



Course Description

Advanced Engineering Economy

This course provides a framework for understanding and applying project evaluation and selection concepts. Topics include decision analysis methods, accounting income, cash flows, revenue requirements, activity-based analysis, multi-attribute decisions, probabilistic analysis and sensitivity/risk analysis, deterministic capital budgeting, risk simulation, and decision tree analysis.

Research methodology and methods

Principles of the Scientific Method: Theory and Measurement ,Principles of the Scientific Method: Validity and Control ,Ethical Issues in a Scientific Research ,Non-Experimental Research: Observational, Archival, and Case-Study Research ,Non-Experimental Research: Survey Research ,Single-Subject Experimental Research ,Group Experimental Research: Single Factor Designs ,Group Experimental Research: Factorial Designs ,Quasi Experimentation ,Reporting Research Results, Conclusions: Bias and Limitations of Experimental Scientifically

Management of Engineering Systems

Theory and practice of leadership and management in engineering organizations; focus on both “hard” skills (systems engineering process, project management, planning, forecasting and financial analysis) and “soft” skills (leadership styles, motivation, teamwork, managing creative people, navigating informal networks); science and technology policy, economic implications of engineering and technology.

Simulation Methods and Applications

Fundamental methodologies of simulation modeling; random number and variate generation, statistical analysis of model output, and discrete event modeling using a commercial simulation language.

Systems Engineering Methods and Frameworks

Concepts, methodology, methods and tools for discovery, definition, analysis, design, creation, and sustainment of systems involving information, physical, and human elements; architecture modeling methods include IDEF/UPDM; systems engineering frameworks include DoDAF/MoDAF, and Zachman; analysis tools include executable architectures to assess consistency, interoperability and performance.

Engineering Management Control Systems

Integration of human relations, planning and control concepts, systems analysis and design, and principles of management oriented toward engineering functions within an organization; organizational design and administration as they impact along the product life cycle, i.e., research, design, development, production and use.

**Advanced Quality Control**

Advanced methods applied to quality control and anomaly detection; classical treatments and recent developments in statistical process control; evaluation, design and maintenance of quality control programs; focus on monitoring and root cause identification.

Quantitative Risk Analysis

Fundamental concepts, techniques, and applications of quantitative risk analysis and risk-informed decision making for all engineering fields; practical uses of probabilistic methods are demonstrated in exercises and case studies from diverse engineering areas.

Traffic Safety Management

In this course student will familiarize with the behavior, performance and management of traffic and transportation systems. The major topics: Highway Safety Improvement; Highway Safety Design and Operation Management; Traffic Demand management; Traffic Safety Strategies; Traffic Congestion Management; Access Control Management; Public Transit System Management; Pedestrian Safety and Pedestrian Facilities Management; Intelligent Transportation System; and Noise Impact management.

Energy Management

This course examine a total management system needed for planning and control of energy resources in an organization, setting of objectives, developing policies and procedures, organizing and staffing, reporting and controlling, and dealing with top management. Topics covers economic evaluation methods, including ranking and analyzing capital projects (pay back, discounted cash flow, and net present value methods), cost accounting systems designed to highlight energy costs, and setting up performance evaluation systems. Students in this course will also study the history of energy technology, energy efficiency in buildings, and utility regulation.

Building Information Modeling

Building information modeling (BIM) concept, BIM is intelligent BD model based process that gives architecture, engineering and construction (AEC) professionals the insight and tools to more efficiency plan, design contract and manage building and infrastructure.



Water Management and Environment

This course is about water resources, their complex relationship with the environment and the economy, and about the growing problem of water scarcity and the various options that exist to deal with this problem. The course examines how water is allocated between various competing demands and explores the role that water plays in food security, public health, and other aspects of social and economic development. Understanding of the processes in hydrologic cycle that includes measurement, computation, estimation and determination in each area. Water resources problems, the conception, planning and design of functional elements and facilities to control and utilize water, basic to all water management. Also, this course covers the following topics: Field ecology-Terrestrial and Aquatic flora and Fauna, Experiments related to water quality management, ambient air sampling and determination of criteria pollutants, Monitoring of stack emission and automobile exhausts.

Advanced Topics in Engineering Management

This course covers the advanced topics in the Engineering Management field, and vary from course to another.