LIST OF COURSES IN THE UNIVERSITY TRANSFER EDUCATION PROGRAM

MAJOR: ELECTRICAL AND ELECTRONIC ENGINEERING TECHNOLOGY

No.	Course Title	Course Objectives	Credits	Teaching Schedule	Student Evaluation Methods
1	Management	Aims to equip students with the following basic knowledge: - Understand the concepts, characteristics, and history of the formation and development of management activities in organizations. - Understand the organizational environment and the influence of macro and micro environmental factors on the activities of organizations and managers. Understand and apply M. Porter's Five Forces analysis model. - Understand the basis, process, conditions, and techniques of decision-making; understand and apply the basic functions of managers in organizations such as planning, organizing, leading, and controlling. - Develop communication, teamwork, operation, and self-management skills. - Planning, organizing, monitoring, and inspection skills. - Decision-making, analysis, synthesis, and problem evaluation skills.	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70%

2	Advanced Mathematics A1	Provides students with a system of knowledge regarding: limits, continuity, derivatives, and differentials of functions of one and several real variables (2, 3 variables); antiderivatives, definite integrals, improper integrals of functions of one variable, multiple integrals, line integrals of types 1 and 2; numerical series, power series, and first and second-order differential equations. Serves as a tool for specialized Mathematics courses and applications in Engineering and Technology majors.	3	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Objective Multiple-Choice)
3	Complex Functions and Laplace Transforms	Provides students with a system of knowledge regarding: complex number operations; analytic functions; derivatives and integrals of complex variables; Laurent series expansion; residues and applications to calculate integrals. Serves as a tool for continuing specialized Engineering-Technology courses and applications in the field of Engineering-Technology.	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Objective Multiple-Choice)
4	Electromagnetic Field Theory	- Understand basic knowledge of electromagnetic field theory. - Calculate and solve electromagnetic field problems. - Apply electromagnetic field knowledge to describe and explain electromagnetic field phenomena of electrical devices and radio transmission/reception devices such as: electrical machines, antennas, radar... - Apply	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		understanding of electromagnetic field theory to other courses.			
5	Digital Control	- Understand advantages of digital control systems. - Mathematical models used when analyzing, designing, and evaluating digital control systems. - Basic steps to design a digital control system.	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
6	Advanced Electronics	Students will have the ability to analyze and design audio power amplifier circuits, BJT and FET amplifier circuits in low-frequency ranges, BJT and FET amplifier circuits in high-frequency ranges, and resonant amplifier circuits.	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
7	Sensor Technology	Students can present sensor concepts and sensor applications in industry; explain the operating principles of various sensors; and select sensor types applicable in industry.	2	Semester 1	- Process Evaluation: 30% - Final Exam Score: 70% (Objective Multiple-Choice)
8	Advanced Electronics Practice	After completing this course, students will have the ability to: - Calculate and design power supply circuits, transceiver circuits, and power amplifier circuits. - Design and construct applied electronic circuits.	1	Semester 1	Course grade is the average score of practice sessions.
9	Project 1	After completing this course, students will have the ability to: - Research and read relevant documents to report on issues related to the assigned topic. - Design and construct a model according to the requirements of the topic.	1	Semester 1	- Process Evaluation: 30% (according to department regulations) - Report grading: 70% (according to department regulations)

10	CAD in Electrical Engineering	- Design electrical drawings according to standards. - Use software for lighting design, lightning protection design, and grounding in the electrical industry.	2	Semester 1	Course grade is the average score of practice sessions.
11	CAD in Electronic Engineering	After completing this course, students will have the ability to use Electronics Workbench software to simulate electrical and electronic circuits; use OrCAD software to draw schematic circuits and design electronic hardware.	2	Semester 1	Course grade is the average score of practice sessions.
12	Electric Circuits 2	After completing this course, students will have the ability to: - Analyze and solve electrical circuits in the time domain. - Analyze and solve electrical circuits in the frequency domain. - Analyze and solve non-linear electrical circuits and long transmission lines.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
13					
14	Microcontrollers 2	- After completing this course, students will have the ability to analyze and design the basic hardware of a microcontroller. - Present the operating principles of blocks within the PIC 16F877A microcontroller. - Understand the instruction set and have the ability to write basic application programs using the Pic 1 F 77 microcontroller on the MPL B and CCS editors and compilers.	2	Semester 2	Course grade is the average score of practice sessions.
15	Signal Theory	- Characteristics of various types of signals and information. - Mathematical models used when analyzing analog and digital signals. -	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		Principles and methods of distinguishing between different modulation techniques.			
16	PLC Practice	- Install and wire PLCs. - Use software to draft programs, test programs, and handle errors. - Program for simple requirements to complex programs. - Apply PLCs to control and automation.	2	Semester 2	Course grade is the average score of practice report sessions.
17	Linear Integrated Circuits	Students will have the ability to analyze and design basic amplifier circuits and application circuits using op-amps.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
18	Efficient Energy Management and Usage	- Evaluate current energy consumption levels in Vietnam and globally, as well as future forecasts. - Analyze issues regarding economical and efficient energy use.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
19	Digital Technology 2	After completing this course, students will have basic knowledge of memory integrated circuits, design methods for sequential systems using memory integrated circuits combined with logic gates or flip-flops, VHDL hardware programming language to describe integrated circuits, state machines, and state machine flowcharts.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
20	Digital Technology 2 Practice	After completing this course, students will have the ability to design and describe combinational circuits, sequential circuits, and state machines using VHDL language and test them on Spartan 3E kit hardware.	1	Semester 2	Course grade is the average score of practice sessions.

21	IC Design on FPGA	After completing this course, students will have the ability to present the design process of a digital system; programmable logic technologies; use Verilog HDL hardware description language; design digital combinational circuits and Finite State Machines (FSM); use FPGA programmable chips and Xilinx's ISE support tools.	3	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
22	Embedded System Design	- After completing this course, students will have the ability to obtain basic knowledge of embedded systems and basic embedded system design/analysis methods; C programming language to program control for single LEDs, 7-segment LEDs, and LCDs; control interface for keyboards and motors.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
23	Electronic Engineering Major Project	Provides tools, techniques, and skills so students can design and complete a project in the field of electronics.	1	Semester 2	- Process Evaluation: 0% - Final Exam Score: 100% (Project defense with instructor)
24	Electric Drives	After completing this course, students will have the ability to: - Summarize electromagnetic drive systems from calculating rated parameters, selecting motor power, as well as the operating modes of electric drive systems. - Establish a basis for determining power drive requirements in systems and production mechanisms.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
25	Relay Protection and Automation in Power Systems	- Introduce students to types of relays and the working/operating principles of power system protection devices. -	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		Provide technical specifications of protection relays in generators, transformers, lines, busbars, capacitors, and reactors. - Introduce principles of various control and protection circuits. - Equip learners with basic knowledge to research and design relay protection systems for elements in the power system, plan maintenance, and manage the system.			
26	Power Systems	- Provide students with basic knowledge of power systems, transmission line parameters, mathematical models of elements in the power system, calculations in distribution networks, loss calculation, and representation of elements in the power system. - Equip basic skills to analyze and solve power distribution, transmission line compensation, and voltage regulation problems in power systems.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
27	Design of Transmission Lines and Substations	- Design high-voltage and low-voltage transmission lines. - Design various types of substations.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
28	Electrical Engineering Major Project	Provides tools, techniques, and skills so students can design and complete a project in the field of electricity.	1	Semester 2	- Process Evaluation: 0% - Final Exam Score: 100% (Project defense with instructor)
29	Advanced Control Theory	- Students taking this course will have the ability to calculate, design, and evaluate the quality of controllers for non-linear systems. - Analyze and simulate control methods for non-linear systems on Matlab.	3	[Not specified]	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

30	Automatic Control Practice	This course equips learners with the basic instruction sets of Matlab software in the field of automatic control. Apply these instruction sets to simulate, evaluate quality, and design an automatic control system.	2	Semester 2	Course grade is the average score of practice sessions.
31	Automation of Industrial Processes	- Provide basic knowledge of technological processes, models, and control algorithms for industrial process automation in production. - Equip students with necessary knowledge to design, exploit, and organize optimized technological automation processes serving production.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
32	Advanced PLC	- Analyze systems and provide appropriate control solutions. - Install and program real-time functions in PLC for systems requiring functional operations in the real-time domain. - Install and operate inverters, connect and control PLC with inverters, as well as select appropriate control methods.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
33	Control - Automation Major Project	Through learned knowledge and applying self-study abilities to find relevant documents, students will apply analysis, evaluation, and design of a control system in practice.	1	Semester 2	- Process Evaluation: 0% - Final Exam Score: 100% (Project defense with instructor)
34	Telecommunication Networks	After completing this course, students will have the ability to: - Present concepts and basic knowledge in telecommunications, telecommunication quality standards, and characteristics of	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		communication environments. - Present general block structures and functions of Telephony Information Systems, mobile information systems, and microwave-satellite information systems. - Analyze the process of making calls in telecommunication networks, detect network incidents, and diagnose the causes of network incidents. - Analyze and design transmission networks.			
35	IoT	Provides students with knowledge regarding: - IoT concepts and application fields. - Connection methods and device management for IoT. - Operating systems and languages used for IoT. - Analysis and exploitation of data from IoT.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
36	Communication Electronics	After completing this course, students will have the ability to: - Present operating principles of several electronic circuits and analog modulation methods. - Present block diagrams of radio transmitters and receivers. - Analyze, calculate, and design electronic circuits such as filter circuits, voltage regulator circuits, impedance matching circuits, power amplifier circuits, and oscillator circuits.	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
37	Optical Communications	After completing this course, students will have knowledge of: - Nature of optoelectronic components, LED/LCD	2	Semester 2	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		emission principles. - Optical transmission principles. - Operating principles of optical sensors, laser diodes...			
38	Telecommunications Major Project	After completing this course, students will have the ability to: - Research and read relevant documents to report on issues related to the assigned telecommunications topic. - Design and construct a telecommunications model.	1	Semester 2	- Process Evaluation: 0% - Final Exam Score: 100% (Project defense with instructor)
39	Biomedical Electronics	After completing this course, students can present the construction and principles of biomedical equipment; apply knowledge to calculate and design electronic circuits in biomedicine; and repair/replace modules in biomedical electronic equipment.	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Objective Multiple-Choice)
40	Optoelectronics	Equips students with knowledge regarding: - LED - LCD - Infrared LED - Photodiode - Photovoltaic cells and Solar panels - Phototransistor, Photo-JFET, and Photothyristor - Opto-couplers - Light switches - Photoresistors - Semiconductor lasers - Photoconductivity technology.	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
41	Computer-based Network Analysis	- Use specialized software to simulate and calculate power distribution in power systems. - Have the ability to use software for design calculations of low-voltage electrical networks.	2	Semester 3	Course grade is the average score of experiment/practice report sessions.

42	Electrical Equipment Applied in Power Distribution	- Present a general knowledge system of electrical equipment applied in power distribution consistent with modern viewpoints, applied to system management, operation, and maintenance, including: - Basic concepts of electrical equipment such as: electric arc, contact, heating, electrodynamic force, and electromagnetic mechanisms. - Knowledge of low-voltage electrical equipment such as: relays, sensors, contactors, fuses, circuit breakers. - Knowledge of medium-voltage electrical equipment such as: Disconnectors, lightning protection devices, circuit breakers, measurement devices. - Apply equipped knowledge to explain phenomena and operation processes of a power system. - Ability to calculate and select basic electrical equipment during the power system maintenance process. - Identify abnormal incidents on the power system.	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
43	Robotics	- Classify industrial robot arms. - Present steps to design an industrial robot arm model. - Present application fields of industrial robots.	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)
44	Embedded System Design	- After completing this course, students will have the ability to obtain basic knowledge of embedded systems and basic embedded system design/analysis methods; C programming language to	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Written/Essay-based exam on paper)

		program control for single LEDs, 7-segment LEDs, and LCDs; control interface for keyboards and motors.			
45	SCADA Systems	- Present concepts, features, and basic components in SCADA (SC D) systems. - Explain communication methods between field devices. - Analyze and design supervisory control and data acquisition systems.	2	Semester 3	- Process Evaluation: 30% - Final Exam Score: 70% (Objective Multiple-Choice)
46	Industrial Production Line Control Practice	- Install and wire systems and industrial production lines. - Use software to draft programs, test programs, and handle errors for industrial production lines. - Apply PLC to control and automate systems and industrial production lines.	2	Semester 3	Course grade is the average score of practice report sessions.
47	Project 2	This course provides students with the abilities to: - Calculate, design, construct, and repair electrical and electronic circuits applied in daily life. - Analyze failures in electrical and electronic circuits, thereby synthesizing and handling situations and proposing corrective measures. - Passion and love for electrical and electronic engineering, appreciating the contributions of electrical and electronic engineering in life and production development. - Apply learned knowledge into life and production.	1	Semester 3	- Process Evaluation: 20% - Final Evaluation Score: 0%