

Industrial Engineering Education in the Philippines

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Outline for Today

- IE in the Philippines: An Overview
- Bachelor's Programs
- Masters Programs
- PhD Programs
- Certifications



Introductions: About Me

- PhD, Industrial Engineering, Arizona State University, (2013)
- MS Industrial Engineering, UP Diliman, (2009)
- BS Industrial Engineering, UP Diliman, (2007)
- Research Interests
 - Data Mining Algorithms, Supply Chain Problems, Agent-Based Simulation and Evolutionary Optimization
- Certifications
 - SAP ERP Materials Management Consultant
 - Matlab Certified Associate



Overview

- BS IE Offered in over 100 universities across the Philippines
 - 5 year program
- MS IE offered in 7 universities
 - 2 year program
- PhD IE offered in 2 universities
 - 5 year program (straight from BS)



Commission on Higher Education

- Regulates and monitors various IE programs offered by universities across the country
- Proposes strict guidelines on the content and courses of IE programs
- Defines course outcomes, specializations and applicable jobs for IE graduates



IE Professional Outcomes

- Apply knowledge of mathematics, physical and information sciences, and engineering sciences
- Design Experiments, analyze and interpret data
- Design, build, improve, and install systems or processes that are efficient, effective and robust
- Recognize, formulate, and solve engineering problems
- Ability to perform services in the form of analysis, design, preparation of plans, specifications, estimates, and implementation of IE Concepts



Courses Overview

- Foundation Courses
 - Algebra and Trigonometry
 - Calculus
 - General Chemistry
 - Physics: Mechanics, Electricity, Magnetism, Relativity
 - Engineering Drawing
 - Statics of Rigid Bodies
 - Dynamics of Rigid Bodies
 - Mechanics of Deformable Bodies
 - Linear Algebra
 - Computer Programming



Courses Overview

- Core Courses
 - Advanced Mathematics
 - Industrial Materials and Processes
 - Descriptive and Inferential Statistics Quality Control
 - Methods Engineering
 - Operations Research and Simulation
 - Engineering Economics
 - Information Systems, Systems and Procedures
 - Production Systems, Facilities Design
 - Systems Engineering



Courses Overview

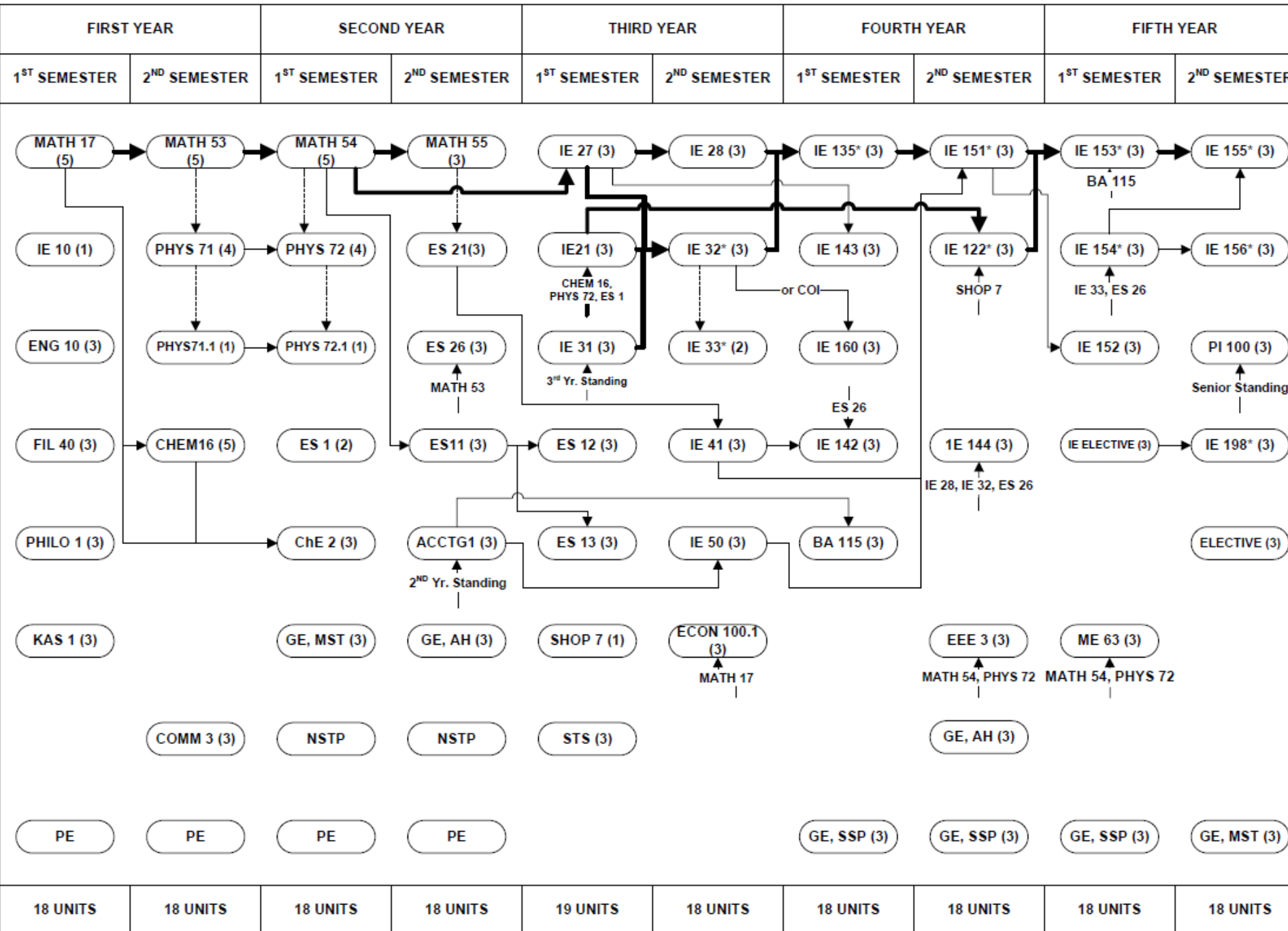
- Cognates and Electives
 - Supply Chain Management
 - Business Analytics and Data Mining
 - Financial Accounting
 - Managerial Accounting
 - Economics
 - Thermodynamics
 - Circuits
 - Chemical Engineering
 - Psychology



Undergraduate Project Courses

- Project courses with industry immersion
 - Methods Engineering
 - Systems Simulation
 - Ergonomics
 - Production Systems
 - Information Systems
 - Feasibility Analysis
 - Total Systems Design





Senior Design/Project

- Feasibility Analysis
- Total Systems Design



Masters Programs

- Masters of Science in IE
 - Core Courses (12 units)
 - Specialization Courses (12 units)
 - Research Seminar (1 unit)
 - Thesis (6 units)



Masters Programs

- Masters of Engineering in IE
 - Core Courses (12 units)
 - Specialization Courses (12 units)
 - Elective (3 units)
 - Research Seminar (1 unit)
 - Project (3 units)
 - Comprehensive Examination



Masters Core Courses

- Design and Analysis of Experiments
 - ANOVA, Factorial Experiments, Response Surface Methodology
- Information Systems Engineering
 - Business Intelligence, Data Warehousing, Data Mining
- Analysis of Production Systems
 - JIT, Lean Systems, Factory Physics
- Deterministic Operations Research
 - Linear Programming, Integer Programming, Complexity Analysis, Dynamic and Goal Programming



Specializations

- Production Engineering
- Organization and Decision Systems
- Ergonomics/Human Factors Engineering
- Information Systems



Specializations

- Production Engineering
 - Supply Chain Management
 - CAD/CAM
 - Lean Manufacturing
 - Total Productive Maintenance and Reliability
 - Product Design and Development



Specializations

- Organization and Decision Systems
 - Systems Simulation
 - Total Quality Management
 - Six Sigma
 - Stochastic Processes in Engineering
 - Strategic Planning
 - Multi-Criteria Decision Making
 - Project Management



Specializations

- Ergonomics/Human Factors Engineering
 - Job Evaluation and Salary and Wage
 - Administration
 - Personnel Management
 - Occupational Safety and Health
 - Cognitive Engineering
 - Risk Management



Specializations

- Information Systems
 - Business Analytics
 - Systems Analysis and Design
 - Big Data
 - Data Mining
 - Data Warehousing



5+1 Dual Degree Program

- 5 year BS Degree
- +1 year for MS Degree



PhD Program

- Core Courses (12 units)
- Qualifying Examination
- Elective Courses (12 units)
- Research (12 units)
- Research Seminar (1 unit)
- Comprehensive Examination
- Dissertation (12 units)



Core Courses

- Non Linear Optimization
 - Convex Thoery, KKT Conditions, Gradient Descent
- Stochastic Optimization
 - Conditioning, Exponential and Poisson Processes, Renewal Theory
- Foundations of Business Analytics
 - Linear Algebra Theory for Data Mining, Principal Components, SVD, Applications
- Mathematical Statistics
 - Estimation, Limit Theorems, Linear Models



PhD Program Specializations

- Production Engineering
- Industrial Statistics
- Ergonomics/Human Factors Engineering
- Information Systems



PIIE Certifications

- IE Certification is a voluntary process, which validates an individual's qualifications in the field of industrial engineering (IE) professional practice.
- Sponsored by the Philippine Institute of Industrial Engineers
- It demonstrates to employers, clients, and peers the individual's knowledge and experience and signifies his or her commitment to continued excellence in IE professional practice.
- In addition, it increases visibility, builds credibility, and validates expertise with those outside the profession.



PIIE Certifications

- Levels of Certifications
 - The Certified Industrial Engineering (CIE)
 - The Professional IE (PIE)



ASEAN Integration

- Changes to undergraduate curriculum (5 years to 4 years)
- Removal of introductory algebra and trigonometry courses, and general education courses



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References

- CHED Memorandum Order, No. 15, Series of 2008
- PIIE Certification Website

