



UNIVERSITY OF SANTO TOMAS

Faculty of Engineering

Electronics Engineering Department



Program Specifications

Program Description

The Bachelor of Science in Electronics Engineering Program (BS ECE) of the University of Santo Tomas provides a curriculum that molds the students to have wide and deep knowledge in various field of Electronics Engineering discipline. The program focuses on the development of undergraduate students enabling them to contribute to technological advancement through research and innovation.

The curriculum is designed to be student-centered that is aligned to meet the Expected Learning Outcomes (ELO) set by the University. Each course in the curriculum is carefully developed based on the Program Educational Objectives (PEO) and Student Outcomes (SO) of the BS ECE Program. The ECE Curriculum provides diverse Outcome-Based Teaching and Learning (OBTL) activities that enable the students to achieve the expected level of global competence and to form Thomasian Engineers who are committed to serve the society with compassion while being engaged in lifelong learning for continuous professional development.

The UST BS ECE Program offers three (3) specialization tracks namely: Communications, Microelectronics, and Instrumentation and Control. The Communications track specializes in the area of network design and efficient wireless transmission of multimedia information. The Microelectronics track specializes in the development of sensors, micro-electromechanical systems (MEMS) and VLSI devices. The Instrumentation track specializes in the area of Artificial Intelligence, Robotics, and Industrial Automation.

Career Opportunities

The UST BS ECE graduates are equipped with the right knowledge and skills that would lead them to any but not limited to the following careers: (a) Telecommunications Engineer, (b) Computer Network Engineer, (c) Product or Test Engineer in Semiconductor Industry, (d) Information and Communications Technology (ICT) Specialist, (e) Biomedical Engineer, (f) Instrumentation Engineer, (g) Research and Development (R&D) Engineer in Electronics/Communications Industry, (h) Teaching and/or Research Personnel in Academic Institution, (i) Broadcast Engineer, (j) Engineer in Aeronautical/Maritime Services.

Program Educational Objectives (PEO)

Within five years after graduation, BS ECE alumni from the University of Santo Tomas shall be engaged either locally or abroad in the design, operation, or management in the fields of electronics, communications, and computer, or pursuing teaching, research, technical sales or entrepreneurship after having completed advanced studies or special training. Furthermore, they shall be expected to imbibe the Thomasian traits of contemplative and critical thinking, exemplary work ethic, and a commitment to improve society and to lifelong learning...



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Student Outcomes (SO)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Comparative Matrix of Program Outcomes in CHED Memorandum Order versus those of UST BS ECE Student Outcomes

CMO 101 s2017 Program Outcomes		UST BS Electronics Engineering Student Outcomes	
a	Apply knowledge of mathematics and science to solve complex engineering problems	1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
b	Design and conduct experiments, as well as to analyze and interpret data	6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
c	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 the standards	2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
d	Function in multidisciplinary teams	5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
e	Identify, formulate, and solve complex engineering problems	1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics



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CMO 101 s2017 Program Outcomes		UST BS Electronics Engineering Student Outcomes	
f	Apply professional and ethical responsibility	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
g	Communicate effectively	3	An ability to communicate effectively with a range of audiences
h	Identify the impact of engineering solutions in a global, economic, environmental, and societal context	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
i	Recognize the need for, and ability to engage in lifelong learning	7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
j	Apply knowledge in contemporary issues	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
k	Use techniques, skills, and modern engineering tools necessary for engineering practice		Implied in 1, 2 and 6
l	Apply knowledge of engineering and management principles as a member and a leader of a team, to manage projects in a multidisciplinary environment	5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
m	Apply knowledge of electronics engineering in at least one specialized field of electronics engineering practice	7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Mapping of Institutional Intended Learning Outcomes (IILOs) with UST BS ECE Student Outcomes

Thomasian Graduate Attributes (THOGA)		UST BS Electronics Engineering Student Outcomes	
SERVANT LEADER			
	Show leadership abilities to promote advocacies for life, freedom, justice, and solidarity in the service of the family, the local and global communities, the Church and the environment.	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts



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Thomsonian Graduate Attributes (THOGA)		UST BS Electronics Engineering Student Outcomes	
	Implement relevant projects and activities that speak of Christian compassion to the poor and the marginalized in order to raise their quality of life	2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	Show respect for the human person, regardless of race, religion, age, and gender	5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
EFFECTIVE COMMUNICATOR AND COLLABORATOR			
	Express myself clearly, correctly, and confidently in various environments, contexts, and technologies of human interaction	3	An ability to communicate effectively with a range of audiences
	Work productively with individuals or groups from diverse cultures and demographics	5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
	Show profound respect for individual differences and/or uniqueness as members of God's creation	5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
ANALYTICAL AND CREATIVE THINKER			
	Show judiciousness and resourcefulness in making personal and professional decisions	6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
	Engage in research undertakings that respond to societal issues	7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
	Express personal and professional insights through an ethical and evidence-based approach	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
LIFELONG LEARNER			
	Engage in reflective practice to ensure disciplinary relevance and professional development	7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
	Exhibit preparedness and interest for continuous upgrading of competencies required by the profession or area of specialization	7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies



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Thomasian Graduate Attributes (THOGA)		UST BS Electronics Engineering Student Outcomes	
	Manifest fidelity to the teachings of Christ, mediated by the Catholic Church, in the continuous deepening of faith and spirituality in dealing with new life situations and challenges	4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

Performance Indicators (PI)

UST BS Electronics Engineering Student Outcomes		Performance Indicators
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Identify applicable methods, techniques, and fundamental principles of engineering, science, mathematics to solve complex electronics engineering problems
		Associate core and specialized knowledge to formulate gaps, methods, and solutions to complex electronics engineering problems
		Synthesize engineering literature to formulate research gaps involving complex electronics engineering problem
		Formulate methods and solutions using appropriate engineering concepts, principles, and tools to solve complex electronics engineering problems
		Solve for the unknown variables or parameters in complex electronics engineering problems based on the derived methods from the principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Design a system or a process using appropriate engineering techniques and tools to produce solutions that meet specified needs within the realistic constraints
		Associate public health, safety and welfare, global, cultural, social, environmental, and economic factors to the proposed system or process that meets specified needs
		Assess and evaluate criteria for acceptability and desirability of design solutions that meet specified needs and with consideration to realistic constraints
		Assess the significance and impact of engineering design or research and innovation that addresses national and/or global issues
		Compare the proposed system or process that meets specified needs with the existing solutions in terms of public



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		health, safety and welfare, global, cultural, social, environmental, and economic factors
		Improve existing solutions to a problem that generally includes public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to communicate effectively with a range of audiences	Use appropriate audio-visual aids to communicate information coherently
		Synthesize, harmonize, and consolidate information, literature, and results for easy understanding of range of audiences and/or readers
		Discuss cohesively and with fluidity the technical reports through oral presentations with confidence, clarity of speech and good audience rapport
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed and morally sound judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Associate ethical principles and policies in designing solutions and methods for complex and/or specialized electronics engineering problem in terms of global, economic, environmental, and societal contexts
		Determine the impact or level of ethical and professional accountabilities from the proposed engineering solutions in global, economic, environmental, and societal contexts
		Assess and compare the advantages and disadvantages of the proposed engineering solutions in terms of global, economic, environmental, and societal contexts
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	Demonstrate effective leadership skills
		Apply knowledge of engineering and management principles to serve and to lead in multidisciplinary teams
		Formulate workplan, goals, tasks, and specific roles as agreed upon by the team
		Participate in teams of diverse composition towards the completion of the tasks
		Indirect Measure using Peer Evaluation
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Design appropriate experimental procedures, algorithms, methods, and/or process flow to acquire necessary data for a specific engineering problem
		Apply and demonstrate the use of derived experimental procedures in an actual and/or simulated set-up using appropriate engineering techniques and tools to acquire the necessary data for a specialized and/or complex engineering problem
		Analyze and interpret experimental data and results to develop generalizations or conclusions



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		Summarize the findings cohesively relevant to the problem and objectives of the experiment
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Demonstrate pursuit and eagerness for advanced training aside from those given to him/her
		Participate in activities promoting further learning beyond the curriculum requirements
		Design appropriate solutions and methods using acquired specialized knowledge addressing problems in a specialized field of electronics engineering
		Solve for the unknown variables and/or parameters using acquired specialized knowledge addressing problems in a specialized field of electronics engineering
		Indirect Measure using Employers and Academic Adviser Evaluation