Course Description of Industrial Engineering (IE)

B. SC. Program.

(IE) First Year

First Term:

MAT 121 Mathematics III. 3 Cr 4-2-0 Hrs/wk.

MAT 151 Introduction to Statistics. 3 Cr. 4-2-0 Hrs/wk.

ME 141 Mechanical Drawing. 4Cr. 2-4-0 Hrs/wk

ME 131 Materials Technology. 3Cr. 4-1-1 Hrs/wk
Introduction to the structure and properties of engineering materials including metals, alloys ceramics, plastics, and composites. Characteristics and processing affecting behavior of materials in service.

ME 151 Thermodynamics. 4Cr. 4-1-1 Hrs/wk

GNS 101 Technical Report Writing. 1Cr. 1-0-0 Hrs/wk.
Second Term:

MAT 132 Mathematics 1V. 3Cr. 4-2-0 Hrs/wk.

ME 142 Design of Machine Elements. 4Cr. 2-4-0 Hrs/wk.
Continuation of ME 141.

ME 122 Manufacturing Processes I. 4Cr. 4-1-1 Hrs/wk.

CE 102 Introduction to Information Technology. 3Cr. 4-1-1 Hrs/wk.
Introduction to the design and use of computer-based information system. Software and hardware used in information system, information requirements. Communication systems. Networking. The Internet: the foundations, resources and uses of the internet, emphasizing practical skills for finding, reading and authorizing materials. Fundamentals of computer communication networks. Introduction to computer networking elements communications architectures and protocols. HTML principles and applications. Case studies.

ECE 134 Fundamentals of Electrical Engineering. 3Cr. 4-1-1 Hrs/wk.

GNS 102 Word Processing. 1Cr. 0-0-1 Hrs/wk.
Use of a software for word processing. Writing of text and mathematical equations, Graphic representation. Tables.
(IE) **Second** Year

**First Term:**

**EM 201 Operations Research I. 3Cr. 4-2-0 Hrs/wk**

**IE 221 Quality Control. 4 Cr. 4-2-0 Hrs/wk.**

**EM 241 Organization Theory and Management. 3Cr. 4-2-0 Hrs/wk.**
A general descriptive and analytical study of organization from the behavioral science point of view. Problem of motivation, leadership, moral structure, groups, communications, hierarchy, and control in complex organizations are addressed.

**IE 211 Manufacturing systems Design. 4Cr. 3-2-0 Hrs/wk.**
The concepts and techniques of designing and improving productive system. Multidisciplinary approach with the use of simulation as a tool for evaluating design alternatives.

**ME 252 Fluid Mechanics. 3Cr. 4-1-1 Hrs/wk.**
Field, fluid static, basic conservation laws for systems, controls, volumes, dimensional analysis. Euler and Bernoulli equations, viscous flow, boundary layer, flow in channels and around submerged bodies, one-dimensional dynamics. Applications: pumps and hydrolic circuits.

**EN 211 Engineering Problems of the Environment I. 1Cr. 1-0-0 Hrs/wk.**
An introduction to the engineering design of measures to limit the impacts on the environment. Global and local cycles in the hydrosphere, atmosphere, and biosphere, energy and materials balance in environmental problems, source control of pollutants. The process of establishing environmental goals is discussed.
Second Term:

**EM 202 Operations Research II. 3Cr. 4-2-0 Hrs/wk.**

**ME 222 Manufacturing Processes II. 4Cr. 4-1-1 Hrs/wk.**

**EM 252 Industrial Accounting and Cost Analysis. 3Cr. 4-2-0 Hrs/wk.**
Industrial accounting systems including computer-oriented systems. Information and control functions of the management decision making process. Study of basic cost accumulation systems and refinements. Products or activities cost estimation in various types of enterprises.

**IE 232 Productions and Inventory Control. 4Cr. 4-2-0 Hrs/wk.**
Models and techniques for managing inventory systems and for planning production. Topics including basic deterministic and probabilistic inventory models and extensions; production loading, planning, and smoothing and sequencing problems.

**EM 222 Fundamentals of Marketing. 3Cr. 3-2-0 Hrs/wk.**
Effective market research study. Topics include research design, psychological measurement, survey methods, experimentation and statistical analysis of marketing data. The evolution of markets and marketing. Market structure, marketing cost and efficiency, public and private regulations, the development of marketing programs including decisions involving products, price, promotional distribution.

**EN 212 Engineering Problems of the Environment II. Cr. 1-0-0 Hrs/wk.**
Continuation of EN 211.
(IE) Third Year

First Term:

EM 331 Engineering Economy and Feasibility study. 3 Cr. 4-2-0 Hrs/wk.

IE 321 Design and Analysis of Industrial Experiments. 4 Cr. 4-2-0 Hrs/wk
Methods of design and analysis of industrial experiments. Topic include: general regression and variance analysis, mixed models, efficient statistical search procedures, model assessment and remedial measures.

EM 361 Human Resource Management. 3Cr. 4-1-0 Hrs/wk.
Major areas of personal management, employment, training, wage and salary administration, and labor relations. The interaction of selection, placement, training, personnel evaluation, and career ladder within an on-going organizations.

IE 341 Computer Aided Engineering. 3 Cr. 2-1-1 Hrs/wk.

ME 353 Heat Transfer. 3Cr. 3-1-1 Hrs/wk.

CE 313 Introduction to Microprocessors. 2Cr. 2-1-1 Hrs/wk
Second Term:

IE 332 Project Management. 4 Cr. 4-2-0 Hrs/wk.

EM 382 Industrial Procurement. 3Cr. 3-1-0 Hrs/wk.
The study of modern purchasing in a manufacturing firm, with emphasis on industrial organization, quantity and quality analysis, sources legal requirements, and related topics. Case studies.

IE 364 Facility Planning and Design. 3 Cr. 4-2-0 Hrs/wk.
Theory and methodology for determining optimal capacity and location of production and service facilities. Elementary engineering and economic considerations in the application of material handling equipment.

IE 352 Human Factors Engineering. 3Cr. 3-1-2 Hrs/wk.

IE 302 Management Information Systems. 2Cr. 2-1-1 Hrs/wk.
Data and information, importance and need. Computers and information technology. Data processing by computer system, organization of data and information technology. Data processing by computer systems, organization of data and information processing systems, capabilities limitation and usage. Database concepts, principles and methods. Various databases: design, advantages, disadvantages, control, security and administration. CASE software tools, principles and usage.

Elective (1)

EM 372 International Business. 3Cr. 3-1-0 Hrs/wk.

Or

ME 332 Engineering Measurements. 3Cr. 2-1-1 Hrs/wk.
First Term:

**IE 431 Production and Operation Management. 3Cr. 4-2-0 Hrs/wk.**
A survey of the concepts and methodologies for management control of production and operations systems. Topics include: inventory control, material requirement planning, aggregate planning, scheduling and projects management.

**IE 471 Industrial Safety. 3Cr. 4-1-0 Hrs/wk.**
Application of human factors and engineering practice in accident prevention and the reduction of health hazards. Safety and healthy practices that fall within the responsibilities of the engineer in industry.
Detection and correction of hazards. Contemporary occupational safety and healthy laws and their enforcement.

**ME 421 Industrial Technologies I. 3Cr. 3-0-2 Hrs/wk.**
Technology of different industrial sectors: food, car assembly, petro-chemical, semiconductor and electronic. Case studies and site visits.

**CE 437 Introduction to Artificial Intelligence. 3Cr. 3-0-1 Hrs/wk.**
Basic ideas and techniques underlying the design of intelligent computer systems. Heuristic search. Problem solving, same paying, knowledge representation, logical inference, planning, reasoning under uncertainty, expert system, learning perceptions, language understanding.

**IE 491 Project I.. 3Cr. 2-0-4 Hrs/wk.**
Supervised projects in small group of students aimed at providing practical experience in some aspects of industrial engineering. This is accomplished through lectures, discussions, field visits and individual design.

*Elective (2)*

**EM421 Consumer Behavior: 3 Cr. 3-2-0 Hrs/wk**
Motivation, Learning theory, perception, attitude theory, and social referent and how they affect consumer behavior. Consumer measurements and strategy.

*Or*

**ME 432 Non-Conventional Machining and forming Processes. 3Cr. 3-1-1Hrs/wk**
Second Term:

**Note This is a repeated Course It is modified to EM444**

**EM 442 Quality Management Systems. 3 Cr. 4-2-0 Hrs/wk.**

**ME 424 Industrial Technologies II. 3Cr. 3-0-1 Hrs/wk.**
Continuation of ME 421.

**IE 442 Automation and Robotics. 3Cr. 4-1-0 Hrs/wk.**

**EM 422 Industrial Marketing Management. 3 Cr. 3-2-0 Hrs/wk.**
Industrial market behavior and market segmentation. Planning and marketing research. Determination of price, product, distribution and promotion in the context of industrial marketing. Industrial marketing evaluation and control.

**IE 492 Project II. 3Cr. 2-0-4 Hrs/wk**
Continuation of IE 492.

*Elective (3)*

**EM 412 Decision Analysis. 3 Cr. 3-1-0 Hrs/wk.**

*Or*

**ME 422 Advanced Manufacturing Machinery. 3Cr. 3-1-0 Hrs/wk.**