

# BIJU PATNAIK UNIVERSITY OF TECHNOLOGY, ODISHA ROURKELA

## M. Tech in Construction Technology and Management

### SEMESTER- I

(Applicable to the students admitted from the Academic year 2013 – 2014 onwards)

Code No.	Course Title	L	T	P	C
<b>THEORY</b>					
<b>Professional Core</b>					
CTPC101	Construction Economics and Finance	3	1	0	4
CTPC102	Project Planning and Management	3	1	0	4
CTPC103	Infrastructure Valuation	3	1	0	4
<b>Professional Electives -I (Any one)</b>					
CTPE101	Quality and Safety Management	3	1	0	3
CTPE102	Building Information Management	3	1	0	3
<b>Professional Electives -II (Any one)</b>					
CTPE103	Construction Equipment Management	3	1	0	3
CTPE104	Maintenance and Rehabilitation of Structures	3	1	0	3
<b>Sessional / Practical</b>					
CTPR101	Construction Management Software laboratory	0	0	3	4
CTPT101	Pre-Thesis work and Seminar				2
<b>Total Credit -24</b>					

# **CTPC101 CONSTRUCTION ECONOMICS AND FINANCE**

Construction accounting - Income statement - Depreciation and amortization - Engineering economics -Benefit-cost analysis - Replacement analysis - Break even analysis - Risks and uncertainties and management decision in capital budgeting - Taxation and inflation - Work pricing - contract - bidding and award – revision - escalation - Turnkey activities - Project appraisal and yield - Working capital management – International finance - Budgeting and budgetary control - Performance - appraisal.

## **Reading:**

1. Danny Myers, Construction Economics: A New Approach, Taylor and Francis Pub, 2004
2. Ofori, G, The Construction Industry Aspects of its economics and Management, Singapore University Press, 1990

# **CTPC102 PROJECT PLANNING AND MANAGEMENT**

## **UNIT-1**

Project Planning and Scheduling - Processes of project planning, scheduling - progress control - project planning and scheduling techniques -

## **UNIT-2**

Network Scheduling Techniques - Use of computer based models - Principles of Project management - Resource Management and Inventory - Implementation of Project Planning Management - Analysis and design of planning and control system

## **UNIT-3**

Disputes and Claims Management -Use of computer based project management tools

## **REFERENCE**

- 1-Callahan, M. T., Quackenbush, D. G., and Rowings, J. E., Construction Project Scheduling, McGraw- Hill, New York, 1992.
2. Cleland, D. I. and Ireland, L. R., Project Management: Strategic Design and Implementation, 4th Edition, McGraw Hill, New York, 2002

## **CTPC103 INFRASTRUCTURE VALUATION**

Function analysis; FAST diagramming; brain storming; criteria scoring matrices; an introduction to value theory; an introduction to value management; definition of the creative and structured phases of value engineering; the workshop approach to achieving value; teambuilding theory; target setting; time management.

### **Reading:**

1. Lawrence D. Miles, Techniques of Value Analysis and Engineering, McGraw-Hill Book Company, 2009.
2. M.R.S. Murthy, Cost Analysis for Management Decisions, Tata McGraw-Hill Publishing Company Ltd., 1988.

## **CTPE101 QUALITY AND SAFETY MANAGEMENT**

Quality policy in construction industry-Consumer satisfaction-Ergonomics-Time of Completion-Statistical Tolerance-Taguchi's concept of quality- Contract and construction programming Inspection procedures- Total QA/QC Program and cost implication. Different aspects of quality - Appraisals - failure mode analysis, Stability methods and tools, Influence of drawings, detailing, specification, Standardization-Bid preparation- Construction activity, Environmental safety, Social and environmental factors.

- 1 Clarkson H. Oglesby, Productivity Improvement in Construction, McGraw Hill, 2000.
2. James, J.O Brian, Construction Inspection Handbook - Quality Assurance and Quality Control, Van Nostrand, New York, 1989.
3. Juran Frank, J.M. and Gryna, F.M. Quality Planning and Analysis, Tata McGraw Hill, 1982.
4. Kwaku A., Tenah and Jose M.Guevera, Fundamental of Construction Management and Organization, PHI 1995.

# **CTPE102 BUILDING INFORMATION MANAGEMENT**

## **UNIT-1**

### **Structural**

Structural System, Systems for enclosing Buildings, Functional aesthetic system, Materials Selection and Specification. Qualities of enclosure necessary to maintain a specified level of interior environmental quality – weather resistance – Thermal infiltration – Acoustic Control – Transmission reduction – Air quality – Illumination – Relevant systems integration with structural systems, Plumbing Electricity – Vertical circulation and their interaction.

## **UNIT-2**

### **Maintenance and Safety**

Component longevity in terms of operation performance and resistance to deleterious forces - Planning systems for least maintenance materials and construction – access for maintenance – Feasibility for replacement of damaged components – equal life elemental design – maintenance free exposed and finished surfaces, Ability of systems to protect fire – preventive systems – fire escape system design – planning for pollution free construction environmental – Hazard free Construction execution.

## **REFERENCES**

1. E.C. Butcher and A.C. Parnell, Designing for Fire Safety, John Wiley and Sons, 1993.
2. William T. Mayer, Energy Economics and Build Design, McGraw-Hill Book Co., 1983.
3. Peter R. Smith and Warren G. Julian, Building Services, Applied Science PubLtd., London.
4. A.J.Elder and Martiz Vinden Barg, Handbook of Building Enclosure, McGraw- Hill Book Company, 1983.
5. Jane Taylor and Gordin Cooke, The Fire Precautions Act in Practices, 1987. L T P Cr

# **CTPE103 CONSTRUCTION EQUIPMENT MANAGEMENT**

## **UNIT- I**

### **CONSTRUCTION EQUIPMENT MANAGEMENT**

Identification – Planning - Equipment Management in Projects - Maintenance Management – Replacement - Cost Control of Equipment - Depreciation Analysis – Safety Management

**EQUIPMENT FOR EARTHWORK** - Fundamentals of Earth Work Operations - Earth Moving Operations - Types of Earth .Work Equipment - Tractors, Motor Graders, Scrapers, Front end Waders, Earth Movers.

## **UNIT-2**

**OTHER CONSTRUCTION EQUIPMENTS** -Equipment for Dredging, Trenching, Tunneling, Drilling, Blasting - Equipment for Compaction - Erection Equipment - Types of pumps used in Construction - Equipment for Dewatering and Grouting – Foundation and Pile Driving Equipment –Equipment for Demolition.

## **UNIT-3**

**MATERIALS HANDLING EQUIPMENT** -Forklifts and related equipment - Portable Material Bins – Conveyors - Hauling Equipment

### **EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING**

Crushers – Feeders - Screening Equipment - Handling Equipment - Batching and Mixing Equipment - Hauling, Pouring and Pumping Equipment – Transporters.

## **REFERENCES:**

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

# **CTPE104 MAINTENANCE AND REHABILITATION OF STRUCTURES**

## **UNIT I**

MAINTENANCE AND REPAIR STRATEGIES -Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance various aspects of Inspection, Assessment procedure for evaluating a damaged structure, causes of deterioration. SERVICEABILITY AND DURABILITY OF CONCRETE -Quality assurance for concrete construction concrete properties- strength, permeability, thermal properties and cracking. - Effects due to climate, temperature, chemicals, corrosion - design and construction errors - Effects of cover thickness and cracking

## **UNIT -2**

### **MATERIALS AND TECHNIQUES FOR REPAIR**

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement and polymers coating for rebars loadings from concrete, mortar and dry pack, vacuum concrete, Genie and Concrete, Epoxy injection, Mortar repair for cracks, shoring and underpinning. Methods of corrosion protection, corrosion inhibitors, corrosion resistant steels and cathodic protection.

## **UNIT -3**

### **REPAIRS TO STRUCTURES**

Repair of structures distressed due to earthquake – Strengthening using FRP Strengthening and stabilization techniques for repair. DEMOLITION OF STRUCTURES-Engineered demolition techniques for structures - case studies

## **REFERENCES:**

1. Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991.
2. Allen R.T and Edwards S.C, "Repair of Concrete Structures", Blakie and Sons, UK, 1987.
3. Raikar, R.N., "Learning from failures - Deficiencies in Design, Construction and Service" - R&D Centre (SDCPL), Raikar Bhavan, Bombay, 1987.
4. Santhakumar A.R., "Concrete Technology" Oxford University Press, Printed in India by Radha Press, New Delhi, 2007.

