Master of Science in Engineering Management

College of Engineering

2025

Prepared By: VP For Academic Programs and Graduate Studies Office

College of Information Technology

College of Engineering

List of M.Sc. Programs

1- **Master of Science in Engineering Management**

Master of Science in Engineering Management

Program Components

Course Type	CRD
University Requirement (UR)	**-**
College Requirement (CR)	**-**
General Studies Compulsory (GSCC)	**-**
Major Requirement (MR)	**32**
Major Elective (ME)	**4**
Major Support Requirement[1]	**-**
General Studies Elective (GSE)[2]	**-**
Training (Internship)	**No**
Total Credit (CRD)	**36**

[1] Student must select one course from the concentration courses offered during the second semester of their study

Detailed Study Plan

Year 1 - Semester 1

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
IEN601	Statistical Data Analysis and Research Methods	4	0	4	MR	None	Yes
IEN602	Operations Management	4	0	4	MR	None	Yes
IEN605	Capital Budgeting	4	0	4	MR	None	Yes

Year 1 - Semester 2

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
IEN611	Quality Improvement	4	0	4	MR	None	Yes
IEN612	Modern Project Management	4	0	4	MR	None	Yes
IEN6XX	Major Elective Course	4	0	4	ME	None	Yes

Year 2 - Semester 3

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
IEN698	Thesis	0	36	12	MR	20 credits	No

LIST OF MAJOR ELECTIVE COURSES

Course Code	Course Title	Course Hours			Course Type	Pre requisite	Major GPA
		LEC	PRAC	CRD			
IEN613	Deterministic Operations Research	4	0	4	ME	None	Yes
IEN614	Reliability and Maintainability	4	0	4	ME	None	Yes
IEN615	Product development and System Engineering	4	0	4	ME	None	Yes
IEN616	Human Factors and Ergonomics	4	0	4	ME	None	Yes
IEN617	Supply Chain Management	4	0	4	ME	None	Yes
IEN618	Entrepreneurship: Crafting Business Journey	4	0	4	ME	None	Yes
IEN619	Managerial Accounting	4	0	4	ME	None	Yes
IEN620	Human Resources Management	4	0	4	ME	None	Yes
IEN621	Special Topics	4	0	4	ME	None	Yes

Course Description

CORE COURSES

Course Code: IEN 601 **Course Title: Statistical Data Analysis and Research Methods**

This applied course is designed for graduate students. The goals of the course are to develop the skills necessary to identify appropriate statistical techniques, estimate models, analyze data, and interpret results for independent research and to critically evaluate contemporary research using advanced quantitative methods. The course will include descriptive and inference statistics, hypothesis testing, confidence intervals, processing and analysis of research data using different parametric and nonparametric statistical methods, regression analysis for linear and nonlinear models, and introduction to the design of experiments. Research methods, research ideas through literature survey, planning and designing specific methods for conducting research, analyzing data using scientific methodology and presenting research results in a systematic and objective way.

Course Code: IEN 602 **Course Title: Operations Management**

This course provides a comprehensive exploration of operations management and supply chain strategies essential for engineering and technology-driven industries. Topics include operations strategy, product and service design, forecasting, inventory management, capacity planning, and enterprise resource planning (ERP). Emphasizing both

analytical tools and decision-making frameworks, the course integrates modern innovations such as Industry 4.0 to prepare students for leadership roles in optimizing operational efficiency and supply chain effectiveness. The course is based on a mixture of lectures and case discussions

Course Code: IEN 605 Course Title: **Capital Budgeting**
Concepts, principles, and techniques of making economic decisions concerning the acquisition, replacement, and retirement of assets by industry and public sector. Decision-making considers the time value of money, taxation and depreciation, cost estimation, risks, variations, and capital allocation.

Course Code: IEN 611 **Course Title: Quality Improvement**
Contemporary approaches, systems, and statistical techniques to assess, control, and improve product and/or service quality in manufacturing and service sectors. Topics include Six Sigma, ISO, TQM, Quality Assurance, SPC, Poke Yoke, Taguchi methods, and Balanced Scorecard.

Course Code: IEN 612 **Course Title: Modern Project Management**
Modern Project Management and Life cycle stages of a project, Project selection and planning, Estimating, Scheduling and Managing Project Time, Cost and Resources, Risk Management, Contract Management, Project Control, Project Closure, Project Management Standards: PMI, PRINCE 2, and ISO 21500. Industry 4.0: Project Management Approaches.

MAJOR ELECTIVE COURSES

Course Code: IEN 613 **Course Title: Deterministic Operations Research**
Concepts and techniques of deterministic operations research with emphasis on industrial applications. Topics include Linear Programming, Transportation Problems, Integer Programming, Network Models, Dynamic Programming, and Nonlinear Programming.

Course Code: IEN 614 **Course Title: Reliability and Maintainability**
This course prepares engineering management professionals to design and maintain reliable products by addressing variability in materials, processes, and systems. Students will explore reliability definitions, parameters, and costs, along with methods for evaluating reliability, including failure rate estimation, modeling, and system availability. The course also covers strategies for reliability assurance and improvement, such as demonstration testing, growth testing, and risk assessment. By understanding and managing variability, students will gain the skills to enhance product performance, optimize systems, and address challenges in reliability and maintainability effectively.

Course Code: IEN 615 **Course Title: Product Development and System Engineering**
Introduction to Product Design and Development, Life Cycle Engineering, Systems Design phases like conceptual design, preliminary design, detail design, and evaluation and testing. Quantitative methods in System Analysis and Evaluation, Design for Operational feasibility, Systems Engineering Management, Dynamic System Modelling, and Introduction to System of System. Systems Engineering Standards recommended by International Council on Systems Engineering (INCOSE) limited to ISO/IEC/IEEE 15288:2023 and 29148:2023

Course Code: IEN 616 **Course Title: Human Factors and Ergonomics**
Introduction to Man-Machine Systems and Interface. Human-Centered designs: human abilities, limitations, behaviors, and processes. Human engineering design principles: displays, controls, and ergonomics. Human cognition: perception, information processing, memory, workload, decision-making, and human errors.

Course Code: IEN 617 **Course Title: Supply Chain Management**
This course provides a comprehensive understanding of supply chain structures, operations, and integration processes to enhance organizational performance. Major topics covered are Inventory, transportation, and warehousing management. Quantitative models. Design sustainable supply chain strategies tailored to global markets. Integration of innovative technologies and collaborative practices to address real-world challenges. Problem-solving and strategic decision-making in supply chain management.

Course Code: IEN 618 **Course Title: Entrepreneurship: Crafting Business Journey**
In this course students bring their business ideas to life. Students learn how to generate ideas, identify opportunities, conduct feasibility studies, and refine their business model. Throughout the course, students are guided through the

process of developing a comprehensive business plan. Moreover, by examining real-world case studies and engaging in hands-on activities, students gain practical insights into the entrepreneurial mindset. By the end of the course, students will have developed a comprehensive understanding of the entrepreneurial process and gained practical skills to pursue their own ventures or contribute effectively to entrepreneurial initiatives within existing organizations.

Course Code: IEN 619 **Course Title: Managerial Accounting**

Concepts and tools of managerial accounting; Accounting and related controls as part of the management process; Management accounting and related analytical methodologies for decision making and control in profit-directed organizations; product costing, relevant information, budgetary control systems and performance evaluation systems for planning coordinating and monitoring the performance of business; Advanced techniques of measurement and framework for assessing behavioral dimensions of control systems; Impact of different managerial styles on motivation and performance in an organization; and Financial and non-financial measures for evaluating business strategies and business unit success (economic measures of performance, balanced scorecard approach), A case Study.

Course Code: IEN 620 **Course Title: Human Resources Management**

Analytical overview of personnel management theory and practice; elements of modern personnel management with special reference to human resources development (HRD); job evaluation and analysis; recruitment and selection; performance appraisal; compensation management, human resources development and training; behavior science contribution to modern HRD practices, Case Study.

Course Code: IEN 621 **Course Title: Special Topics**

Any important, relevant and possibly hot topic in the field that is not covered in the approved elective list. Topics may vary based on students' interest and availability of staff.

Course Code: IEN 698 **Course Title: Thesis**

This course serves as the capstone component of MSc in Engineering Management Program. Students conduct independent research supervised by a faculty advisor, developing advanced research capabilities, analytical thinking, and specialized knowledge. The program culminates in a thesis that contributes new insights to the field. Students develop research proposal, review literature, collect and analyze data, write a comprehensive thesis, and defend their findings in front of faculty committee members.