

Curriculum Map and Program Overview of Two-Year Undergraduate Program, Department of Electrical Engineering, National Formosa University

Educational objectives

1. Lay a solid theoretical foundation and practical technology of electrical engineering.
2. Focus on professional theory to cultivate research and innovation knowledge.
3. Cultivate humanistic literacy and forward-looking vision and fulfill social responsibilities.

Features

1. Design complete foundational professional courses in areas such as Electronics, Electrical Power, Computer Science, Control, Communications, and Integrated Circuit Design.
2. Train students' practical skills through laboratory courses and develop their abilities in problem analysis and technical research.
3. Utilize capstone projects to cultivate communication skills and team cooperation spirit.
4. Encourage student participation in project competitions and industry-academia collaborations to stimulate their interest in research and development and nurture their innovation abilities.
5. Educate students to value social civic responsibility, respect professional and administrative ethics, and maintain sound personal character.
6. Cultivate interest and appreciation for culture, arts, and music through general education courses.
7. Enhance students' ability to read original texts through basic training in original textbooks and technical papers, and subsequently guide them to utilize various learning tools, strengthen foreign language training, and encourage participation in international sister school exchanges to broaden personal horizons.

Student Core Competencies

1. Possess professional knowledge in Electrical Engineering.
2. Be able to use computers and instruments to design circuits, perform experiments, and analyze experimental data.
3. Possess practical skills in Electrical Engineering and the ability to use relevant tools.
4. Possess software and hardware application abilities, combining sensing and driving hardware circuits to complete specific function module designs.
5. Possess the spirit of teamwork and the ability to communicate and coordinate.
6. Possess a spirit of research and innovation, and be able to systematically analyze and handle problems.
7. Be able to pay attention to current affairs, understand the impact of Electrical Engineering technology on society and the environment, and establish the concept of continuous learning to keep absorbing new knowledge.
8. Understand professional ethics and social responsibility.

Department Course List and Regulations

1. In addition to the listed courses, professional electives may also include courses offered by other colleges. The total maximum number of credits for elective courses from other departments that can be recognized for graduation is 12 credits; however, a maximum of 6 credits will be recognized from the College of Liberal Arts and the College of Management.
2. Graduating students must select a minimum of 9 hours of courses offered by this department each semester (including compulsory and elective courses).
3. Military training courses for All-out National Defense Education are not included in the calculation of graduation credits.
4. Starting from the first academic year, students must take at least one "Social Responsibility Practice Education" course each semester (fall and spring) and complete them before graduation. Students who select "Social Responsibility Practice Education (3) or (4)" may apply for exemption from "Social Responsibility Practice Education (1) or (2)".
5. Graduation credits must include at least 6 credits of Department Professional Elective Course (I) "Mathematics and Basic Sciences".
6. The implementation content and required hours for off-campus internship courses are stipulated in the department's "Student Off-Campus Internship Course Operation Essentials".
7. For General Education Courses (1) and (2), one semester must include an elective course related to "Professional Ethics".

Category	Course Names (Recommended Course Enrollment year)
University Compulsory Courses	Chinese(1), Social Responsibility Practice Education 1(1), Physical Education 3(1), Physical Education 4(1), English (1), Social Responsibility Practice Education 2(1), General Education Lecture (1), General Education 1 (2), General Education 2 (2).
Department Compulsory Courses	Electric circuits (1), Engineering Mathematics (1), Signal and Systems (1), Human Machine Interface Application (1), Power Electronics (1), Electronics (1), Electronics Lab. (1), Communication Systems (1), Practical Project 1(1), Practical Project 2(2), Power Electronics Lab. (2)
Department Elective Courses (I)	Linear Algebra (1), Probability and Statistics (1), Complex Analysis (1), Discrete Mathematics (2), Vector Analysis (2), Numerical Methods (2)
Power and Energy Processing Group	Power System (1), Circuits Implementation of Power Electronics (2), Power Electronics Simulation and Analysis (2), Introduction to EMI Prevention (2), Power Electronics Applications project (2), Design of Electronics Ballasta (2), Protection Relay (2)
System Control Group	Applications of Microcomputer Systems (1), Python Programming and Implementation (1), Intelligent Robotics (1), Introduction to Embedded Systems (1), Industrial Process Control (1), Artificial intelligence (2), Fuzzy Control (2), Special Topics in Artificial Intelligence (2), Expert Systems (2), Neural Network (2), The Practice of Machine Learning (2)
System-on-a-Chip (SoC) Group	Very Large Scale Integrated DesignCircuits (1), Programmable Logic Circuits Design and Lab. (1), Integrated Circuits Layout and Verification (1), Operating Systems (1), Design and Simulation of HDL (1), Introduction to Circuit Board Industry and Manufacturing (1), Introduction to Embedded Systems (1), Computer Structure (1), System Chip Applications (1), Digital Integrated Circuit Design (2), Design and Implementation of Processor (2), Introduction to Analog Integrated Circuit Design (2)
Communications and Network Group	Introduction to Computer Networks (1), Computer Programming Design and Application with MATLAB (1), Python Programming and Implementation (1), Introduction to DSP (2), Electromagnetics (2), Introduction to Wireless Communication Networks (2), Digital Communications (2), Introduction to EMI Prevention (2), Special Topics in Artificial Intelligence 1 (2), Wireless Communication System (2), Digital Communication Simulations (2), Image Processing (2), Network Programming Design (2), The Practice of Machine Learning (2), Special Topics in Artificial Intelligence 2 (2)
Other Electives	Social Responsibility Practice Education 3(1), Practicum Training 2 (1), Practice of License 1(1), Social Responsibility Practice Education 3(1), Social Responsibility Practice Education 4(1), Practice of License 2 (2), Science and Technology Japanese(2), Practicum Training 5(2)

Future Development

Further Education	Employment
Continue advanced studies in related graduate institutes in Taiwan or abroad, such as Electrical, Electronic, Information, Optoelectronic, or Telecommunication Engineering.	Electrical Engineer, VLSI Design Engineer, Communication System Engineer, Computer Software/Hardware Engineer, and other positions, or engage in teaching in related departments within the vocational and technical education system.

Curriculum Structure Diagram for Two-Year Undergraduate Program

First Year		Second Year	
First semester	Second semester	First semester	Second semester
Social Responsibility Practice Education(1)	Physical Education(4)	General Education(1)	
Physical Education(3)	English	General Education(2)	
Chinese	Lectures for General Education		
Electric circuits	Power Electronics	Practical Project(2)	
Engineering Mathematics	Electronics	Power Electronics Lab.	
Signal and Systems	Electronics Lab.		
Human Machine Interface Application	Practical Project(1)		
	Communication Systems		
Linear Algebra	Probability and Statistics	Discrete Mathematics	Numerical Methods
	Complex Analysis	Vector Analysis	
Power System		Power Electronics Simulation and Analysis	Design of Electronics Ballasta
		Introduction to EMI Prevention	Protection Relay
		Circuits Implementation of Power Electronics	Power Electronics Applications project
Applications of Microcomputer Systems	Industrial Process Control	Artificial intelligence	Expert Systems
Python Programming and Implementation	Intelligent Robotics	Neural Network	The Practice of Machine Learning
	Introduction to Embedded Systems	Fuzzy Control	
		Special Topics in Artificial Intelligence	
Very Large Scale Integrated DesignCircuits	Integrated Circuits Layout and Verification	Digital Integrated Circuit Design	Introduction to Analog Integrated Circuit Design
Programmable Logic Circuits Design and Lab.	Operating Systems	Design and Implementation of Processor	
	Design and Simulation of HDL		
	Computer Structure		
	System Chip Applications		
	Introduction to Circuit Board Industry and Manufacturing		
	Introduction to Embedded Systems		
Introduction to Computer Networks		Introduction to DSP	Wireless Communication System
Computer Programming Design and Application with MATLAB		Electromagnetics	Digital Communication Simulations
Python Programming and Implementation		Introduction to Wireless Communication Networks	Image Processing
		Digital Communications	Network Programming Design
		Introduction to EMI Prevention	The Practice of Machine Learning
		Special Topics in Artificial Intelligence(1)	Special Topics in Artificial Intelligence(2)
Social Responsibility Practice Education(3)	Practicum Training(2)	Practice of License(2)	Science and Technology Japanese
	Practice of License(1)		Practicum Training(5)
	Social Responsibility Practice Education(2)		
	Social Responsibility Practice Education(4)		

University Compulsory Courses	Power and Energy Processing Group
Department Compulsory Courses	System Control Group
Department Elective Courses (I)	System-on-a-Chip (SoC) Group
Other Electives	Communications and Network Group

Graduation Requirements (Two-Year Bachelor's Program)

- The minimum graduation credits are 72 credits including 9 credits for University Common Compulsory Courses, 27 credits for Department Professional Compulsory Courses, and a minimum of 36 credits for Professional Elective Courses.
- In addition to the listed courses, professional electives may also include courses offered by other colleges. The total maximum number of credits for elective courses from other departments that can be recognized for graduation is 12 credits; however, a maximum of 6 credits will be recognized from the College of Liberal Arts and the College of Management.
- Senior students must select a minimum of 9 hours of courses offered by the department each semester (including compulsory and elective courses).
- Military training courses for All-out National Defense Education are not included in the graduation credits.
- Completion of the "Social Responsibility Practice Education" course is required to fulfill this graduation threshold. Students must select and take at least one course each semester during their first year. Those who select "Social Responsibility Practice Education (2), (3), or (4)" may apply for exemption from "Social Responsibility Practice Education (1)", and the credits can be counted towards elective credits and graduation credits. A maximum of two courses of "Social Responsibility Practice Education (3) or (4)" can be recognized toward the 6-credit inter-college requirement. Course credits will be processed in accordance with the University's Credit Waiver Guidelines, and the lower number of credits will be recognized after the waiver.
- Graduation credits must include at least 6 credits of Department Elective Course (I) "Mathematics and Basic Sciences".
- The implementation content and required hours for Practicum Training courses are stipulated in the department's "Student Practicum Training Course Operation Essentials".
- For General Education Courses(1) to (2), one semester must include an elective course related to "Professional Ethics".