| PROGRAM SPECIFICATION | |
|---|---|
| **PROGRAM TITLE** | ELECTRONICS ENGINEERING (ECE) |
| **FACULTY NAME** | FACULTY OF ENGINEERING, DEPARTMENT OF ELECTRONICS ENGINEERING |
| **ACCREDITATION AGENCIES** | |
| ASEAN University Network – Quality Assurance (AUN – QA) certified | |
| Awarded as Center of Development (COD) by the Commission on Higher Education (CHED) | |
| Level III accreditation by the Philippine Accrediting Association of Schools, Colleges and Universities (PAASCU), a member of the Federation of Accrediting Agencies of the Philippines (FAAP) authorized by the Commission on Higher Education (CHED) that accredits Academic Programs which meet the standards of quality education | |
| Accredited by the Philippine Technological Council (PTC), a recognized unit by CHED that accredits and monitor proper implementation of Outcomes-based Education (OBE) system aligned with the CHED memorandum order (CMO) No. 37 s2012 | |
| **AWARDING BODY** | UNIVERSITY OF SANTO TOMAS |
| **PROGRAM EDUCATIONAL OBJECTIVES (PEO)** | |

Program Educational Objectives are broad statements that the graduates from the BS ECE Program must be able to attain within five years of graduation. In narrative form, these are presented as follows:

Within five years after graduation, Bachelor of Science in Electronics Engineering 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.

**STUDENT OUTCOMES (SO)**

The Student Outcomes (SOs), also known as Program Outcomes (POs), describe what students are expected to know and be able to do by the time of graduation. It includes subject-specific learning outcomes that relate to knowledge and skills of a UST ECE graduate and generic transferable skills.

a-K1: An ability to apply knowledge of mathematics and science appropriately to solve complex Electronics Engineering problems

b-D1: An ability to design and conduct experiments, as well as to analyze and interpret data accordingly

c-D2: An 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-P1: An ability to function effectively in multi-disciplinary teams

e-D3: An ability to identify, formulate, and solve Electronics Engineering problems correctly

f-K2: Understanding of professional and ethical responsibility

g-P2: An ability for effective written, visual, and oral communication

h-K3: The broad education necessary to understand the impact of engineering solutions or research and innovation in a global, economic, environmental, and societal context

i-P3: The recognition of the need for, and an ability to engage in life-long learning

j-P4: An active concern for contemporary local and global issues

k-P5: An ability to use techniques, skills, and modern engineering tools necessary for the practice of Electronics Engineering

l-K4: The knowledge and understanding of Engineering and management principles as a member and leader in a team, to manage projects in multidisciplinary environments

m-K5: The specialized knowledge in at least one field of Electronics Engineering practice, and the ability to apply such knowledge to provide solutions to actual problems

## 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.

| NAME OF FINAL AWARD | Bachelor of Science in Electronics Engineering |
|---|---|

## ANNUAL STUDENT ENROLLMENT AND GRADUATE DATA

### Student Enrollment and Graduate Data of UST BSECE Program

| ACADEMIC YEAR | FIRST YEAR | | SECOND YEAR | | THIRD YEAR | | FOURTH YEAR | | FIFTH YEAR | | TOTAL NO. OF GRADUATES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1ST SEM | 2ND SEM | 1ST SEM | 2ND SEM | 1ST SEM | 2ND SEM | 1ST SEM | 2ND SEM | 1ST SEM | 2ND SEM | |
| 2008-2009 | 205 | 208 | 177 | 181 | 100 | 98 | 142 | 141 | 111 | 112 | 96 |
| 2009-2010 | 307 | 298 | 205 | 197 | 175 | 180 | 103 | 104 | 143 | 140 | 113 |
| 2010-2011 | 275 | 267 | 282 | 286 | 184 | 184 | 177 | 178 | 103 | 101 | 100 |
| 2011-2012 | 190 | 183 | 270 | 262 | 229 | 234 | 179 | 175 | 175 | 172 | 162 |
| 2012-2013 | 258 | 252 | 179 | 193 | 213 | 215 | 206 | 212 | 183 | 173 | 153 |
| 2013-2014 | 200 | 186 | 229 | 220 | 166 | 173 | 200 | 200 | 223 | 213 | 198 |
| 2014-2015 | 229 | 229 | 183 | 183 | 176 | 176 | 166 | 162 | 201 | 200 | 189 |
| 2015-2016 | 226 | 218 | 199 | 197 | 149 | 156 | 172 | 160 | 166 | 167 | 156 |
| 2016-2017 | 3 | 0 | 222 | 204 | 150 | 169 | 158 | 165 | 163 | 139 | 123 |
| 2017-2018 | 0 | 0 | 15 | 2 | 183 | 181 | 169 | 171 | 161 | 156 | 137 |

## PROGRAM STUDY PLAN

### First Year – First Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| CHEM 111 | General Chemistry 1 | 3 | |
| CHEM 111L | General Chemistry 1 (Laboratory) | 1 | |
| DRAW 111 | Engineering Drawing | 1 | |
| ENG 1 | Introduction to College English | 3 | |
| GE 101 | Engineering Orientation | 1 | |
| MATH 111 | Engineering Algebra | 5 | |
| MATH 215 | Solid Mensuration | 2 | MATH111 (co-requisite) |
| PHIST | Philippine History | 3 | |
| THY 1 | Contextualized Salvation History | 3 | |
| PE 1 | Physical Education 1 | 2 | |
| ROTC | Reserve Officers' Training Corps | 1 | |
| **TOTAL** | | **27** | |

### First Year – Second Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| CHEM 112 | Chemistry for Engineers | 2 | CHEM 111 |
| CHEM 112L | Chemistry for Engineers (Laboratory) | 1 | CHEM 111, CHEM 111L |
| ENG 2 | Reading and Thinking Skills for Academic Study | 3 | ENG 1 |
| LIT 101A | World Literatures | 3 | |
| MATH 104 | Analytic Geometry | 2 | MATH 111, MATH 205 (co-requisite) |
| MATH 205 | Plane and Spherical Trigonometry | 3 | MATH 111 |
| RC | Rizal Course | 3 | |
| THY 2 | Church and Sacraments | 3 | THY 1 |
| PE 2 | Physical Education | 2 | |
| ROTC | Reserve Officers' Training Corps | 3 | |
| **TOTAL** | | **25** | |

### Second Year – First Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 201 | Computer Programming I | 3 | |
| ENG 3 | Academic Wiritng Skills | 3 | ENG 2 |
| FIL 1 | *Komunikasyon sa Akademikong Filipino* | 3 | |
| LIT 102A | Philippine Literatures | 3 | |
| MATH 108 | Differential Calculus | 4 | MATH 104, MATH 111 MATH 205, MATH 215 |
| PHL 5 | Christian Ethics | 3 | THY 1, THY 2 |
| PHYS 202 | College Physics I | 3 | MATH 111, MATH 205 |
| PHYS 202L | College Physics I (Laboratory) | 1 | PHYS 202 (co-requisite) |
| PE 3 | Physical Education | 2 | |
| NSTP | National Service Training Program | 3 | |
| *TOTAL* | | *26* | |

### Second Year – Second Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 202 | Computer Programming II | 1 | COMP 201 |
| FIL 2 | *Pagbasa at Pagsulat tungo sa Pananaliksik* | 3 | FIL 1 |
| MATH 109 | Integral Calculus | 4 | MATH 108 |
| PGC | Philippine Government and Constitution | 3 | |
| PHL 2 | Logic | 3 | |
| PHYS 205 | College Physics II | 3 | MATH 111, MATH 205 |
| PHYS 205L | College Physics II (Laboratory) | 1 | PHYS 202, PHYS 205 (co-requisite) |
| PSY 1 | General Psychology | 3 | |
| PE 4 | Physical Education | 2 | |
| NSTP | National Service Training Program | 3 | |
| *TOTAL* | | *26* | |

### Third Year – First Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| CNET 311 | Computer Networks I | 1 | Third Year Standing |
| EE 306A | Circuit Analysis I | 3 | MATH 109, PHYS 205, PHYS 205L |
| EE 306AL | Circuit Analysis I (Laboratory) | 1 | EE 306A (co-requisite) |
| ECE 311 | Electronic Devices and Circuits | 3 | MATH 109, PHYS 205, PHYS 205L |
| ECE 311L | Electronic Devices and Circuits (Laboratory) | 1 | ECE 311 (co-requisite) |
| ECE-M311 | Discrete Mathematics | 3 | MATH 111 |
| ECE-M312 | Technical Computing | 1 | COMP 202, EE 306A (co-requisite), ECE 311 (co-requisite), MATH 109 |
| ECE-M313 | Vector Analysis | 3 | MATH 109, PHYS 205, PHYS 205L |
| ETAR | Economics with Taxation and Agrarian Reform | 3 | |
| MATH 208 | Differential Equations | 3 | MATH 109 |
| MECH 311 | Statics of Rigid Bodies | 3 | MATH 109, PHYS 205, PHYS 205L |
| *TOTAL* | | *25* | |

### Third Year – Second Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 321 | Computer-Aided Circuit Design and Simulation | 1 | ECE-M312 |
| CNET 321 | Computer Networks II | 1 | CNET 311 |
| EE 306B | Circuit Analysis II | 3 | EE 306A |
| EE 306BL | Circuit Analysis II (Laboratory) | 1 | EE 306B (co-requisite) |
| ECE 321 | Electronic Circuit Analysis and Design | 3 | ECE 311, ECE 311L |
| ECE 321L | Electronic Circuit Analysis and Design (Laboratory) | 1 | ECE 321 (co-requisite) |
| ECE 322 | Material Science Engineering | 3 | CHEM 111, CHEM 111L PHYS 205, PHYS 205L |
| ECE 323 | Electromagnetics | 3 | ECE-M313 |
| ECE-M321 | Advanced Engineering Mathematics for Electronics Engineering | 3 | MATH 208 |
| MATH 301 | Probability Theory and Random Processes | 3 | MATH 101, Third Year Standing |
| MECH 312 | Dynamics of Rigid Bodies | 2 | MECH 311 |
| **TOTAL** | | **24** | |

### Fourth Year – First Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 411 | Logic Circuits and Switching Theory | 3 | ECE 311, ECE 311L |
| COMP 411L | Logic Circuits and Switching Theory (Laboratory) | 1 | COMP 411 (co-requisite) |
| ECE 411 | Signals, Spectra, and Signal Processing | 3 | ECE-M321, MATH 301 |
| ECE 411L | Signals, Spectra, and Signal Processing (Laboratory) | 1 | ECE 411 (co-requisite) |
| ECE 412 | Principles of Communications | 3 | ECE 321, ECE 321L, ECE-M321 |
| ECE 412L | Principles of Communications (Laboratory) | 1 | ECE 412 (co-requisite) |
| EE 307 | Energy Conversion | 3 | ECE 323, EE 306B, EE 306BL |
| EE 307L | Energy Conversion (Laboratory) | 1 | EE 307 (co-requisite) |
| ENE 300 | Environmental Engineering | 3 | Fourth Year Standing |
| ME 302 | Basic Thermodynamics | 2 | MATH 109, PHYS 205, PHYS 205L |
| MECH 313 | Mechanics of Deformable Bodies | 3 | MECH 312 |
| **TOTAL** | | **23** | |

### Fourth Year – Second Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 421 | Microprocessor Systems | 3 | COMP 202, COMP 411, COMP 411L ECE 321, ECE 321L |
| COMP 421L | Microprocessor Systems (Laboratory) | 1 | COMP 202. COMP 411, COMP 411L ECE 321, ECE 321L |
| ECE 421 | Industrial Electronics | 3 | Fourth Year Standing |
| ECE 421L | Industrial Electronics (Laboratory) | 1 | ECE 421 (co-requisite) |
| ECE 422 | Digital Communications | 3 | ECE 411, ECE 411L ECE 412, ECE 412L |
| ECE 422L | Digital Communications (Laboratory) | 1 | ECE 411, ECE 411L ECE 412, ECE 412L |
| ECE-ELEC1 | Advanced Electronics | 3 | ECE 321, ECE 321L |

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| ECE-M421 | Numerical Methods | 3 | COMP 202, ECE-M321 |
| ECE-M421L | Numerical Methods (Laboratory) | 1 | ECE-M421 (co-requisite) |
| ECE-MR | Methods of Research | 1 | COMP 411, ECE 411, ECE 412, COMP 411L, ECE 411L, ECE 412L |
| GE 301 | Engineering Economy | 3 | |
| **TOTAL** | | **23** | |

### Fourth Year – Special Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| ECE-PRACT | Practicum | 1 | Fifth Year Standing |
| **TOTAL** | | **1** | |

### Fifth Year – First Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| COMP 511 | Computer Systems Architecture | 2 | COMP 421, COMP 421L |
| COMP 512 | Embedded Systems and Automation | 2 | COMP 421, COMP 421L |
| ECE 511 | Feedback and Control Systems | 3 | ECE-M321 |
| ECE 511L | Feedback and Control Systems (Laboratory) | 1 | ECE 511 (co-requisite) |
| ECE 512 | Transmission Media and Antenna Systems | 3 | ECE 323, ECE 422, ECE 422L |
| ECE 512L | Transmission Media and Antenna Systems (Laboratory) | 1 | ECE 512 (co-requisite) |
| ECE 513 | Data Communications | 3 | ECE 422, ECE 422L |
| ECE 513L | Data Communications (Laboratory) | 1 | ECE 422, ECE 422L |
| ECE-PS1 | Thesis I | 1 | ECE-MR |
| GE 302 | Engineering Management | 3 | Fifth Year Standing |
| SCL 3 | The Social Teachings of the Church | 3 | THY 2 |
| **TOTAL** | | **23** | |

### Fifth Year – Second Term

| Course Code | Course Title | Credit Units | Pre-requisite/s |
|---|---|---|---|
| ECE 521 | Communication Systems Analysis and Design | 3 | ECE 512, ECE 512L |
| ECE 522 | Electronics Engineering Laws, Ethics, and Contracts | 3 | Fifth Year Standing |
| ECE 523 | Seminars and Field Trips | 1 | Fifth Year Standing |
| ECE-ELEC2 | Electronics Engineering Elective II | 3 | Fifth Year Standing |
| ECE-ELEC3 | Electronics Engineering Elective III | 3 | Fifth Year Standing |
| ECE-ELEC4 | Electronics Engineering Elective IV | 3 | Fifth Year Standing |
| ECE-PS2 | Thesis II | 1 | ECE-PS1 |
| GE 303 | Safety Management | 1 | Fifth Year Standing |
| SCL 9 | Marriage and Family | 3 | SCL 3 |
| **TOTAL** | | **21** | |

## 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.