



**IPS Academy, Institute of Engineering & Science**  
(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)  
Scheme & Syllabus  
**Civil Engineering Department**  
(U.G.NBA Accredited up to June 2023)

**Bachelor of Technology (B.Tech.)**  
**Honors Certification in Construction Management & BIM**  
(To be offered to students of Civil Engineering Department)

S.No.	Semester	Subject Code	Subject Name	Contact Hours per week			Total Credits
				L	T	P	
1	V	HOCE-CM-501	Construction Management and project planning	3	-	2	4
2	VI	HOCE-CM-601	Construction Equipment & Material Management	3	1		4
3	VII	HOCE-CM-701	Construction Quality Control & management in	2	1	-	3
4	VIII	HOCE-CM-801	Construction Safety Management	3	1	-	4
<b>Total</b>				<b>11</b>	<b>3</b>	<b>2</b>	<b>15</b>
<b>Total Academic Engagement and Credits</b>				<b>16</b>			<b>15</b>

\* L : Lecture, T: Tutorial, P:Practical



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**Honors Subject Offered by Civil Department**

<b>HOCE- CM-501</b>	<b>Construction Management and Project Planning</b>	<b>3L: 0T: 2P (5 hrs.)</b>	<b>4 credits</b>
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**Course Objective:**

Objective of this course is that student will be successful learn about the project's procedures of initiation, planning, execution, regulation and closure.

**Course Contents: (40 hrs.)**

**Module 1** **(08 hrs)**

**Time Management:** Introduction, steps in Project Management – work break down structure, Bar Chart, Mile stone chart, Ganttchart, Activity on Arrow and Activity On node.

Introduction to PERT: Concept of probability, normal and Beta Distribution, Central limit theorem. Time estimates and calculations of project duration, critical path, slack, probability of project completion.

**Module 2** **(08 hrs)**

**Network Analysis:** Precedence network, Critical Path Method (CPM): Introduction, Time estimates, floats, critical path, Network compression – Least Cost and optimum duration, Updating of networks– needs, steps, project duration, calculation for updated network.

**Module 3** **(08 hrs)**

**Resource Management:** Human resource allocation- smoothing and leveling, material management – definition by international federation of purchasing and material management. Objectives, Role Functions, Qualities of material manager Material forecasting. Inventory Control- Necessity, Techniques such as ABC, EOQ, HML, VED, SDE, etc

**Module 4** **(08 hrs)**

**Financial Management:** Introduction to Engineering economics, importance, demand and supply, types of costs, Types of interest such as – simple, compound, continuous, effective. Value of Money – time and equivalence, tangible and intangible factors, introduction to inflation. Interest factors – Uniform series factors – derivations.

## **Module 5**

**(08 hrs)**

**Economic Analysis:** Economic comparisons, Discounting methods: Present worth method, equivalent annual cost method, capitalized cost method, net present value, and internal rate of return.

### **Course Outcomes:**

CO1: To understand the Project time Management through various charts and techniques.

CO2: To know the network Analysis of project scheduling.

CO3: To know about the material and inventory management with different techniques.

CO4: To understand the financial management of construction project

CO5: To understand the Economic analysis by various methods.

### **List of Text / Reference Books:**

1. Jha K. N. “Construction Project Management” Pearsons publication. 2015
2. B.C.Punmia, “Project Planning and Control with PERT and CPM”, Laxmi Publications (P) Ltd.
3. S. Seetharaman, “Construction Engineering and Management”, Umesh Publications
4. K KChitkara, “Construction Project Management,” Tata McGraw-Hill Education
5. K.S. Menon, “Purchasing and Inventory Control”, A. H. Wheeler Publishing Company Limited
6. Gopalkrishnan and Sundaresan,” Materials Management: An Integrated Approach”, PHI Learning Pvt. Ltd.



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<b>HOCE- CM-601</b>	<b>Construction Equipment &amp; Material Management</b>	<b>3L: 2T: 0P (5 hrs.)</b>	<b>4 credits</b>
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**Course Objective:**

Student will learn about the management of construction equipment and material on the construction field.

**Course Contents: (40 hrs.)**

**Module 1** **(08 hrs)**

**Equipment Management:** Equipment Management, Costing, Optimum utilization and Equipment selection, depreciation, interest on capital, Manpower, Spare parts etc,

**Equipment maintenance** - Planned, unplanned, preventive, breakdown maintenance, merits and demerits of maintenance

**Module 2** **(08 hrs)**

**Construction Equipment:** Construction Equipment's – Understanding basics, Capacity, Function & Efficiency of All Machinery, involving all machinery data, power use, fuel consumption and labour utilization. Equipment for Earthmoving Machinery, Concreting Equipment, Material Handling Equipment such as cranes, boom, lift and maintenance transportation Equipments.

**Module 3** **(08 hrs)**

**Importance of Materials Management:** Importance of material management and its role in construction industry-scope, objectives and functions, integrated approach to materials management, Role of materials manager

**Module 4:****(08 hrs)**

**Codification and Procurement:** Classification and Codification of materials of construction. ABC analysis-Procedure and its use, Standardization in materials and their management, procurement, identification of sources of procurement, vendor analysis. Vendor analysis concept of (MRP) Material requirement planning, planning, purchase procedure, legal aspects.

**Module 5****(08 hrs)**

**Inventory Management:** Inventory Control techniques. EOQ, Advantages and limitation of use of EOQ, Periodic ordering, order point control, safety stock, stock outs, application of AC analysis in inventory control.

**Stores Management:** Receipt and inspection, care and safety in handling, loss on storage, wastage, Bulk purchasing, site layout and site organization, scheduling of men, materials and equipment.

**Course Outcomes:**

**CO1:** To understand the equipment management and maintenance.

**CO2:** To know the Capacity, Function & Efficiency of Construction Equipments.

**CO3:** To know the importance of material management

**CO4:** To understand the standardization and codification of construction materials.

**CO5:** To learn the inventory and stores managements.

**List of Text / Reference Books**

1. K. S. Menon "Purchasing and Inventory Control" Wheeler Publication.
2. P.Gopalkrishnan "Materials Managemen" Prentice Hall.
3. P.Gopalkrishnan, Sundershan "Handbook of materials management" Prentice Hall.
4. L.C.Jhamb "Inventory Management" Everest Publication.
5. Dr. Mahesh Varma "Construction Equipment Planning and Applications"
6. Roy Chudley and Roger Greeno "Construction Technology" Prentice Hall, 2005.



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<b>HOCE- CM-701</b>	<b>Construction Quality Control &amp; Management</b>	<b>3L: 2T: 0P (5 hrs.)</b>	<b>4 credits</b>
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**Course Objective:**

Main objective of this course is to student will be understand about the all quality aspect and managerial skill of quality control in construction.

**Course Contents: (40 hrs.)**

**Module 1** **(08 hrs.)**

**Concept of Quality:** Definition of quality as given by Deming, Juran, Crosby, difference between Quality control, Quality Assurance (QA/QC). Total quality control (TQC) and Total Quality Management(TQM), Need for TQM in construction industry. Organization necessary for implementation of quality, Quality manual-Contents, data required, Quality aspects in every phase in the life cycle of Construction project.

**Module 2** **(08 hrs.)**

**Quality Control tools :** Histogram, Pareto diagram, Fishbone diagram, Quality control chart- Testing required for quality control of construction material used in RCC Work-destructive and Non destructive Test (NDT)

**Statistical Quality Control-** Necessity, Benchmarking, Application of dispersion methods in qualitycontrol of construction activity

**Module 3** **(08 hrs.)**

**Training and development of Human Resources:** Training needs assessment, technical and managerial competencies necessary for achieving quality, preparation for training. Training on Project Rework Reduction Tool (PRRT) software- training for preparation of checklist

necessary for RCC work, for commonly used formats.

#### **Module 4**

**(08 hrs.)**

**Quality inspection & monitoring:** Development of quality circles, quality inspection team, inspection reports, monitoring and control, 360° feedback for quality

#### **Module 5**

**(08 hrs.)**

**Achieving TQM on Construction Projects:** Advantages, barriers, principles, steps in implementation, seven types of construction defects. Determining cost of poor quality including hidden cost. Quality functions deployment (QFD). Importance of third party quality audits. CIDC- CQRA quality rating systems, customers satisfaction surveys, Non Conformity reports (NCR), remedial strategy for reducing NCR's construction project

#### **Course Outcomes:**

**CO1:** To learn the concept of quality control along with total quality management.

**CO2:** To Know the various tools and techniques of quality control.

**CO3:** To learn the Training and development of Human Resources in construction.

**CO4:** To understand the Quality inspection & monitoring of construction.

**CO5:** To understand the total quality management in construction.

#### **List of Text / Reference Books:**

1. International Standards Organization – ISO 9001 and ISO 9004
2. Mantri Handbook – A to Z of Construction – Mantri Publications
3. Juran's Quality Handbook – Joseph M. Juran, A. Blanton. Godfrey – Mcgraw Hill International Edition (1998)
4. Probability and Statistics for Engineers – Miller, Freund-Hall, Prentice India Ltd.
5. Quality Control and Total Quality Management, P.L.Jain, Tata Mcgraw Hill Publ.



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<b>HOCE- CM-801</b>	<b>Construction Safety Management</b>	<b>3L: 2T: 0P (5 hrs.)</b>	<b>4 credits</b>
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**Course Objective:**

To make students aware about construction safety management in which students learn about various safety operations, safety equipments, and safety policies.

**Course Contents: (40hrs.)**

**Module 1** **(10 hrs.)**

**Construction Safety Management:** Role of various parties, duties and responsibilities of top management, site managers, supervisors etc. role of safety officers, responsibilities of general employees, safety committee, safety training, incentives and monitoring. Writing safety manuals, preparing safety checklists and inspection reports.

**Module 2** **(10 hrs.)**

**Safety in construction operations:** Safety of accidents on various construction sites such as buildings, dams, tunnels, bridges, roads, etc. safety at various stages of construction. Prevention of accidents. Safety measures. Safety in use of construction equipment e.g. vehicles, cranes, hoists and lifts etc. safety of scaffolding and working platforms. Safety while using electrical appliances. Explosives used.

**Module 3** **(10 hrs.)**

**Safety equipment:** Various safety equipment and gear used on site. First aid on site, Safety awareness program. Labour laws, legal requirement and cost aspects of accidents on site, Incentive for safety practices.



## **Module 4**

**(10 hrs.)**

**Safety policies:** Study of safety policies, methods, equipment, training provided on any ISO approved construction Company ,safety in office, working on sites of high rise construction, deepexcavation

### **Course Outcomes:**

CO1: To understand the duty and responsibility of safety managers.

CO2: To learn various safety operations in construction.

CO3: To know about safety equipment used in construction.

CO4: To know about various safety policies in construction

### **List of Text / Reference Books:**

1. Construction safety manual published by National Safety Commission of India.
2. Safety Management in Construction Industry – A manual for project managers. NICMARMumbai.
3. Construction Safety Handbook – Davies V.S.Thomasin K, Thomas Telford, London.
4. ISI for safety in Construction – Bureau of Indian Standrads.–Safety managementll – Girimaldi and Simonds, AITBS, New Delhi.

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