# GUJARAT TECHNOLOGICAL UNIVERSITY

## BRANCH NAME: CIVIL ENGINEERING (06)
## SUBJECT NAME: Infrastructure Engineering and Management
## SUBJECT CODE: 2170611

B.E. 7th Semester

**Type of course:** Departmental Elective Subject in Civil Engineering

**Teaching and Examination Scheme:**

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|
| L | T | P | C | Theory Marks | | | Practical Marks | | | |
| | | | | ESE | PA(M) | | PA(V) | | PA (I) | |
| | | | | | PA | ALA | ESE | OEP | | |
| 3 | 1 | 0 | 4 | 70 | 20 | 10 | 30 | 0 | 20 | 150 |

## Topics:

| Module No. | Topics | Teaching Hrs. | Module Weightage |
|---|---|---|---|
| 1 | **Infrastructure:** Definitions of infrastructure, Governing Features, Historical overview of Infrastructure development in India, Infrastructure Organizations & Systems. | 10 | 24 |
| 2 | **Infrastructure Planning:** Typical infrastructure planning steps, Planning and appraisal of major infrastructure projects, Screening of project ideas, Life cycle analysis, Multi-criteria analysis for comparison of infrastructure alternatives, Procurement strategies, Scheduling and management of planning activities, Infrastructure Project Budgeting and Funding, Regulatory Framework, Sources of Funding. | 10 | 24 |

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|---|---|---|---|
| **3** | **Project Management in Construction:** Introduction to project management processes - Initiating, Planning, Executing, Controlling, and Closing processes; Project Integration Management - Project plan development, Project plan execution, and Overall change control; Project Scope Management - Initiation, Scope planning, Scope definition, Scope verification, and Scope change control. | **12** | **28** |
| **4** | **Contracts and Management of Contracts:** Engineering contracts and its formulation, Definition and essentials of a contract, Indian Contract Act 1872, types of contracts and clauses for contracts, Preparation of tender documents, Issues related to tendering process, Awarding contract. | **10** | **24** |

**Reference Books:**


- A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York, 2006.
- J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London, 1999.
- P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi, 2009.
- J. D. Finnerty, Project financing - Asset-based financial engineering, John Wiley & Sons, New York, 1996.
- L. Squire and H. G.van der Tak, Economic analysis of projects, John Hopkins University Press, London, 1975.
- T. Hegazy, Computer-based construction project management, Prentice Hall, New Jersey, 2002.
- S. M. Levy, Project management in construction, 5th ed., McGraw Hill, New York, 2007.
- PMI, A guide to the project management body of knowledge, 3rd ed., Project Management Institute, Pennsylvania, 1996.
- M. Mawdesley, W. Askew and M. O'Reilly, Planning and controlling construction projects, Addison Wesley Longman Limited, Essex, 1997.
- J. Kelly, S. Male and D. Graham, Value management of construction projects, Blackwell Publishing, Oxford, 2003.
- Vasant Desai, "Project Management", Himalaya Publishing , 1st Edition, 2010
- James C. Van Horne, John M. Wachowicz, "Fundamentals of Financial Management", PHI, 2nd Edition, 2000
- Ronald W Hudson, "Infrastructure Management: integrating design, Construction, maintenance, rehabilitation and renovation", MGH, 1st Edition, 1997
- "Codes of Practice and Standard Specifications" of AP PWD, CPWD, MES etc.
- B.J. Vasavada, "Engineering Contracts and Arbitration", Jubilee Publications, 2nd Edition., 1996
- Grig N. S., "Infrastructure Engineering and Management", Wiley-Interseience, 1988

**Course Outcomes**:

- After studying this subject students will be able to:
- Understand infrastructure organizations
- Prepare infrastructure master plan
- Schedule infrastructure project activities
- Prepare project development plan
- Prepare tender documents for infrastructure project contract

**Term-Work:**

- The students will have to prepare at least one infrastructure plan (individually) and should have to prepare project development plan and tender document for the same infrastructure plan. Students are requested to learn available project management tool.

**ACTIVE LEARNING ASSIGNMENTS**: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.