



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



FIRST YEAR		SECOND YEAR		THIRD YEAR		FOURTH YEAR		FIFTH YEAR	
1 ST SEMESTER	2 ND SEMESTER	1 ST SEMESTER	2 ND SEMESTER	1 ST SEMESTER	2 ND SEMESTER	1 ST SEMESTER	2 ND SEMESTER	1 ST SEMESTER	2 ND SEMESTER
MATH 17 (5)	MATH 53 (5)	MATH 54 (5)	MATH 55 (3)	IE 27 (3)	IE 28 (3)	IE 135* (3)	IE 151* (3)	IE 153* (3)	IE 155* (3)
IE 10 (1)	PHYS 71 (4)	PHYS 72 (4)	ES 21(3)	IE 21 (3)	IE 32* (3)	IE 143 (3)	IE 122* (3)	BA 115	IE 156* (3)
ENG 10 (3)	PHYS71.1 (1)	PHYS 72.1 (1)	ES 26 (3)	CHM 16, PHYS 72, ES 1	IE 33* (2)	IE 160 (3)	SHOP 7	IE 154* (3)	IE 156* (3)
FIL 40 (3)	CHEM16 (5)	ES 1 (2)	ES 11 (3)	3 rd Yr. Standing	IE 41 (3)	IE 142 (3)	IE 144 (3)	IE 152 (3)	PI 100 (3)
PHILO 1 (3)		ChE 2 (3)	ACCTG1 (3)	2 nd Yr. Standing	ES 13 (3)	IE 50 (3)	IE 144 (3)	IE ELECTIVE (3)	IE 198* (3)
KAS 1 (3)		GE, MST (3)	GE, AH (3)		SHOP 7 (1)	ECON 100.1 (3)	EEE 3 (3)	IE ELECTIVE (3)	IE 198* (3)
	COMM 3 (3)	NSTP	NSTP		STS (3)	MATH 17	MATH 54, PHYS 72	ME 63 (3)	
							GE, AH (3)		
PE	PE	PE	PE				GE, SSP (3)	GE, SSP (3)	GE, SSP (3)
								GE, SSP (3)	GE, MST (3)
18 UNITS	18 UNITS	18 UNITS	18 UNITS	19 UNITS	18 UNITS	18 UNITS	18 UNITS	18 UNITS	18 UNITS

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

