Detailed Contents of Courses for the Master of Engineering Management Programme

Compulsory Courses

EM-501 Organisational Systems

Definitions of management; Evolution of management thought, classical, quantitative and behavioral schools; interactions between organisations and their environments. The planning process; strategic and tactical planning, developing planning premises, nature of managerial decision making, quantitative aids, management by objectives. Organisational structures; behavior of the individual, work group, and organisation; coordination and spans of control, the informal organisation; authority delegation and decentralisation, groups and committees, managing organisational change and conflict. Motivation, performance and satisfaction; building a high-performance team; leadership, interpersonal and organisational communication, staffing and personal function. The control process; budgetary and non-budgetary methods of control; team performance measurement and improvement strategies. Use of management information systems.

EM-502 Accounting and Financial Management


EM-503 Strategic Planning and Decision Making

Critical issues in shaping the competitive strategy for engineering-driven companies in a turbulent business environment; corporate mission; key result areas and situational analysis including strengths, weaknesses, opportunities and threats; identifying planning assumptions, critical issues, setting objectives, formulating strategy. Managing technology as a strategic resource of the firm; understanding of the process, roles and rewards of technological innovation; integrating the strategic relationship of technology with strategic planning, marketing, finance, engineering and manufacturing; government, societal and international issues; issues pertaining to cultural diversity and ethical concerns. Subjective, judgmental and expert decisions; conflict resolution in strategic decisions involving technological alternatives; hierarchical decision modeling; individual and aggregate decisions; decision discrepancies and evaluation of group disagreements.

EM-504 Project Management Framework and Tools

Role of projects in organisation’s competitive strategy; Standard methodologies for managing projects; Project life cycle; Design-implementation interface; Estimating: preliminary and detailed; Contractual risk allocation; Scheduling: PBS; WBS; Integration of scope, time, resource and cost dimensions of a project; Evaluation of labor, material, equipment, and subcontract resources; Scheduling techniques
including CPM/PERT, GERT, critical chain; Solving real-world project schedules; Monte Carlo simulation; Cost budgeting; Cost baseline; Cash flow analysis; Earned value analysis; Cost control; Proposal presentation; Application of software for project management (MS Project, Primavera Project Planner - P3).

**EM-505 Operations Research**

Deterministic modeling: Linear programming; The Simplex method; Multiple objective linear optimisation; Duality and sensitivity analysis; Post optimality analysis from the viewpoint of technology management; Transportation, transshipment, and assignment problems; Problem formulation; Goal programming; Network analysis; Dynamic programming; Integer programming and nonlinear programming. Probabilistic modeling: Markov chains; Queuing theory and applications; Inventory theory; Forecasting; Design analysis and simulation; Pareto optimality and tradeoff curves.

**Common Electives**

**EM-511 Total Quality Management**

Critical principles and procedures of quality management in a competitive global environment; contemporary definitions of quality; construction quality; Product quality; Process quality; Quality economics; Quality philosophies; Planning, organising and controlling for quality; Human resource strategies; QA and QC tools.

**EM-512 Project Evaluation and Feasibility Analysis**

Evaluation of engineering projects from the engineering management perspective; Techniques for capital investment for decision-making; Time value of money and the concept of equivalence; Present worth, annual and rate of return analysis; Multiple alternatives; Replacement criteria; Tax considerations; Breakeven sensitivity analysis; Project evaluations under uncertainty; Risk sharing; Capital budgeting; Cost of capital depreciation; Multicriteria decisions. Project feasibility analysis; Organisational impacts; societal impacts; Environmental impacts.

**EM-513 Research Methods in Engineering Management**

Research methods in engineering and technology management; Statistical techniques including proper selection; Use and interpretation of parametric and non-parametric tests along with factor and discriminate analysis; Design of experiments and model misspecification; Simulation in engineering and management research and practice.