



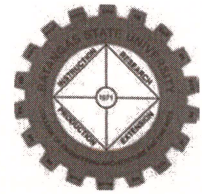
Republic of the Philippines
BATANGAS STATE UNIVERSITY

BatStateU Alangilan

Alangilan, Batangas City

College of Engineering, Architecture and Fine Arts

<https://batstate-u.edu.ph>, Tel. No. (043) 425-0139 loc. 0118/2121



CURRICULUM

Straight Master's-Doctoral in Electronics Engineering (SMD ECE)

Academic Year 2021-2022

References: Final Draft of CMO – PSG for graduate degree programs in Engineering, CMO No. 15 s. 2019

Curriculum Description

The Straight Master's-Doctoral in Electronics Engineering is a research degree in which the Master of Science in Electronics Engineering (MS ECE) and Doctor of Philosophy in Electronics Engineering (PhD ECE) can be earned together. Upon completion of the Straight Master's-Doctoral Degree Program in Electronics Engineering, the student shall receive both the Master of Science in Electronics Engineering and the Doctor of Philosophy in Electronics Engineering degrees.

The Doctor of Philosophy (PhD) in Electronics Engineering (ECE) is a research degree that emphasizes the development of knowledge, skills and attitude necessary for the conduct of individual research at a level that will make a distinct contribution to the knowledge base of engineering. Further, this degree develops advanced research skills that will prepare one for a career in business, academia and research institutions, industry, public sector and other settings in which systematic and critical analytical skills are required. Graduates of this advanced program are expected to be able to produce creative solutions to existing and emerging complex engineering and engineering-rated problems in academia, industry and government.

Electronics Engineering is the branch of engineering that integrates available and emerging technologies with knowledge of mathematics, natural, social and applied sciences to conceptualize, design, and implement new, improved, or innovative electronic, computer and communication systems, devices, goods, services and processes.

Program Educational Objectives

The graduates of Doctor of Philosophy in Electronics Engineering after graduation shall:

1. Develop advanced research skills relevant to one's career in academia, industry, government and other settings.
2. Exhibit a high degree of professionalism in the workplace.

Student Outcomes

Graduates of the Doctor of Philosophy in Electronics Engineering from the Straight Master's-Doctoral Program should have the ability to:

- a. Demonstrate a comprehensive and broad understanding of electronics engineering principles and apply advanced knowledge on this specific discipline;
- b. Analyze, synthesize, create and evaluate electronics engineering systems;
- c. Design components, devices and systems to meet specified electronics engineering needs under real – world constraints;
- d. Communicate effectively technical knowledge, both orally and in writing, on complex engineering activities;
- e. Function effectively as an individual, a team member, or as a leader in diverse work environments;

- f. Contribute to the generation, dissemination and preservation of electronics engineering knowledge, methodologies, techniques, and processes;
- g. Engage in professional development and life-long learning;
- h. Conduct oneself within professional and ethical standards; and
- i. Perform independent scientific research that results in creation of new knowledge in the electronics engineering discipline.

CURRICULUM OVERVIEW

The Straight Master’s-Docctoral in Electronics Engineering (SMD ECE) curriculum comprises 54 credit units divided into nine (9) units of Foundation Courses, nine (9) units of Core Courses, eighteen (18) units of Specialization Courses, six (6) units of Elective Courses, and twelve (12) units of Dissertation.

No. of terms: 8 semesters

No. of units: 54 units

Core courses:	9 units
Major courses:	9 units
Specialization courses:	18 units
Elective courses:	6 units
Dissertation:	12 units
Total:	54 units

STRAIGHT MASTER'S-DOCTORAL IN ELECTRONICS ENGINEERING CURRICULUM

References: Final Draft of CMO – PSG for graduate degree programs in Engineering, CMO No. 15 s. 2019

Classification/ Field/ Course	No. of Hours/Week		Credit Units
	Lec	Lab	
I. FOUNDATION COURSES	9	0	9
II. CORE COURSES	9	0	9
III. SPECIALIZATION COURSES	18	0	18
IV. ELECTIVE COURSES	6	0	6
V. DISSERTATION	12	0	12
TOTAL	54	0	54

- Specializations:
- Communications
 - Control
 - Artificial Intelligence
 - Microelectronics

PROGRAM OF STUDY

Graduate School of Engineering				
STRAIGHT MASTER'S-DOCTORAL IN ELECTRONICS ENGINEERING (SMD ECE)				
COURSE OFFERINGS				
All Subjects have 3 units of credit except for Dissertation with 6 units				
Foundations Courses (9 units required)				
Course Code	Course Title	No. of Hours		Unit/s
		Lec	Lab	
ENGG 501	COMPUTATIONAL MATHEMATICS 1	3		3
ENGG 502	COMPUTATIONAL MATHEMATICS 2	3		3
ENGG 503	DESIGN OF EXPERIMENTS AND DATA ANALYTICS	3		3
Major Courses (9 units required)				
Course Code	Course Title	No. of Hours		Unit/s
		Lec	Lab	
GECE 501	LINEAR SYSTEMS THEORY	3		3
GECE 502	MODERN CONTROL THEORY AND APPLICATIONS	3		3
ENGG 504	APPLIED MATERIALS SCIENCE AND ENGINEERING	3		3
Specialization Courses (18 units required)				
Course Code	Course Title	No. of Hours		Unit/s
		Lec	Lab	
GECE 503	MANAGEMENT OF TECHNOLOGY	3		3
GECE 504	ADVANCED DIGITAL SIGNAL PROCESSING	3		3
GECE 505	ADVANCED ELECTROMAGNETIC THEORY	3		3
GECE 506	ANTENNAS AND RADIOWAVE PROPAGATION	3		3
GECE 510	DIGITAL CONTROL	3		3
GECE 512	NONLINEAR SYSTEMS	3		3
GECE 513	OPTIMAL CONTROL	3		3
GECE 515	ARTIFICIAL INTELLIGENCE FOR CYBER-PHYSICAL SYSTEMS	3		3
GECE 517	MACHINE LEARNING	3		3
GECE 518	NEURAL NETWORKS	3		3
GECE 519	ADVANCED ANALOG IC DESIGN	3		3
GECE 520	ADVANCED DIGITAL IC DESIGN	3		3
GECE 521	MIXED-SIGNAL IC DESIGN	3		3
Elective (6 units required)				
Course Code	Course Title	No. of Hours		Unit/s
		Lec	Lab	
GECE 507	OPTICAL FIBER COMMUNICATIONS	3		3
GECE 508	SPECIAL TOPICS IN COMMUNICATIONS	3		3
GECE 509	ADAPTIVE CONTROL	3		3
GECE 511	MULTIVARIABLE CONTROL SYSTEM	3		3
GECE 514	ADVANCED IMAGE PROCESSING	3		3
GECE 516	DATA MINING	3		3
GECE 522	SPECIAL TOPICS IN ELECTRONICS	3		3
GECE 523	SPECIAL TOPICS IN SYSTEMS AND CONTROL	3		3
GECE 524	FLAT ANTENNA DESIGN	3		3
GECE 525	NUMERICAL ELECTROMAGNETICS	3		3
GECE 526	HILBERT SPACE METHOD AND APPLICATIONS	3		3
GECE 527	ROBOTICS AND AUTOMATION	3		3
GECE 528	HIGH PERFORMANCE & PARALLEL COMPUTER ARCHITECTURES	3		3
GECE 529	HYPERSPECTRAL DATA PROCESSING	3		3
GECE 530	LOW POWER SYSTEM DESIGN	3		3
GECE 531	SYSTEM-ON-CHIP DESIGN	3		3
Dissertation (12 units)				
Course Code	Course Title	No. of Hours		Unit/s
		Lec	Lab	
GECE 603	DISSERTATION 1	6		6
GECE 604	DISSERTATION 2	6		6

Any subject taken in excess of 18 units from the specialization courses can be credited as an elective course.
Total No. of Units = 54 units

MAPPING OF CURRICULUM COURSES TO PROGRAM OUTCOMES

COURSE CODE	COURSES	PROGRAM OUTCOMES								
		a	b	c	d	e	f	g	h	i
ENGG 501	COMPUTATIONAL MATHEMATICS 1	x								
ENGG 502	COMPUTATIONAL MATHEMATICS 2	x								
ENGG 503	DESIGN OF EXPERIMENTS AND DATA ANALYTICS		x	x	x					
ENGG 504	APPLIED MATERIALS SCIENCE AND ENGINEERING	x			x					
GECE 501	LINEAR SYSTEMS THEORY	x			x					
GECE 502	MODERN CONTROL THEORY AND APPLICATIONS	x	x		x					
GECE 503	MANAGEMENT OF TECHNOLOGY				x	x		x		
GECE 504	ADVANCED DIGITAL SIGNAL PROCESSING				x	x		x		
GECE 505	ADVANCED ELECTROMAGNETIC THEORY				x	x		x		
GECE 506	ANTENNAS AND RADIOWAVE PROPAGATION				x	x		x		
GECE 510	DIGITAL CONTROL				x	x		x		
GECE 512	NONLINEAR SYSTEMS				x	x		x		
GECE 513	OPTIMAL CONTROL				x	x		x		
GECE 515	ARTIFICIAL INTELLIGENCE FOR CYBER-PHYSICAL SYSTEMS				x	x		x		
GECE 517	MACHINE LEARNING				x	x		x		
GECE 518	NEURAL NETWORKS				x	x		x		
GECE 519	ADVANCED ANALOG IC DESIGN				x	x		x		
GECE 520	ADVANCED DIGITAL IC DESIGN				x	x		x		
GECE 521	MIXED-SIGNAL IC DESIGN				x	x		x		
GECE 507	OPTICAL FIBER COMMUNICATIONS				x	x		x		
GECE 508	SPECIAL TOPICS IN COMMUNICATIONS				x	x		x		
GECE 509	ADAPTIVE CONTROL				x	x		x		
GECE 511	MULTIVARIABLE CONTROL SYSTEM				x	x		x		
GECE 514	ADVANCED IMAGE PROCESSING				x	x		x		
GECE 516	DATA MINING				x	x		x		
GECE 522	SPECIAL TOPICS IN ELECTRONICS				x	x		x		
GECE 523	SPECIAL TOPICS IN SYSTEMS AND CONTROL				x	x		x		
GECE 524	FLAT ANTENNA DESIGN				x	x		x		
GECE 525	NUMERICAL ELECTROMAGNETICS				x	x		x		
GECE 526	HILBERT SPACE METHOD AND APPLICATIONS				x	x		x		
GECE 527	ROBOTICS AND AUTOMATION				x	x		x		
GECE 528	HIGH PERFORMANCE & PARALLEL COMPUTER ARCHITECTURES				x	x		x		
GECE 529	HYPERSPECTRAL DATA PROCESSING				x	x		x		
GECE 530	LOW POWER SYSTEM DESIGN				x	x		x		
GECE 531	SYSTEM-ON-CHIP DESIGN				x	x		x		
GECE 603	DISSERTATION 1						x		x	x
GECE 604	DISSERTATION 2			x			x			x

PROGRAM SCHEDULE

Year 1

- 1st Semester (9 units):

Computational Mathematics 1, Linear Systems Theory, Modern Control Theory and Applications
- 2nd Semester (9 units):

Computational Mathematics 2, Applied Materials Science and Engineering, Design of Experiments and Data Analytics
- Midterm (6 units):

Specialization 1, Specialization 2

Year 2

- 1st Semester (9 units):

Specialization 3, Specialization 4, Elective 1
- 2nd Semester (9 units):

Specialization 5, Specialization 6, Elective 2
- Midterm:

Comprehensive Examination

Year 3

- 1st Semester (6 units):

Dissertation 1
- 2nd Semester (6 units):

Dissertation 2