CURRICULUM

Bachelor of Science in Instrumentation and Control Engineering (BSICE)

Academic Year 2018-2019

Reference CMOs: CMO No. 4 s. 2018 and CMO No. 20 s. 2013

Curriculum Description

Instrumentation and Control Engineering provides the necessary training and technical foundation to students to become a skilled instrumentation & control specialist. An instrumentation and control engineer is essentially responsible for designing, developing, installing, managing and/or maintaining equipment and systems used to monitor and control engineering systems, machineries and processes.

Program Educational Objectives

The instrumentation and control engineering alumni three to five years after graduation shall:

1. Be engaged in project planning, material applications, design and installation, operations and/or maintenance in the fields of measurement, signal processing, control and industrial automation.
2. Be well-rounded individuals with strong personal skills (decision making, analytic reasoning, problem solving), professional skills (creative thinking, critical thinking, ethics and responsibilities) and able to work and communicate in team environments.
3. Participate in endeavors that promote career advancement and life-long learning.

Student Outcomes

The following skills, knowledge, and behaviors are expected to be attained by students as they progress through the program:

a. Ability to apply knowledge of mathematics and science to solve engineering problems.
b. Ability to design and conduct experiments, as well as to analyze and interpret data.
c. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards.
d. Ability to function on multidisciplinary teams.
e. Ability to identify, formulate, and solve engineering problems.
f. Understanding of professional and ethical responsibility.
g. Ability to communicate effectively.
h. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i. Recognition of the need for, and an ability to engage in life-long learning.
j. Knowledge of contemporary issues.
k. Ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
l. Knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments.

CURRICULUM COMPONENTS

Classification/ Field / Course	No. of Hours/Week		Credit Units
	Lec	Lab	
I. TECHNICAL COURSES			
A. Mathematics			
Differential Calculus	3	0	3
Integral Calculus	3	0	3
Engineering Data Analysis	3	0	3
Differential Equations	3	0	3
Sub-total	**12**	**0**	**12**
B. Natural/Physical Sciences			
General Chemistry	3	3	4
Modern Biology	2	3	3
Physics 1	3	3	4
Sub-total	**8**	**9**	**11**
C. Basic Engineering Sciences			
Introduction to Engineering	0	3	1
Engineering Drawing	0	3	1
Computer-Aided Design	0	3	1
Engineering Economics	3	0	3
Technopreneurship	3	0	3
Engineering Management	2	0	2
Sub-total	**8**	**9**	**11**
D. Allied Courses			
Analytical Instrumentation	3	0	3
Computer Programming 1	0	3	1
Digital Principles and Logic Design	3	3	4
Microprocessor and Microcontroller Systems and Design	3	3	4
Electronics Circuits: Devices and Analysis	3	3	4
Control Systems Engineering	2	3	3
Fundamentals of Data Communications	3	0	3
Industrial Networks and Protocols	3	0	3
Circuits 1	3	3	4
Circuits 2	3	3	4
Basic Occupational Safety and Health	3	0	3
Material Science and Engineering	3	0	3
Environmental Science and Engineering	3	0	3
Thermodynamics	3	0	3
Fluid Mechanics	3	0	3
PLC Fundamentals and Programming	2	3	3
Pneumatics and Hydraulic Systems	2	3	3
Physics 2	3	3	4
Sub-total	**48**	**30**	**58**
E. Professional Courses			
1. Core Courses			
Advanced Engineering Mathematics for ICE	3	0	3
Fundamentals of Instrumentation	2	3	3
Principles of Process Engineering	3	0	3
Process Instrumentation	2	3	3
Sensors Engineering	2	3	3
Industrial Drives and Control	2	3	3
Control and Optimization of Unit Operations	3	0	3
ICE Seminars/Colloquium	0	3	1
Codes, Standards and Professional Ethics for ICE	3	0	3
Advanced Control System	2	3	3
ICE Capstone Design 1	0	3	1
ICE Capstone Design 2	0	3	1
Electronics Measurements and Instrumentation	1	3	2
Research Methods	3	0	3
Sub-total	**26**	**27**	**35**

2. Technical Electives			
ICE Elective 1	3	0	3
ICE Elective 2	3	0	3
Sub-total	**6**	**0**	**6**
F. On-the Job Training	320 hrs		4
Total (Technical Courses)	**108**	**75**	**137**
II. NON-TECHNICAL COURSES			
A. General Education Course			
Understanding the Self	3	0	3
Mathematics in the Modern World	3	0	3
The Contemporary World	3	0	3
Readings in Philippine History	3	0	3
Purposive Communication	3	0	3
Ethics	3	0	3
Art Appreciation	3	0	3
Science, Technology and Society	3	0	3
Sub-total	**24**	**0**	**24**
B. Filipino/Literature/Mandated Courses			
Kontekstwalisadong Komunikasyon sa Filipino	3	0	3
Filipino sa Iba't Ibang Disiplina	3	0	3
ASEAN Literature	3	0	3
Life and Works of Rizal	3	0	3
Sub-total	**12**	**0**	**12**
C. Physical Education			
Physical Fitness, Gymnastics and Aerobics	2	0	2
Rhythmic Activities	2	0	2
Individual and Dual Sports	2	0	2
Team Sports	2	0	2
Sub-total	**8**	**0**	**8**
D. National Service Training Program			
NSTP 1	3	0	3
NSTP 2	3	0	3
Sub-total	**6**	**0**	**6**
Total (Non-Technical Courses)	**50**	**0**	**50**
GRAND TOTAL	**158**	**75**	**187**

SUMMARY	
Courses	**Number of Units**
I. Technical Courses	
A. Mathematics	12
B. Natural/Physical Sciences	11
C. Basic Engineering Sciences	11
D. Allied Courses	58
E. Professional Courses	
1. Core Courses	35
2. Elective Courses	6
F. OJT	4
II. Non-Technical Courses	
A. General Education Courses	24
B. Filipino/Literature/Mandated Courses	12
C. Physical Education	8
D. NSTP	6
TOTAL	**187**

PROGRAM OF STUDY

FIRST YEAR						
First Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
MATH 401	Differential Calculus	3	0	3		
SCI 401	General Chemistry	3	3	4		
ENGG 401	Introduction to Engineering	0	3	1		
GEd 102	Mathematics in the Modern World	3	0	3		
GEd 105	Readings in Philippine History	3	0	3		
GEd 101	Understanding the Self	3	0	3		
GEd 106	Purposive Communication	3	0	3		
PE 101	Physical Fitness, Gymnastics and Aerobics	2	0	2		
NSTP 111	National Service Training Program 1	3	0	3		
	Total	**23**	**6**	**25**		
FIRST YEAR						
Second Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
MATH 402	Integral Calculus	3	0	3	MATH 401	
SCI 403	Physics 1	3	3	4	MATH 401	MATH 402
GEd 104	The Contemporary World	3	0	3		
GEd 109	Science, Technology and Society	3	0	3		
GEd 108	Art Appreciation	3	0	3		
ENGG 402	Engineering Drawing	0	3	1		
CpE 401	Computer Programming 1	0	3	1		
PE 102	Rhythmic Activities	2	0	2	PE 101	
NSTP 121	National Service Training Program2	3	0	3	NSTP 111	
	Total	**20**	**9**	**23**		
FIRST YEAR						
Midterm						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
GEd 103	Life and Works of Rizal	3	0	3		
GEd 107	Ethics	3	0	3		
SCI 402	Modern Biology	2	3	3		
	Total	**8**	**3**	**9**		
SECOND YEAR						
FIRST SEMESTER						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ENGG 403	Computer-Aided Design	0	3	1	ENGG 402	
SCI 404	Physics 2	3	3	4	SCI 403	
MATH 403	Engineering Data Analysis	3	0	3	MATH 402	
MATH 404	Differential Equations	3	0	3	MATH 402	
ENGG 412	Materials Science and Engineering	3	0	3	SCI 401	
ENGG 413	Environmental Science and Engineering	3	0	3	SCI 401	
ME 431	Thermodynamics	3	0	3	SCI 403, MATH 402	
EE 424	Circuits 1	3	3	4	MATH 402	SCI 404
PE 103	Individual and Dual Sports	2	0	2	PE 101	
	Total	**23**	**9**	**26**		
SECOND YEAR						
Second Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ICE 401	Advanced Engineering Mathematics for ICE	3	0	3	MATH 404	
ICE 402	Fundamentals of Instrumentation	2	3	3		
ECE 405	Digital Principles and Logic Design	3	3	4	EE 424	ECE 421
ECE 421	Electronics Circuits: Devices and Analysis	3	3	4	EE 424	
EE 425	Circuits 2	3	3	4	EE 424	ICE 401
ME 406	Fluid Mechanics	3	0	3	ME 431	
PE 104	Team Sports	2	0	2	PE 101	
	Total	**19**	**12**	**23**		

THIRD YEAR						
First Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ICE 403	Principles of Process Engineering	3	0	3	ICE 402	
ICE 404	Process Instrumentation	2	3	3	ICE 401, ICE 402	
ICE 405	Sensors Engineering	2	3	3		ECE 427
ECE 425	Control Systems Engineering	2	3	3	MATH 404, EE 425	
ECE 427	Electronics Measurements and Instrumentation	1	3	2	ECE 421, CpE 401	
ENGG 416	Research Methods	3	0	3	MATH 403	
MexE 403	Pneumatics and Hydraulics Systems	2	3	3	ME 431	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	0	3		
	Total	**18**	**15**	**23**		
THIRD YEAR						
Second Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ICE 406	Industrial Drives and Control	2	3	3	EE 425	
ENGG 404	Engineering Economics	3	0	3	MATH 402	
ECE 415	Microprocessor and Microcontroller Systems and Design	3	3	4	CpE 401, ECE 405	
ECE 426	Fundamentals of Data Communications	3	0	3		
ChE 437	Analytical Instrumentation	3	0	3	ICE 403	
MexE 407	PLC Fundamentals and Programming	2	3	3	ECE 405, MexE 403	
ICEE 401	ICE Elective 1	3	0	3	3rd year standing	
	Total	**19**	**9**	**22**		
THIRD YEAR						
Midterm						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ECE 429	Industrial Networks and Protocols	3	0	3	ECE 426	
ICE 407	Control and Optimization of Unit Operations	3	0	3	ChE 437	
	Total	**6**	**0**	**6**		
FOURTH YEAR						
First Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
ICE 408	ICE Seminars/Colloquium	0	3	1	4th year standing	
ICE 409	Codes, Standards and Professional Ethics for ICE	3	0	3	4th year standing	
ICE 410	Advanced Control System	2	3	3	ICE 404, ICE 403	
ICE 411	ICE Capstone Design 1	0	3	1	ENGG 416	
ENGG 406	Engineering Management	2	0	2		
ENGG 411	Basic Occupational Safety and Health	3	0	3		
Fili 102	Filipino sa Iba't Ibang Disiplina	3	0	3		
ICEE 402	ICE Elective 2	3	0	3	ICEE 401	
	Total	**16**	**9**	**19**		
FOURTH YEAR						
Second Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
Litr 102	ASEAN Literature	3	0	3		
ENGG 405	Technopreneurship	3	0	3	4th year standing	
ICE 412	ICE Capstone Design 2	0	3	1	Graduating	
ENGG 417	On-the-Job Training	320 hours		4	4th year standing	
	Total	**6**	**3**	**11**		
GRAND TOTAL UNITS		**158**	**75**	**187**		