

BRANCH-CONSTRUCTION TECHNOLOGY & MANAGEMENT

Specialization: Construction Technology & Management

Second Semester							
Theory					Practical		
Course Name	Hours/Week L/T	Credit Theory	University Marks	Internal Evaluation	Hours/Week L/T	Credit Practical	Marks
Specialization Core-I Infrastructure Valuation	4-0	4	100	50	-	-	-
Specialization Core-II Strategic Management in Construction	4-0	4	100	50	-	-	-
Elective – I (Specialization related) 1. Quality & Safety Management 2. Building Information Management 3. Construction Techniques 4. Quantitative Methods in Construction	4-0	4	100	50	-	-	-
Elective – II (Departmental related) 1. Advance Construction Materials 2. Construction Equipment Management 3. Maintenance & Rehabilitation of Structures 4. Contract Management & Arbitration	4-0	4	100	50	-	-	-
Elective _ III (from any department) 1. Energy Conservation Techniques in Building Construction 2. Environmental Impact Assessment & Management 3. Human Resource Development for Construction 4. Climate Change & Sustainable Development 5. Green Building Concepts	4-0	4	100	50	-	-	-
LAB 2 (Specialization lab to be decided by the department)					4	4	150
Seminar/Project					4	4	150
Total							
Total Marks: 1050							
Total Credits: 28							

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.

TENTATIVE
Likely to be Modified

STRATEGIC MANAGEMENT IN CONSTRUCTION

MODULE-1

Introduction to Strategic Management Concepts, Strategy Formation and Implementation, External and Internal Environment Analysis,

MODULE-2

Financial Strategies, Decision and Analytical Tools, Corporate Strategic Events, Leadership and Decision-making, Corporate Social Responsibility.

REFERENCES

1. David Langford, Steven Male, Strategic Management in Construction, 2nd Edition, John Wiley and Sons, 2008.
2. Richard Fellows, Construction Management in Practice, 2nd Edition, Blackwell Science, 2001.

TENTATIVE
Likely to be Modified

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.

REFERENCES:

- 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.

BUILDING INFORMATION MANAGEMENT

MODULE-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.

MODULE-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 Company, 1983.
3. Peter R. Smith and Warren G. Julian, Building Services, Applied Science Publishers Ltd., 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

CONSTRUCTION TECHNIQUES

Reinforced and prestressed concrete construction - Prefabricated structures - Production of ready mixed concrete - Productivity analysis, Economics of form work, Design of Formwork and their reusability, Modular construction Practices, Fibonacci series, its handling and other reliable proportioning concepts. Modular coordination, Standardisation, system building, Lamination and Advantages of modular construction

References:

1. Allen E, Iano, J, Fundamentals of Building Construction Material and Method, John Wiley & Sons, 2011.
2. Cameron K. Andres, Ronald C. Smith, Principles and Practices of Commercial Construction, 8th Edition, Prentice Hall, 2009

TENTATIVE
Likely to be Modified

QUANTITATIVE METHODS IN CONSTRUCTION

Introduction and concepts of probability and statistics, Linear programming, Transportation and assignment problems. Dynamic programming, Queuing theory, Decision theory, Games theory simulations applied to construction, Modifications and improvement on CPM/PERT techniques.

Reference:

1. Freund, J.E. and Miller, I.R., Probability and Statistics for Engineers, 5th Edition, Prentice Hall of India, New Delhi, 1994.
2. Goel B.S. and Mittal, S.K., Operations Research, Pragati Prakashan, Meerut, 2000.
3. Gupta, S.C. and Kapur, V.K., Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 1999
4. Taha, H.A., Operations Research: An Introduction, 8th Edition, Prentice Hall of India, New Delhi, 2010.

TENTATIVE
Likely to be Modified

ADVANCED CONSTRUCTION MATERIALS

Module 1:

Fresh concrete and its rheology. Mechanical, deformational behavior and microstructure of hardened concrete. Creep and shrinkage. Testing of concrete. mix design and properties of concrete; High strength concrete; High density and lightweight concretes; admixtures

Module 2:

Industrial waste materials in concrete, their influence on physical and mechanical properties and durability of concrete, Concreting under extreme weather conditions, High strength concrete. Changes in concrete with time, Corrosion of concrete in various environments. Corrosion of reinforcing steel. Ferro-cement, material and properties.

Module 3:

Foams and light weight materials, fibre reinforced concrete. Types of fibres, workability, mechanical and physical properties of fibre reinforced concrete. Polymers in Civil Engineering, Polymers, fibres and composites,

Module 4:

Fibre reinforced plastic in sandwich panels, modeling. Architectural use and aesthetics of composites. Adhesives and sealants. Structural elastomeric bearings and resilient seating. Moisture barriers, Polymer foams and polymers in Building, Polymer concrete composites.

Books:

1. Neville A.M., 'Properties of concrete', 3rd ed., 1985, ELBS Lea F.M.,
2. 'Chemistry of cement and concrete', 3rd ed., 1970, Edward Arnold Proceedings of recent seminars etc. and journals.

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.

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.

CONTRACT MANAGEMENT AND ARBITRATION

Construction Law - public law; Government Departments and Local Authorities; Private Law, Contracts, torts, property law and building law. Construction Contracts - Contract Specifications - types of contract documents used for construction - Contract Procurement - selecting a contractor. Contract Procedure- Disputes, Arbitration and litigation procedure- preparation, settlement, evidence. Price Adjustment: need for the formulae, comparison with previous system, Civil Engineering and building formulae, practical implications.

Reference

1. Gajaria G.T., Laws Relating to Building and Engineering Contracts in India, M.M. Tripathi Private Ltd., Bombay, 1982.
2. Jimmie Hinze, Construction Contracts, 2nd Ed., McGraw Hill, 2001.
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, 6th Edition, McGraw Hill, 2000.

ENERGY CONSERVATION TECHNIQUES IN BUILDING CONSTRUCTION

UNIT I

Fundamentals of energy- Energy Production Systems-Heating, Ventilating and Airconditioning – Solar Energy and Conservation – Energy Economic Analysis – Energy conservation and audits – Domestic energy consumption – savings - challenges – primary energy use in buildings - Residential – Commercial – Institutional and public buildings – Legal requirements for conservation of fuel and power in building, Energy and resource conservation – Design of green buildings – Evaluation tools for building energy – Embodied and operating energy – Peak demand – Comfort and Indoor Air quality – Visual and acoustical quality – Land, water and materials - Airborne emissions and waste management.

UNIT -2

Natural building design consideration – Energy efficient design strategies – Contextual factors – Longevity and process Assessment – Renewable Energy Sources and design – Advanced building Technologies – Smart buildings – Economies and cost analysis. Energy in building design – Energy efficient and environment friendly building – Thermal phenomena – thermal comfort – Indoor Air quality – Climate, sun and Solar radiation, - Psychometrics – passive heating and cooling systems - Energy Analysis – Active HVAC systems - Preliminary Investigation – Goals and policies – Energy audit – Types of Energy audit – Analysis of results – Energy flow diagram – Energy consumption / Unit Production – Identification of wastage- Priority of conservative measures – Maintenance of energy management programme.

UNIT -3

Energy management of electrical equipment - Improvement of power factor – Management of maximum demand – Energy savings in pumps – Fans – Compressed air systems – Energy savings in Lighting systems – Air conditioning systems – Applications – Facility operation and maintenance – Facility modifications – Energy recovery dehumidifier – Waster heat recovery – Steam plants and distribution systems – Improvement of boiler efficiency – Frequency of blow down – Steam leakage – steam Flash and condense return.

REFERENCES:

1. Moore F., Environmental Control system Mc Graw Hill, Inc. 1994.
2. Brown, GZ, Sun, Wind and light: Architectural design strategies, John Wiley & Sons, 1985.
3. Cook, J, Award – Winning passive Solar Design, Mc Graw Hill, 1984.

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Environmental attributes, Environmental imbalances, Sustainable development and EIA, Environmental issues in water resource development - Impacts of Dams on Environment, Environmental impacts of industrial development, Highways, Mining and energy development, EIA Methodologies, Environmental management plan.

References:

1. Canter, L.W., Environmental Impact Assessment, McGraw Hill Pub. Co., 1997.
2. David P. Lawrence, Environmental Impact Assessment: Practical Solutions to Recurrent Problems, John Wiley & Sons, 2003.
3. Hosetti, B. B., Kumar Eds, A., Environmental Impact Assessment and Management, Daya Publishing House, 1998.
4. UNESCO, Methodological Guidelines for the Integrated Environmental Evaluation of Water Resources Development, UNESCO/UNEP, Paris, 1987.

HUMAN RESOURCE DEVELOPMENT FOR CONSTRUCTION

Challenges of managing people in construction; organization and management theory; HRM theory; strategic

HRM approaches; operational HRM approaches; employee relations; employee empowerment; diversity

and work/life balance; employee welfare; strategic human resource development; employment legislation.

Reading:

1. Langfor D.A, Human Resource Management in Construction, Longman, 1995.
2. Martin Loosemore, Andrew Dainty, Helen Lingard, Human Resource Management in Construction Projects: Strategic and Operational Approaches, Taylor and Francis, 2010.

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

Climate system, Human impacts on the climate, Modeling-interpretation and prediction of climate, Long term climate monitoring, Concepts of climate change, Potential causes of climate change, Integrated approach and sectoral approach, Climate change regimes, Sustainable development, Climate protection pathways of development.

Reading:

1. Anil Markandya, Climate Change and Sustainable Development: Prospects for Developing Countries, Routledge, 2002.
2. Heal, G. M., Interpreting Sustainability, in Sustainability: Dynamics and Uncertainty, Kluwer Academic Publ., 1998.
3. Jepma, C.J., and Munasinghe, M., Climate Change Policy - Facts, Issues and Analysis, Cambridge University Press, 1998.
4. Munasinghe, M., Sustainable Energy Development: Issues and Policy in Energy, Environment and Economy: Asian Perspective, Kleindorfer P. R. et. al (ed.), Edward Elgar, 1996.

GREEN BUILDING CONCEPTS

Module I

Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building materials: sources, methods of production and environmental Implications. Embodied Energy in Building Materials: Transportation Energy for Building Materials; Maintenance Energy for Buildings.

Module II

Implications of Building Technologies Embodied Energy of Buildings: Framed Construction, Masonry Construction. Resources for Building Materials, Alternative concepts. Recycling of Industrial and Buildings Wastes. Biomass Resources for buildings.

Module III

Comforts in Building: Thermal Comfort in Buildings- Issues; Heat Transfer Characteristic of Building Materials and Building Techniques. Incidence of Solar Heat on Buildings-Implications of Geographical Locations.

Module IV

Utility of Solar energy in buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling. Case studies of Solar Passive Cooled and Heated Buildings. Unit V Green Composites for buildings: Concepts of Green Composites. Water Utilization in Buildings, Low Energy Approaches to Water Management. Management of Solid Wastes. Management of Sullage Water and Sewage. Urban Environment and Green Buildings. Green Cover and Built Environment.

TEXT BOOKS

- [1] K.S.Jagadish, B. U. Venkataramareddy and K. S. Nanjundarao. Alternative Building Materials and Technologies. New Age International, 2007.
- [2] Low Energy Cooling For Sustainable Buildings. John Wiley and Sons Ltd, 2009.
- [3] Green My Home!: 10 Steps to Lowering Energy Costs and Reducing Your Carbon Footprint, by Dennis C. Brewer, ISBN:9781427798411, Publisher: Kaplan Publishing, Publication Date: October 2008.
- [4] B. Givoni, Man, Climate and Architecture Elsevier, 1969.
- [5] T. A. Markus and E. N. Morris Buildings Climate and Energy. Pitman, London, 1980. Arvind Kishan et al (Ed)
- [6] Climate Responsive Architecture. TataMcGraw Hill, 2001.
- [7] Sustainable Building Design Manual. Vol 1 and 2, Teri, New Delhi, 2004.
- [8] O. H. Koenigs Berger, T. G. Ingersoll, Alan Mayhew and S. V. Szokolay. Manual of Tropical Housing and Building. Orient Long man, 1975.

REFERENCE BOOKS

- [1] Osman Attmann Green Architecture Advanced Technologies and Materials. McGraw Hill, 2010.
- [2] Michael F. Ashby Materials and the Environment, Elsevier, 2009.
- [3] Jerry Yudelson Green building Through Integrated Design. McGraw Hill, 2009.
- [4] Mili M. Ajumdar (Ed) Energy Efficient Building in India. Teri and Mnes, 2001/2002.
- [5] T. N. Seshadri et al Climatological and Solar Data for India. CBRI and SaritaPrakashan, 1968. 34
- [6] Fundamentals of Integrated Design for Sustainable Building By Marian Keeler, Bill Burke