity	
<b>2.2</b>	<b>Finding Information</b>	
	How to conduct effective searches	
	How to find relevant papers related to your area of research	
	How to capture critical information	
<b>2.3</b>	<b>Identify main ideas in scholarly literature</b>	
	Understand and identify the bias, theoretical position and evidence produced	
<b>2.4</b>	<b>Write notes to organize your ideas</b>	
	Compare ideas and concepts from different papers	
	<b>Module 3 Writing and Presenting your Work</b>	
<b>3.1</b>	<b>Effective technical writing</b>	
	How to write Report, Paper, Developing a Research Proposal, Format of research proposal	
<b>3.2</b>	<b>Build your argument</b>	
	Recognise the importance of emphasizing your point	
	Distinguish between your point and the evidence available	
	Acknowledge the evidence	
<b>3.3</b>	<b>Review and finalize your work</b>	
	Know and follow the Process of reviewing and proof reading your work	
	Use feedback to improve your work	
<b>3.4</b>	<b>Check the logistics of your presentation</b>	
	Identify the key message of your presentation	
	Understand the expectations and what will be the key review points	
<b>3.5</b>	<b>Develop the structure of your presentation</b>	
	Understand the key components of an oral presentation	
	Know the usual structure of a good presentation	
<b>3.6</b>	<b>Prepare for delivery of your Oral presentation</b>	
	Rehearse and time your presentation	
	Prepare to answer questions from the audience: Fundamental concepts should be spoken from memory as reviewer will be looking for evidence of your thorough understanding.	
	Read more than the content you are presenting; keep sources ready on hand for reference;	
	<b>Module 4 Intellectual Property</b>	
<b>4.1</b>	<b>Patents, Designs, Trade and Copyright.,</b>	
	Process of Patenting and Development: Technological research innovation, patenting, development.	

<b>4.2</b>	<b>International Scenario:</b>	
	International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.	
<b>4.3</b>	<b>Patent Rights</b>	
	Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications	
<b>4.4</b>	<b>New Developments in IPR</b>	
	Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies	

**Reference Books:**

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"
2. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
3. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
4. Mayall, "Industrial Design", McGraw Hill, 1992.
5. Niebel, "Product Design", McGraw Hill, 1974.
6. Asimov, "Introduction to Design", Prentice Hall, 1962.
7. Robert P. Merges, Peter S. Menell, Mark A. Lemley, "Intellectual Property in New Technological Age", 2016.
8. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

**Course Outcome:**

At the end of the course the students should be able to:

1. Conduct a quality literature review and find the research gap.
2. Identify an original and relevant problem and identify methods to find its solution
3. Validate the model
4. Present and defend the solution obtained in an effective manner in written or spoken form.
5. Follow research ethics
6. Understand IPR protection for further research and better products

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ME Civil (Construction Engineering & Management) Planning, Scheduling & Control of Construction Projects SUBJECT CODE: 3711408

**Type of Course:** Core

**Prerequisite:** NIL

### Teaching and Examination Scheme:

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

### Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Introduction to Construction Projects:</b> Construction projects & their features, Formal and informal organization, Forms of Project organizations, Requirements of a project organization, Types and selection of organizations, Purpose and functions of construction management, Construction management process & scope, Construction project life cycle, Construction project organisations, Project Team and their roles, Relevance of construction management in project success. Introduction.	4	11
2	<b>Introduction to Construction Project Planning:</b> Work Breakdown Structure: Necessity, Methodology and Types. Project planning and scheduling techniques: CPM, PERT & GERT, LOB & LADDER Networks, Precedence Networks, Critical Chain Network. Time & Resource Planning. Management Software.	6	17
3	<b>Project Scheduling &amp; Monitoring using CPM:</b> AOA and AON Networks, Event time/Activity time calculations, Critical activities and critical paths, Activity floats, Time grid diagrams & resource allocation, Project updating, Time-cost optimization of networks, Cost control and monitoring using CPM networks, Network based Time & Cost variance analysis/Earned Value Analysis, MS PROJECT/PRIMAVERA	16	44
4	<b>Advanced Networks and Scheduling Concepts/Tools:</b> PERT Network Analysis, Precedence Network Analysis, Line of Balance Methods	6	17

5	<b>Project Quality Control:</b> Introduction. Construction Quality Control: QA-QC Model, Quality Assurance: TQM, ISO Standards, CONQUAS and AUDIT. Cost of Quality. Quality policy, Objectives and methods in construction industry, Factors Influencing Construction Quality, Construction Productivity	4	11
	<b>Total</b>	<b>36</b>	<b>100</b>

### Reference Book(s)

1. Sharma, M.R., Fundamentals of Construction Planning and Management, S.K. Kataria & Son, New Delhi, 2012
2. Seetharaman, S., Construction Engineering & Management, Umesh Publications, 2007.
3. Srinath, L.S., PERT & CPM Principles and Applications, Tata McGraw Hill, New Delhi.
4. Peurifoy, L., Schexnayder, C.J. and Shapira, A., Construction Planning, Equipment and Methods, McGraw Hill, New Delhi, 8th Edition, 2010.
5. Punamia, B.C. and Khandelwal, K.K., Project Planning and Control with PERT and CPM, Laxmi Publications, New Delhi, 2004.
6. Gahlot, P.S. and Dhir, B.M., Construction Planning & Management, New Age International (P) Ltd., New Delhi
7. Chitkara, K. K., Construction Project Management Planning, Scheduling and Controlling, Tata McGraw Hill, New Delhi.

### Course Outcome

1. Student can demonstrate an ability to develop the various components of project controls including planning, scheduling, cost and resource management
2. Students will be able to demonstrate planning, scheduling and monitoring of projects using professional software.

### List of Tutorials

1. Work breakdown structure (WBS)
2. Development of Activity logical Relations
3. Bar charts
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. Time-grid diagrams & resource allocation/resource histogram
9. Earned value analysis
10. PERT network analysis
11. PD network analysis
12. Line of Balance Method (LOB)
13. Software Based Project (To be issued at the beginning and to be developed throughout)

**List of Open Source Software/learning website:** [www.nptel.iitm.ac.in/courses/](http://www.nptel.iitm.ac.in/courses/)

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME Civil (Construction Engineering & Management)**  
**Advanced Construction Techniques**  
**SUBJECT CODE: 3711409**

**Type of Course:** Core

**Prerequisite:** NIL

**Teaching and Examination Scheme:**

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

**Contents:**

Sr.No.	Topics	Hrs.	% Weightage
1	Introduction to Advanced Construction Techniques	2	05
2	Construction Techniques for Excavations, Dewatering of Excavations, Pile Foundations and Piling Techniques, Caissons, Box Jacking, Pipe Jacking, Construction of Cofferdams, Trenchless Technology. Construction for High Rise Structures, Buildings, Chimneys, Cooling Towers.	10	28
3	Construction Techniques of Special Structures: Lattice Towers and Transmission Line Structures, On Shore and Off Shore Structures, Geodesic Structures. Tunnels, Bridges, Roads	10	28
4	Temporary Structures for new and damaged structures, Advance Demolition and Dismantling Techniques, Retrofitting, Strengthening of Various R.C.C Structures, Strengthening of Masonry Structures	6	17
5	Precast and Pre Stressing Techniques. Modular Coordination: Basics of Modular Co-Ordination, Advantages of Modular Coordination, applications of Modular Coordination, Erection Technology: Erection Cycle, Erection Methods for Various Types of Buildings And Steel Structures	8	22
		<b>36</b>	<b>100</b>

**Reference Book(s):**

1. S.S. Ataev, "Construction Technology", Mir Publishers.
2. P. Dyanchenko and S. Mirotvorsky, "Prefabrication of Reinforced Concrete", Mir Publishers.

3. Henrick Nissen, "*Industrial Building and Modular Design*", Cement Concrete Association, London.
4. R. Chudlay, "*Construction Technology (Vol. I to IV)*", Longman.
5. Robert wade Brown, "*Practical foundation engineering hand book*", McGraw Hill Publications.
6. Patrick Powers, and J. John, "*Construction Dewatering: New Methods and Applications*", Wiley & Sons.
7. Roy Chudley and Roger Greeno, "*Advanced Construction Techniques*", Pearson Prentice Hall.
8. Peurifoy, "*Construction Planning, Equipment & Method*", Tata McGraw Hall Pub.
9. Sanksar S and Saraswati S., "*Construction Technology*", Oxford University Press.
10. M.S. Shetty, "*Concrete Technology: Theory and Practice*", S.Chand Pub. 5.

**List of Experiments:** Based on Above Syllabus.

# GUJARAT TECHNOLOGICAL UNIVERSITY

ME Civil (Construction Engineering & Management)

Remote Sensing & GIS in Civil Engineering

SUBJECT CODE: 3711410

Type of Course: Elective Subject

Prerequisite: NIL

## Teaching and Examination Scheme:

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

## Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Introduction:</b> Introduction of Remote Sensing – Energy sources and Radiation principles, Energy equation, EMR and Spectrum, EMR interaction with Atmosphere scattering, Absorption, EMR interaction with earth surface features reflection, absorption, emission and transmission, Spectral response pattern, vegetation, soil, water bodies- Spectral reflectance  Geographical Concepts and Terminology, Difference between Image Processing System and Geographic Information System (GIS), utility of GIS, various GIS packages and their salient features, Essential components of a GIS.	4	12
2	<b>Data Acquisition:</b> Digital Image interpretation, Pattern recognition, shape analysis, Textural analysis, Decision concepts, fuzzy sets and Evidential reasoning, Change detection, multitemporal data merging, multi sensor image merging merging image data with ancillary data, Expert system, Artificial Neural Network; Integration with GIS.	8	22

	Scanners and Digitizers, Method of Digitization, Raster and Vector Data, Data Storage, Verification and Edition. Data Preprocessing; Format Conversion, Data Compression, Data Reduction and Generalization, Run Length Coding, Merging, Edge Matching, Rectification and Registration, Interpolation.		
3	<b>Data Base Structure:</b> Hierarchical Data, Network Systems, Relation Database, Data Management – Conventional Database Management System, Spatial Database Management	8	22
4	<b>Data Manipulation and Analysis:</b> Reclassification and Aggregation, geometric and Spatial Operations on Data Measurement and Statistical Modeling. Data Output – Types of Output. Application of GIS in various Natural Resources Mapping & Monitoring, Engineering Application	8	22
5	Introduction to Global Navigation Satellite System, Introduction to GPS, GPS Segments: Space, Control and User segments. GPS principles, receiver types and positioning techniques GPS applications in Transportation Engineering: Intelligent Transport System, Mass transport system and location based services. GPS applications in Construction Management: Location based material and equipment management	8	22
		<b>36</b>	<b>100</b>

### Reference Book(s)

1. P.A. Borrough, "*Principles of Geographic information Systems for Land Resources Assessment*", Oxford University Press, 1986.
2. Manual of Remote Sensing Vol. 2, American Society of Photogrammetry and Remote Sensing.
3. Stan Aronoff, "*Geographic Information Systems: A Management Perspective*", WDL Publications, 1991.
4. Dr. Chandra A.M., "*Remote Sensing and GIS*", Narosa Publishers, New Delhi.
5. B. Bhatta, "*Remote Sensing and GIS*", Oxford University Press, New Delhi.
6. M. Anji Reddy, Textbook of Remote Sensing and Geographical Information systems, BS Publications, Hyderabad. 2011. ISBN: 81- 7800-112-8
7. A.M.Chandra and S.K. Gosh. Remote Sensing and GIS, Narosa Publishing Home, New Delhi 2009.
8. Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman Remote sensing and image interpretation John Wiley & Sons, 2008

9. George Joseph , Fundamentals of Remote Sensing Universities Press, Hyderabad 2005

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**GUJARAT TECHNOLOGICAL UNIVERSITY**

**ME Civil (Construction Engineering & Management)**

**Value Engineering**

**SUBJECT CODE: 3711411**

**Type of Course:** Elective Subject

**Prerequisite:** NIL

**Teaching and Examination Scheme:**

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

**Contents:**

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Introduction:</b> Concept and definition, objectives of Value engineering, Advantages of Value methodology, Scenario of value engineering with context to India, Origin of Value engineering.  Quantity surveying and value engineering, team of value engineering and its quality, Applicability to Mega projects, Value engineering and project management.	6	15
2	<b>Value Analysis:</b> Concept, Job planning and its importance in value engineering, Various phases of Value Engineering -Information Phase, Function Analysis Phase, Creative Phase, Evaluation Phase , Development Phase.	9	21
3	<b>Functional Analysis:</b> Functions at various levels and of various types, cost and worth of function, importance of functional analysis, FAST Diagramming - How to prepare	9	21
4	<b>Creative Phase:</b>	9	21

	Creative thinking and creative processes, Application in Value engineering, Various techniques, fundamental approaches of similarity, contiguity and contrast, Positive approach		
5	<b>Cost Model:</b> Introduction, Value, Cost and Worth, True and Poor value, Factors affecting the value , Value Index, Cost and Value Gap, importance of cost model in Value Engineering , Function and Matrix Cost model, Life cycle cost analysis	6	15
6	Environmental Impact Assessment with VE approach for the projects.	3	07
	<b>Total</b>	<b>36</b>	<b>100</b>

### **Reference Book(s)**

1. Larry W. Zimmerman, "Value Engineering: A Practical Approach for Owners", Designers & Contractors - CBS Publication.
2. Arthur E. Mudge, "Value Engineering: A Systematic Approach", Mc GrawHill.
3. Donald E. Parker, "Value Engineering : Theory", Soundaram Publishers
4. O' Brien J.J., "Value Analysis in Design and Construction", Mc Graw Hill.
5. "Value Methodology" A Pocket Guide to Reduce Cost and Improve Value Through Function Analysis; Lawrence D Miles Foundation.
6. Lomansh, S., "Value Management: A Textbook", 1997 - Sterling Publishers (Pvt.) Ltd., New Delhi

# GUJARAT TECHNOLOGICAL UNIVERSITY

ME Civil (Construction Engineering & Management)

Advanced Construction Materials

SUBJECT CODE: 3711412

Type of Course: Elective

Prerequisite: NIL

## Teaching and Examination Scheme:

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

## Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	Introduction, Durability, Mechanical Properties, Deformational Behavior, Thermo Physical Properties Etc.	3	8
2	Classification, Specification, Properties, Tests As Per IS For Various Civil Engineering Materials	6	17
3	Walling Units, Binding Materials And Additives, Aggregates, Gypsum Products, Wood Base Products, Ferrous And Non-Ferrous Metal Products, Various Types Of Concretes And Concrete Additives And Admixtures	12	33
4	Repair Materials, Adhesives And Sealants	6	17
5	Recent Developments And Market Awareness Regarding Applications, Varieties, Sizes And Specification For Various Materials	9	25
	<b>Total</b>	<b>36</b>	<b>100</b>

## Reference Book(s):

1. D.N. Ghose, "Materials of Construction", Tata Mc Graw Hill.
2. Jackson N. Ed., "Civil Engineering Materials", ELBS, London.
3. S.Z. Haider, "Material of Construction", Oxford University Press.
4. BRE Digest, "Building Materials", the Construction Press, London.
5. CBRI, "Building Materials and Components", Tata Mc Graw Hill.

# GUJARAT TECHNOLOGICAL UNIVERSITY

ME Civil (Construction Engineering & Management)

Construction Finance and Accounting

SUBJECT CODE: 3711413

Type of Course: Elective Subject

Prerequisite: NIL

## Teaching and Examination Scheme:

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

## Course Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Basic Financial Concepts:</b> Capital and Revenue, financial accounting, cost accounting, management accounting, financial management	3	8
2	<b>Accounting Process:</b> GAPP, double entry system, ten point book keeping system, journal, ledger, cash book, trial balance, final account, provision and reserves, depreciation accounting, preparation of profit and loss account and balance sheet as per companies act, 1956, interpretation of financial statements	7	20
3	<b>Project Accounts:</b> Methods of recording and reporting site accounts to project office and from project office to head office	6	16
4	<b>Financial Management:</b> Financial statement analysis, ratio analysis, fund flow, cash flow analysis, source of finance. Estimating working capital needs and factors affecting it, financing working capital needs, sources, procedures and practice in construction industry, break even analysis	7	20
5	<b>Taxing:</b> Corporate taxing and tax planning, joint ventures, financial packaging of project	6	16

6	<b>Project Cost Management:</b> Introduction. Cost Planning, Cost Budgeting and Cost Control. Estimation of project cost. Cost appraisal of project. Project cash- flow analysis and planning. Value engineering in cost validation	7	20
	<b>Total</b>	<b>36</b>	<b>100</b>

**Reference Book(s)**

1. Bhattacharya S.K. and John Dearden, "Accounting for Management" Vani Educational Books, Bombay.
2. Mott C.H., "Accounting and Finance Management for Construction Vol. I", John Wiley, New York.
3. EPPS B.G. and Whiteman D.E. , "Cost Accounting for Construction Firms", John Wiley, New York.
4. Corniman D., "Construction Management: Planning & Finance", Construction Press, London.

# GUJARAT TECHNOLOGICAL UNIVERSITY

ME Civil (Construction Engineering & Management)

Building Information Systems

SUBJECT CODE: 3711414

Type of Course: Elective Subject

Prerequisite: NIL

## Teaching and Examination Scheme:

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

## Course Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Building Information System:</b> <ul style="list-style-type: none"><li>In-depth work with Software: Massing models, assembly models, more editing tools, texturing</li><li>The ins and outs of Software Platform: Import/export, creating animations, working with Google Earth and 3D Warehouse</li><li>3D BIM modeling with Software: Walls, floors, doors, windows, stairs, Using components, creating new types and new families</li><li>How to work with BIM content: Plans, DWF Models (3D for the web), schedules, materials takeoff</li><li>Use of Software models for analysis: Solar analysis, energy performance, etc.</li></ul>	24	67
2	<b>Infrastructure Asset Management:</b> Infrastructure assets through: asset inventory compilation, maintenance, condition assessment, life-cycle analysis and optimization, and communicating the results to decision-makers, infrastructure management policy, maintenance, refurbishment and replacement of strategic assets	12	33

**Reference Book(s):**

1. Architectural Design with SketchUp / Schreyer / John Wiley & Sons
2. Commercial Design Using Autodesk Revit 2014 / Daniel John Stine / SDC Publications
3. BIM and Construction Management: Proven Tools, Methods, and Workflows / Hardin / Sybex
4. BIM and Integrated Design – Strategies for Architectural Practice / Deutsch / John Wiley & Sons
5. Green BIM / Krygiel, Nies / Sybex
6. BIM Handbook / Eastman, Teicholz, Sacks, Liston / John Wiley & Sons
7. Architectural Graphic Standards Student Edition / Ramsey, Sleeper / John Wiley & Sons
8. Architectural Graphics / Ching / John Wiley & Sons
9. Architectural Drafting and Design / Jefferis, Madsen / Thomson, Delmar Learning

# GUJARAT TECHNOLOGICAL UNIVERSITY

ME Civil (Construction Engineering & Management)

Sustainable Construction Practices

SUBJECT CODE: 3711415

Type of Course: Elective Subject

Prerequisite: NIL

## Teaching and Examination Scheme:

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

## Course Contents:

Sr.No.	Topics	Hrs.	% Weightage
1	<b>Sustainable Planning:</b> Energy Efficient Shelters, Housing Options Today, Site Planning And Use Of On-Site Resources, Studio House, Convertible Space Concept, Material Efficient Planning, Working With Nature, Balancing Energy And Aesthetic Needs, etc.	7	19
2	<b>Sustainable Materials &amp; Systems:</b> Sensing Technology: Types of Sensors, Physical Measurement , Chemical & Bio- Chemical Measurement, Actuator Techniques: Actuator and actuator materials, etc.	9	25
3	<b>Sustainable Materials:</b> Vernacular building materials - Soil, Fly ash, Ferro cement, Lime, Fibers, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer-ADOBE, Cob Rammed Earthlight Clay, Straw-Bale, Bamboo, Agro-Industrial Waste, Structural Properties Of Alternate Building Materials, Innovative Materials of CBRI, etc.	5	14
4	<b>Construction Equipment:</b> Productivity of cranes, earth movers and excavators, etc., Brick moulding machine, Stabilized soil block making machines, Plants for the	9	25

	manufacturing of concrete blocks, Tile making machines, Wall panel & Roofing channel making machine, etc.		
5	<b>Construction Techniques:</b> Innovative Construction Techniques for foundation, superstructure, roofing, wall panelling, etc. Precast construction techniques, Pre Engineering Building Techniques, modular contained earth, earth bag construction, Innovative lapping methods, glass panels and facades, etc.	6	16
	<b>Total</b>	<b>36</b>	<b>100</b>

### Reference Book(s)

1. Lynne, Cassandra Adams "Alternative Construction: Contemporary Natural Building Methods", Soft cover, Wiley & Sons Australia, Limited, John, 2005.
2. Eugene Eccli, "Low Cost, Energy efficient shelter for owner & builder", Rodale Press, 1976.
3. Givoni, "Man, Climate, Architecture", Van Nostrand, New York, 1976.
4. Charles J. Kibert, "Sustainable Construction: Green Building Design and Delivery", John Wiley & Sons, 2005.
5. Brain Culshaw, "Smart Structure and Materials", Artech House - Borton. London-1996.
6. Srinivasan A.V and Michael McFarland. D, "Smart Structures - Analysis and Design", Cambridge University Press, 2001.
7. L. S. Srinath, "Experimental Stress Analysis", Tata McGraw-Hill, 1998.
8. J. W. Dally and W. F. Riley, "Experimental Stress Analysis", Tata McGraw-Hill, 1998.
9. Mukesh V. Gandhi and Brian S. Thompson, "Smart Materials and Structures", Springer, May-1992.