Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-7 (B. Tech.)

Subject: Construction Engineering and Management – BETCV17340
Type of Course: Professional Core
Prerequisite: Knowledge of Professional Practice and Valuation

Rationale: Knowledge of construction project plans, allocate resources and analyze workload, track work progress, estimation of project costs and manage budgets etc. are very important aspects of construction project management. In addition to these, various skill sets such as management of complex construction works, safety and quality in construction projects etc. needs to be required for successful execution of any project. These subject covers all above aspects required to know by the students of civil engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
3	0	0	3	60	30	10	00	50	150

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No.	Course Content	Hrs.	% Weightage
1	**Introduction to Construction Project Planning** Features of Construction Projects, phases of construction project, Stakeholders of construction management., Project Planning Stages, different phases involved in planning project planning methods such as Bar Charts, Line of Balance, and Milestone Charts	10	15%
2	**Planning and organizing construction site and resources** Site layout including enabling structures, developing site organization, Manpower: Planning, organizing, staffing, motivation; Materials, Equipment and Funds: Cash flow, sources of funds, activity on arrow and activity on node representation, computation of float values, critical paths, and calendaring networks, PERT analysis, calculation of probability of completion.	10	20%
3	**Project Monitoring & Control** Network crashing and cost time trade off. Periodic progress, reports, and periodical progress meetings, purpose, frequency and methods of updating plans, Modern project management Systems: lean construction aimed at minimizing waste, improving efficiency, and enhancing productivity in construction projects. Construction, Building Information Modeling (BIM) in Project Management, Overview of BIM technology and its role in improving planning, coordination, visualization, and management of construction projects.	10	20%
4	**Quality Control** Concept of quality, quality of constructed structure, use of manuals and checklists for quality, role of inspection, basics of statistical quality control, CONQUAS-Construction Quality Assessment System, Safety, health and environment on project sites, Accidents, their causes, effects and preventive measures, costs of accidents, Health and Safety Policies/Standards: OSHA, ISO 45001, occupational health & safety hazards in construction.	10	25%
5	**Construction equipment** Conventional construction method Vs Mechanized methods, Equipment, Capacity, Feasibility, owning and operating cost and Productivity of Different Equipment: Earthmoving, dewatering, concrete mixing, lifting, transporting & placing, pile boring, driving equipment, tunnel boring machines.	05	20 %

Continuous Assessment:

Sr. No.	Active Learning Activities	Marks
1	**Construction Site Layout Planning Drawing** Students, (in groups) will visit a construction site. Based on the visit, they are required to prepare a detailed layout plan of the site, indicating temporary structures, material storage areas, equipment locations, and site facilities. This activity will be conducted as part of active learning to enhance practical understanding of site planning and organization. The completed work must be uploaded on the GMIU web portal.	10
2	**Analysis of Modern Project Management Systems:** Students will be assigned to prepare a chart paper on modern project management systems. They will present their work in front of the class to enhance communication and understanding. Faculty will evaluate the work based on content, clarity, and presentation skills. The final report, along with the chart paper, must also be uploaded on the GMIU web portal.	10
3	**Knowledge in BIM technology:** Students will be assigned by the faculty to study Building Information Modeling (BIM) and its applications in construction projects. Based on their understanding, they shall prepare a PowerPoint presentation in a structured and professional format. Students will present their work in front of the class to enhance their conceptual clarity and communication skills. Faculty will guide and evaluate the presentations based on content and delivery. The final presentation must also be uploaded on the GMIU web portal within the prescribed time.	10
4	**Construction Site Quality Control Study** Students will be assigned by the faculty to visit an active construction site and study the quality control practices implemented during execution. They shall collect relevant data, observe on-site processes, and analyze quality measures adopted in the project. Based on their field observations, students will prepare a detailed and structured report. The final report must be uploaded on the GMIU web portal	10
5	**Advance Construction Equipment Field Study** A construction project Field visit shall be arranged by the faculty to demonstrate various construction equipment such as dragline, bulldozer, clamshell, belt conveyors, scrapers, etc. Students will observe the working, applications, and operational aspects of these equipment. Based on their observations, students shall prepare a brief report in a structured format. The final report must be uploaded on the GMIU web portal.	10
TOTAL		**50**

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	10%	30%	30%	20%	10%	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Understand construction project planning concepts, project phases, stakeholders, and planning techniques such as Bar Charts and Milestone Charts.
CO2	Evaluate construction sites and resources, including site layout, manpower, materials, equipment, and financial aspects such as cash flow and funding sources.
CO3	Apply project monitoring and control techniques including PERT/CPM, cost-time trade-off, and modern tools like Lean Construction and BIM.
CO4	Understand quality control practices, safety standards, and health management systems in construction projects.
CO5	Analyze construction equipment selection, productivity, and cost considerations for various construction activities.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

[1] Project Planning with PERT and CPM – B. C. Punmia and K. K. Khandelwal, Laxmi Publications.
[2] Construction Project Management – K. K. Chitkara, Tata McGraw-Hill Education.
[3] Construction Planning, Methods and Equipment – R. L. Peurifoy, McGraw Hill, 2011.
[4] Construction Planning and Management – P. S. Gehlot and B. M. Dhir, Wiley Eastern Ltd.
[5] Construction Engineering & Management – S. Seetharaman, Umesh Publication.