PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. To prepare students to excel in research or to succeed in Construction Engineering and Management profession through global, rigorous post graduate education.

II. To provide students with a solid foundation in mathematical, scientific and construction engineering fundamentals required to solve Construction Engineering and Management problems.

III. To train students with efficient and effective construction knowledge in project formulation, planning, scheduling techniques, quantitative methods, costing, quality control and assurance techniques for the existing and new construction projects.

IV. To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, leadership quality, safety management, energy management in construction, multidisciplinary approach, and an ability to relate Construction Engineering and Management issues in broader social context.

V. To provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the lifelong learning needed for a successful professional career.

PROGRAMME OUTCOMES (POs):

On successful completion of the programme,

1. Graduates will demonstrate knowledge of statistical methods and queuing theory and its applications science and construction engineering.

2. Graduates will demonstrate an ability to identify, formulate, plan and schedule construction engineering projects.

3. Graduate will demonstrate an ability to understand and structure the construction engineering activities and its management.

4. Graduates will demonstrate an ability to design a required man, material, equipment, cost and time as per needs and specifications.

5. Graduates will demonstrate an ability to visualize and work on laboratory in advanced concrete technology.

6. Graduate will demonstrate skills to use modern construction engineering tools, software and equipment.

7. Graduates will demonstrate knowledge of professional and ethical responsibilities.

8. Graduate will be able to communicate effectively in both verbal and written form.

9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

10. Graduate will develop confidence in self education and ability for lifelong learning.
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# M.E. CONSTRUCTION ENGINEERING AND MANAGEMENT
## REGULATIONS – 2015
### CHOICE BASED CREDIT SYSTEM
#### CURRICULA AND SYLLABI

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**EMPLOYABILITY ENHANCEMENT COURSES (EEC)**

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OBJECTIVE:
- To study and understand the various types of equipments used for earthwork, tunneling, drilling, blasting, dewatering, material handling conveyors and its applications in construction projects.

UNIT I
CONSTRUCTION EQUIPMENTS AND MANAGEMENT 9

UNIT II
EQUIPMENT FOR EARTHWORK 9

UNIT III
OTHER CONSTRUCTION EQUIPMENT 9

UNIT IV
ASPHALT AND CONCRETE PLANTS 9

UNIT V
MATERIALS HANDLING EQUIPMENT 9
Forklifts and related equipment - Portable Material Bins – Material Handling Conveyors – Material Handling Cranes- Industrial Trucks.

TOTAL : 45 PERIODS

OUTCOME:
- At the end of this course students will be able to know various types of equipments to be used in the constructions projects.

REFERENCES:
OBJECTIVE:
- To study and understand the properties of modern construction materials used in construction such as special concretes, metals, composites, water proofing compounds, non weathering materials, and smart materials.

UNIT I  SPECIAL CONCRETES  9

UNIT II  METALS  9

UNIT III  COMPOSITES  9
Types of Plastics – Properties & Manufacturing process – Advantages of Reinforced polymers – Types of FRP – FRP on different structural elements – Applications of FRP.

UNIT IV  OTHER MATERIALS  9
Types and properties of Water Proofing Compounds – Types of Non-weathering Materials and its uses – Types of Flooring and Facade Materials and its application.

UNIT V  SMART AND INTELLIGENT MATERIALS  9
Types & Differences between Smart and Intelligent Materials – Special features – Case studies showing the applications of smart & Intelligent Materials.

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will have the knowledge of modern construction materials used in the field.

REFERENCES:
1. ACI Report 440.2R-02, “Guide for the design and construction of externally bonded RP systems for strengthening concrete structures”, American Concrete Institute, 2002.
CN7103  PROJECT FORMULATION AND APPRAISAL  L T P C
3 0 0 3

OBJECTIVE:
- To study and understand the formulation, costing of construction projects, appraisal, finance and private sector participation.

UNIT I  PROJECT FORMULATION  9

UNIT II  PROJECT COSTING  9

UNIT III  PROJECT APPRAISAL  9

UNIT IV  PROJECT FINANCING  9

UNIT V  PRIVATE SECTOR PARTICIPATION  9
Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Scope of Technology Transfer.

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will be able to know the formulations of projects, projects costing, appraisal and financing.

REFERENCES:
2. Joy P.K., Total Project Management - The Indian Context, New Delhi, Macmillan India Ltd., 1992

MA7160  STATISTICAL METHODS FOR ENGINEERS  L T P C
4 0 0 4

OBJECTIVES:
- This course aims at providing the necessary basic concepts of a few statistical methods and apply them to various engineering problems.
UNIT I ESTIMATION THEORY
Estimators: Unbiasedness, Consistency, Efficiency and Sufficiency – Maximum Likelihood
Estimation – Method of moments.

UNIT II TESTING OF HYPOTHESIS
Tests based on Normal, t, X^2 and F distributions for testing of means, variance and proportions –
Analysis of r x c tables – Goodness of fit.

UNIT III CORRELATION AND REGRESSION
Multiple and Partial Correlation - Method of Least Squares - Plane of Regression - Properties of
Residuals - Coefficient of Multiple Correlation - Coefficient of Partial Correlation - Multiple
Correlation with total and partial correlations - Regression and Partial correlations in terms of lower
order coefficients.

UNIT IV DESIGN OF EXPERIMENTS
Analysis of variance – One-way and two-way classifications – Completely randomized design –
Randomized block design – Latin square design.

UNIT V MULTIVARIATE ANALYSIS
Random vectors and Matrices – Mean vectors and Covariance matrices – Multivariate Normal
density and its properties – Principal components: Population principal components – Principal
components from standardized variables.

TOTAL : 60 PERIODS

OUTCOME:
- It helps the students to have a clear perception of the power of statistical ideas, tools and
would be able to demonstrate the applications of statistical techniques to problems drawn
from industry, management and other engineering fields.

REFERENCES:
2. Devore, J.L., “Probability and statistics for Engineering and the Sciences”, Thomson and

CN7201 ADVANCED CONSTRUCTION TECHNIQUES

OBJECTIVE:
- To study and understand the latest construction techniques applied to engineering
construction for sub structure, super structure, special structures, rehabilitation and
strengthening techniques and demolition techniques.
UNIT I  SUB STRUCTURE CONSTRUCTION  
Box jacking - Pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - Piling techniques - Driving well and caisson - sinking cofferdam - cable anchoring and grouting - Driving diaphragm walls, Sheet piles - Laying operations for built up offshore system - Shoring for deep cutting - Large reservoir construction - well points - Dewatering for underground open excavation.

UNIT II  SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS  
Vacuum dewatering of concrete flooring – Concrete paving technology – Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections – Erection techniques of tall structures, Large span structures – launching techniques for heavy decks – in-situ prestressing in high rise structures, Post tensioning of slab- aerial transporting – Handling and erecting lightweight components on tall structures.

UNIT III  CONSTRUCTION OF SPECIAL STRUCTURES  
Erection of lattice towers - Rigging of transmission line structures – Construction sequence in cooling towers, Silos, chimney, sky scrapers - Bow string bridges, Cable stayed bridges – Launching and pushing of box decks – Construction of jetties and break water structures – Construction sequence and methods in domes – Support structure for heavy equipment and machinery in heavy industries – Erection of articulated structures and space decks.

UNIT IV  REHABILITATION AND STRENGTHENING TECHNIQUES  

UNIT V  DEMOLITION  
Demolition Techniques, Demolition by Machines, Demolition by Explosives, Advanced techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety precaution in Demolition and Dismantling.

TOTAL : 45 PERIODS

OUTCOME:

- On completion of this course the students will know the modern construction techniques used in the construction of buildings and special structures and also rehabilitation, strengthening techniques and demolition.

REFERENCES:

1. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984
OBJECTIVE:
- To study and understand the hardware and software requirements of computer, programming, optimization techniques, inventory models and scheduling techniques applied to construction engineering.

UNIT I  INTRODUCTION  6+6
Overview of IT Applications in Construction – Construction process – Computerization in Construction – Computer aided Cost Estimation – Developing application with database software.

UNIT II  OPTIMIZATION TECHNIQUES  6+6
Linear, Dynamic and Integer Programming - Branch and Bound Techniques – Application to Production Scheduling, Equipment Replacement, Material Transportation and Work Assignment Problems – Software applications.

UNIT III  INVENTORY MODELS  6+6
Deterministic and Probabilistic Inventory Models - Software applications.

UNIT IV  SCHEDULING APPLICATION  6+6
PERT and CPM - Advanced planning and scheduling concepts – Computer applications – Case study.

UNIT V  OTHER PROBLEMS  6+6
Sequencing problems – Simulation – Enterprises – Introduction to ERP systems.

TOTAL (L:30+P:30) : 60 PERIODS

OUTCOME:
- On completion of this course the students will know the computer applications in construction, different optimization techniques and sequencing problems.

REFERENCES:
OBJECTIVE:
- To study and understand the concept of planning, scheduling, cost and quality control, safety during construction, organization and use of project information necessary for construction project.

UNIT I CONSTRUCTION PLANNING

UNIT II SCHEDULING PROCEDURES AND TECHNIQUES

UNIT III COST CONTROL, MONITORING AND ACCOUNTING

UNIT IV QUALITY CONTROL AND SAFETY DURING CONSTRUCTION

UNIT V ORGANIZATION AND USE OF PROJECT INFORMATION

TOTAL: 45 PERIODS

OUTCOME:
- On completion of this course the students will know the development of construction planning, scheduling procedure and controls.

REFERENCES:
OBJECTIVE:
- To study the various types of construction contracts and their legal aspects and provisions.
- To study the type of tenders, arbitration, legal requirement, and labour regulations.

UNIT I  CONSTRUCTION CONTRACTS  9

UNIT II  TENDERS  9

UNIT III  ARBITRATION  9

UNIT IV  LEGAL REQUIREMENTS  9

UNIT V  LABOUR REGULATIONS  9

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will know different types of contracts in construction, arbitration and legal aspect and its provisions.

REFERENCES:
(A) ADVANCED CONSTRUCTION ENGINEERING LABORATORY

OBJECTIVE:
- This course provides a thorough knowledge of material selection through the material testing based on specification.

LIST OF EXPERIMENTS
1. Mix design of concrete as per IS, ACI & BS methods for high performance concrete.
3. Effect of minerals and chemical admixtures in concrete at fresh and hardened state with relevance to workability, strength and durability.
4. NDT on hardened concrete - UPV, Rebound hammer and core test.
5. Permeability tests on hardened concrete – Demonstration

OUTCOME:
- On completion of this laboratory course students will be able to test the concrete mixes designed as per IS, ACI and BS methods.
- Students will also be able to know various tests on hardened concrete.

TOTAL : 30 PERIODS

(B) ADVANCED COMPUTING TECHNIQUES LABORATORY

OBJECTIVE:
- This course gives an exposure to students in utilizing the sophisticated spread sheets programs, estimation software and other package programs.

LIST OF EXPERIMENTS
1. Quantity takeoff, Preparation and delivery of the bid or proposal of an engineering construction project.
2. Design of a simple equipment information system for a construction project.
3. Scheduling of a small construction project using Primavera scheduling systems including reports and tracking.
4. Scheduling of a small construction project using tools like MS project scheduling systems including reports and tracking.
5. Simulation models for project risk analysis.

TOTAL : 30 PERIODS

OUTCOME:
- On completion of this laboratory course the students will be able to do the scheduling of constructions projects using tools like primavera and MS projects.

OBJECTIVE:
- To train the students in the field work so as to have a firsthand knowledge of practical problems related to Construction Management in carrying out engineering tasks.
- To develop skills in facing and solving the problems experiencing in the field.
SYLLABUS:
The students individually undertake training in reputed engineering companies doing construction during the summer vacation for a specified duration of four weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a team of internal staff.

CN7312 SEMINAR

OBJECTIVE:
- To work on a specific technical topic in Construction Engineering and Management in order to acquire the skills of oral presentation.
- To acquire technical writing abilities for seminars and conferences.

SYLLABUS:
The students will work for two hours per week guided by a group of staff members. They will be asked to talk on any topic of their choice related to construction engineering and management and to engage in dialogue with the audience. A brief copy of their talk also should be submitted. Similarly, the students will have to present a seminar of not less than fifteen minutes and not more than thirty minutes on the technical topic. They will also answer the queries on the topic. The students as audience also should interact. Evaluation will be based on the technical presentation and the report and also on the interaction during the seminar.

TOTAL: 30 PERIODS

CN7313 PROJECT WORK (PHASE I)

OBJECTIVE:
- To identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature.
- To develop the methodology to solve the identified problem.
- To train the students in preparing project reports and to face reviews and viva-voce examination.

SYLLABUS:
The student individually works on a specific topic approved by the head of the division under the guidance of a faculty member who is familiar in this area of interest. The student can select any topic which is relevant to the area of construction engineering and management. The topic may be theoretical or case studies. At the end of the semester, a detailed report on the work done should be submitted which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 180 PERIODS

OUTCOME:
- At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.

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CN7411  PROJECT WORK (PHASE II)  L T P C  0 0 24 12

OBJECTIVE:
- To solve the identified problem based on the formulated methodology.
- To develop skills to analyze and discuss the test results, and make conclusions.

SYLLABUS:
The student should continue the phase I work on the selected topic as per the formulated methodology under the same supervisor. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report should be prepared and submitted to the head of the department. The students will be evaluated through based on the report and the viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 360 PERIODS

OUTCOME:
- On completion of the project work students will be in a position to take up any challenging practical problems in the field of construction engineering and management and find better solutions to it.

CN7001  ADVANCED CONCRETE TECHNOLOGY  L T P C  3 0 0 3

OBJECTIVE:
- To study the properties of concrete making materials, tests, mix design, special concretes and various methods for making concrete.

UNIT I  CONCRETE MAKING MATERIALS  9

UNIT II  TESTS ON CONCRETE  9

UNIT III  MIX DESIGN  9

UNIT IV  SPECIAL CONCRETE  9
UNIT V CONCRETING METHODS


OUTCOME:

- On completion of this course the students will know various tests on fresh, hardened concrete, special concrete and the methods of manufacturing of concrete.

REFERENCES:


CN7002 CONSTRUCTION PERSONNEL MANAGEMENT

OBJECTIVE:

- To study the various aspects of manpower management such as man power planning, organization, human relations, welfare and development methods in construction.

UNIT I MANPOWER PLANNING


UNIT II ORGANISATION


UNIT III HUMAN RELATIONS AND ORGANISATIONAL BEHAVIOUR

Basic individual psychology – Approaches to job design and job redesign – Self managing work teams – Intergroup – Conflict in organizations – Leadership-Engineer as Manager – al aspects of decision making – Significance of human relation and organizational – Individual in organization – Motivation – Personality and creativity – Group dynamics, Team working – Communication and negotiation skills.

UNIT IV WELFARE MEASURES

UNIT V MANAGEMENT AND DEVELOPMENT METHODS


TOTAL : 45 PERIODS

OUTCOME:
• On completion of this course the students will know various processes in manpower planning, organizational and welfare measures.

REFERENCES:

CN7003 CONSTRUCTION PROJECT MANAGEMENT

OBJECTIVE:
• To study the various management techniques for successful completion of construction projects.
• To study the effect of management for project organization, design of construction process, labour, material and equipment utilization, and cost estimation.

UNIT I THE OWNERS' PERSPECTIVE

UNIT II ORGANIZING FOR PROJECT MANAGEMENT

UNIT III DESIGN AND CONSTRUCTION PROCESS
UNIT IV  LABOUR, MATERIAL AND EQUIPMENT UTILIZATION  9

UNIT V  COST ESTIMATION  9

OUTCOME:
- On completion of this course the students will be able to know the modern trends in project management viz. design, construction, resource utilisation and cost estimation.

REFERENCES:

CN7004  DESIGN OF ENERGY EFFICIENT BUILDINGS  L T P C
3 0 0 3

OBJECTIVE:
- To study the design of energy efficient buildings which balances all aspects of energy, lighting, space conditioning and ventilation by providing a mix of passive solar design strategies and to learn the use of materials with low embodied energy.

UNIT I  INTRODUCTION  9

UNIT II  PASSIVE SOLAR HEATING AND COOLING  9
UNIT III DAYLIGHTING AND ELECTRICAL LIGHTING

UNIT IV HEAT CONTROL AND VENTILATION

UNIT V DESIGN FOR CLIMATIC ZONES

OUTCOME:
- On completion of this course the students will be able to know various components which makes the building energy efficient such as lighting, space conditioning, heat control and energy efficient.

REFERENCES:

CN7005 ECONOMICS AND FINANCE MANAGEMENT IN CONSTRUCTION L T P C
3 0 0 3

OBJECTIVE:
- To study the concepts of Construction Economic and Finance such as comparing alternatives proposals, evaluating alternative investments, management of funds, and management of accounting.
UNIT I BASIC PRINCIPLES 9
Time Value of Money – Cash Flow diagram – Nominal and effective interest- continuous interest . Single Payment Compound Amount Factor (P/F,F/P) – Uniform series of Payments (F/A,A/F,F/P,A/P)– Problem time zero (PTZ)- equation time zero (ETZ). Constant increment to periodic payments – Arithmetic Gradient(G), Geometric Gradient (C).

UNIT II COMPARING ALTERNATIVES PROPOSALS 9
Comparing alternatives- Present Worth Analysis, Annual Worth Analysis, Future Worth Analysis, Rate of Return Analysis (ROR) and Incremental Rate of Return (IROR)Analysis, Benefit/Cost Analysis, Break Even Analysis.

UNIT III EVALUATING ALTERNATIVE INVESTMENTS 9
Real Estate - Investment Property, Equipment Replace Analysis, Depreciation – Tax before and after depreciation – Value Added Tax (VAT) – Inflation.

UNIT IV FUNDS MANAGEMENT 9

UNIT V FUNDAMENTALS OF MANAGEMENT ACCOUNTING 9

TOTAL : 45 PERIODS

OUTCOME:
• On completion of this course the students will be able to know the concepts in economics and finance in constructions.

REFERENCES:

CN7006 MANAGEMENT INFORMATION SYSTEMS L T P C
3 0 0 3

OBJECTIVE:
• To study the concepts of information systems and their applications, system development and information systems, implementation and control, and system audit.

UNIT I INTRODUCTION 9
UNIT II SYSTEM DEVELOPMENT

UNIT III INFORMATION SYSTEMS

UNIT IV IMPLEMENTATION AND CONTROL

UNIT V SYSTEM AUDIT

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will be able to know the various applications of information systems in management.

REFERENCES:

CN7007 PROJECT SAFETY MANAGEMENT

OBJECTIVES:
- To study and understand the various safety concepts and requirements applied to construction projects.
- To study of the construction accidents, safety programmes, contractual obligations, and design for safety.

UNIT I CONSTRUCTION ACCIDENTS

UNIT II SAFETY PROGRAMMES
UNIT III  CONTRACTUAL OBLIGATIONS  9
Safety in Construction Contracts – Substance Abuse – Safety Record Keeping.

UNIT IV  DESIGNING FOR SAFETY  9

UNIT V  OWNERS’ AND DESIGNERS’ OUTLOOK  9
Owner’s responsibility for safety – Owner preparedness – Role of designer in ensuring safety – Safety clause in design document.

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will be able to know various constructions safety concepts.

REFERENCES:

CN7008  QUALITY CONTROL AND ASSURANCE IN CONSTRUCTION  L T P C 3 0 0 3

OBJECTIVES:
- To study the concepts of quality assurance and control techniques in construction.
- To study the design of philosophy, design of special elements, flat slabs and yield line based design, and ductile detailing.

UNIT I  QUALITY MANAGEMENT  9

UNIT II  QUALITY SYSTEMS  9

UNIT III  QUALITY PLANNING  9

UNIT IV  QUALITY ASSURANCE AND CONTROL  9
Objectives – Regularity agent, owner, design, contract and construction oriented objectives, methods – Techniques and needs of QA/QC – Different aspects of quality – Appraisals, Factors influencing construction quality – Critical, major failure aspects and failure mode analysis, – Stability methods and tools, optimum design – Reliability testing, reliability coefficient and reliability prediction.

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UNIT V  QULAITY IMPROVEMENT TECHNIQUES  
Selection of new materials – Influence of drawings, detailing, specification, standardization – Bid preparation – Construction activity, environmental safety, social and environmental factors – Natural causes and speed of construction – Life cycle costing – Value engineering and value analysis.

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will be able to know the quality control aspects in planning, systems management, assurance and improvement techniques.

REFERENCES:

CN7009  QUANTITATIVE TECHNIQUES IN MANAGEMENT  

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<th>UNIT V</th>
<th>MANAGERIAL ECONOMICS</th>
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TOTAL : 45 PERIODS
**OUTCOME:**
- On completion of this course the students will be able to know operations research, production management, financial management and cost concepts.

**REFERENCES:**

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**OBJECTIVE:**
- To study the management and control of various resources involved in construction.
- To study the effect of resource planning, labour management, material and equipment, time management, and resource allocation and resource leveling in construction.

**UNIT I**  **RESOURCE PLANNING**  9
Resource Planning, Procurement, Identification, Personnel, Planning for material, Labour, time schedule and cost control, Types of resources, manpower, Equipment, Material, Money, Time.

**UNIT II**  **LABOUR MANAGEMENT**  9
Systems approach, Characteristics of resources, Utilization, measurement of actual resources required, Tools for measurement of resources, Labour, Classes of Labour, Cost of Labour, Labour schedule, optimum use Labour.

**UNIT III**  **MATERIALS AND EQUIPMENT**  9
Material: Time of purchase, quantity of material, sources, Transportation, Delivery and Distribution.
Equipment: Planning and selecting by optimistic choice with respect to cost, Time, Source and handling.

**UNIT IV**  **TIME MANAGEMENT**  9
Personnel time, Management and planning, managing time on the project, forecasting the future, Critical path measuring the changes and their effects – Cash flow and cost control.

**UNIT V**  **RESOURCE ALLOCATION AND LEVELLING**  9

**TOTAL : 45 PERIODS**

**OUTCOME:**
- On completion of this course the students will be able to know resource planning, management, allocation and resource leveling in construction.
REFERENCES:

CN7011 SHORING, SCAFFOLDING AND FORMWORK L T P C
3 0 0 3

OBJECTIVE:
- To study and understand the overall and detailed planning of formwork, plant and site equipment.
- To understand the Design and erection of forms for various elements such as slabs, beams, columns, walls, shells and tunnels.
- To know the latest methods of form construction.

UNIT I PLANNING, SITE EQUIPMENT & PLANT FOR FORM WORK
Introduction - Forms for foundations, columns, beams walls etc., General objectives of formwork building - Planning for safety - Development of a Basic System - Key Areas of cost reduction - Planning examples. Overall Planning - Detailed planning - Standard units - Corner units - Pass units - Calculation of labour constants - Formwork hours - Labour Requirement - Overall programme - Detailed programme - Costing - Planning crane arrangements - Site layout plan - Transporting plant - Formwork beams - Scaffold frames - Framed panel formwork - Formwork accessories.

UNIT II MATERIALS ACCESSORIES PROPRIETARY PRODUCTS & PRESSURES

UNIT III DESIGN OF FORMS AND SHORES
Basic simplification - Beam formulae - Allowable stresses - Deflection, Bending - Lateral stability - Shear, Bearing - Design of Wall forms - Slab forms - Beam forms - Column forms - Examples in each. Simple wood stresses - Slenderness ratio - Allowable load vs length behaviour of wood shores - Form lining Design Tables for Wall formwork - Slab Formwork - Column Formwork - Slab props - Stacking Towers - Free standing and restrained - Rosett Shoring - Shoring Tower - Heavy Duty props.

UNIT IV BUILDING AND ERECTING THE FORM WORK
Carpentry Shop and job mill - Forms for Footings - Wall footings - Column footings - Sloped footing forms - Strap footing - Stepped footing - Slab form systems - Sky deck and Multiflex - Customized slab table - Standard Table module forms - Swivel head and uniportal head - Assembly sequence - Cycling with lifting fork - Moving with table trolley and table prop. Various causes of failures - ACI - Design deficiencies - Permitted and gradual irregularities.
UNIT V  FORMS FOR DOMES AND TUNNELS, SLIP FORMS AND SCAFFOLDS  9
Hemispherical, Parabolic, Translational shells - Typical barrel vaults Folded plate roof details - Forms for Thin Shell roof slabs design considerations - Building the forms - Placing concrete - Form removed -Strength requirements -Tunnel forming components - Curb forms invert forms - Arch forms - Concrete placement methods - Cut and cover construction - Bulk head method - Pressures on tunnels - Continuous Advancing Slope method - Form construction - Shafts. Slip Forms - Principles -Types - advantages - Functions of various components - Planning -Desirable characteristics of concrete - Common problems faced - Safety in slip forms special structures built with slip form Technique - Types of scaffolds - Putlog and independent scaffold -Single pole scaffolds - Truss suspended - Gantry and system scaffolds.

TOTAL: 45 PERIODS

OUTCOME:
• On completion of this course the students will be able to know the detailed planning of framework, design of forms and erection of form work.

REFERENCES:
2. Hurd, M.K., Formwork for Concrete, Special Publication No.4, American Concrete Institute, Detroit, 1996

CN7012  SYSTEM INTEGRATION IN CONSTRUCTION  L T P C
3 0 0 3

OBJECTIVE:
• To study and understand the construction system integration, environmental factors, services, maintenance and safety systems.

UNIT I  STRUCTURAL INTEGRATION  9

UNIT II  ENVIRONMENTAL FACTORS  9

UNIT III  SERVICES  9
Plumbing – Electricity – Vertical circulation and their interaction – HVAC.

UNIT IV  MAINTENANCE  9
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.
UNIT V  SAFETY
Ability of systems to protect fire – Preventive systems – fire escape system design – Planning for pollution free construction environmental – Hazard free Construction execution.

TOTAL : 45 PERIODS

OUTCOME:
- On completion of this course the students will be able to know various Structural systems, Services, Safety and Maintenance requirements in construction.

REFERENCES: