

Approved: 9th Senate Meeting

Course Number: CE 503

Course Name: Fundamentals of Project Management

Credits: 3-0-0-3

Prerequisites: - None

Intended for: UG/PG

Distribution: - Elective

Semester: Odd/Even

Preamble: Project management is the art of planning, organizing, motivating and controlling resources to achieve specific goals set for the project. The skill is of immense relevance to all engineering students as they invariably confront the task of handling industrial or research projects during the course of their professional practice. The present course has been designed to introduce a student to the fundamental concepts of project management and to the mathematical tools required to address related problems.

Course Outline: The course touches up on the fundamentals of project management and management science. It encompasses the facets of project planning, scheduling, evaluation and control of cost and quality. The course lays a special emphasis on the description of essential management science techniques involving the application of optimization methods and advanced statistical analysis.

Modules:

1. Introduction: Project definition, Constraints and Scope triangle, Project environment, Classification of projects, Conception, Selection, Life cycle, Project management – necessity and processes, Systems approach, Project manager – knowledge areas and role, Project team, Planning – principles, objectives, steps and advantages, Work breakdown structure, Scheduling - Bar charts, Milestone charts, Networks. Project control and evaluation. (8 contact hours)
2. Scheduling by network analysis: (i) *Programme Evaluation and Review Technique (PERT)*: Time estimates for activities, Computation of event times, Network analysis – Slack and critical path. (ii) *Critical Path Method (CPM)*: Computation of event and activity times, Network analysis – Float and critical path. (6 contact hours)
3. Time-Cost optimization: Crashing a network. Updating a project: Data required and implementation. Resource allocation: Resource usage profiles, Smoothing and Levelling of resources. (4 contact hours)

4. Quality management: Policy, Assurance, Management systems, Control, Plan, Audit, Reviews, Statistical methods for quality control – Shewhart, Cusum and EWMA control charts, Process capability analysis, Factorial experiments and Acceptance sampling.
(10 contact hours)

5. Management science techniques: Linear and integer programming, Distribution and network models – transportation, assignment, transshipment and shortest route problems. Non-linear optimization, Time series analysis and forecasting.
(14 contact hours)

Textbooks:

1. Project planning and control with PERT and CPM by B.C.Punmia and K.K.Khandelwal. Laxmi Publications. 2006.
2. Statistical quality control (7th ed.) by E. L. Grant and R. S. Leavenworth. TMH. 2000.
3. An introduction to management science (13th ed.) by D. R. Anderson, D. J. Sweeney, T. A. Williams, J. D. Camm and Kipp Martin. South-Western. 2012.
4. Operations Research – an introduction by Hamdy A. Taha. Pearson. 2014.
5. Project management for engineering, business and technology (4th edition) by J. M. Nicholas and Herman Steyn. Routledge. 2012.

References:

1. Fundamentals of project management (3rd ed.) by James P. Lewis. AMACOM. 2007.
2. Project management, planning and control by Albert Lester. Elsevier. 2014.
3. Introduction to statistical quality control (6th ed.) by D. C. Montgomery. Wiley. 2009.
4. Applied management science by J. A. Lawrence, Jr. and B. A. Pasternack. Wiley. 2002.
5. A management guide to PERT/CPM with GERT/PDM/DCPM by J. D. West and F. K. Levy. 1979.