

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205201	Introduction to Electrical Engineering	3	Tue / Thu 16–17.30

Course Description

Direct current and alternating current circuit analysis. Generators and their uses. Motors and their uses. Transformers. Three-phase systems. Power transmission system. Electrical instruments.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205211	Electric Circuit Analysis I	3	Fri 9–12

Course Description

Definitions. Basic concepts and units. Circuit elements. Resistive circuits. Dependent sources. Circuit theorem and analysis. Node and mesh analysis. Network theorem. Graph theory. Energy storage elements. First order and second order circuits. Sinusoidal signal. Phasor diagram. Alternating current steady-state analysis. AC power circuits. Three-phase circuits.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205241	Digital Circuits and Logic Design	3	Mon / Wed 13-14.30

Course Description

Number systems and codes. Logic gate. CMOS circuit. Boolean algebra. Combinational logic design principles and practices. Latch and flip-flop. Sequential logic design principles and practices. Computer-aided design (CAD) for digital circuit design.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205301	Digital Circuits & Microcontrollers	3	Fri 9–12

Course Description

Number systems and codes. Boolean algebra. Combinational and sequential logic circuit design. Karnaugh map. State machine. Synchronous and asynchronous sequential logic circuit design. Hardware and software development tools for microcontroller. Microcontroller architectures and peripherals. Compilers and debuggers. Timer and interrupt systems. Interfacing of devices. Data communication and networks.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205311	Microprocessor	3	Tue / Thu 10.30–12

Course Description

Introduction to microprocessors. Structure of microprocessors. Assembly programming. Interface techniques. Memories. Input–output interfaces. Applications of microprocessors in instrumentation systems. Applications of microprocessors in automation systems. Hardware and software interactions to solve complex electrical engineering problems and parts design.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205312	Linear Control Systems	3	Mon / Wed 9–10.30

Course Description

Mathematical models of system. Transfer function and state–space representations. System models on time domain and frequency domain. Block diagram and signal flow graphs. Dynamic models and dynamic responses of systems. First and second order systems. Open–loop and closed–loop control. Feedback control and sensitivity. Steady–state error. Types of feedback control. Concepts and conditions of system stability. Methods of stability test. Root locus. Time domain analysis and design of control systems. Bode plots. Nyquist plots. Frequency domain analysis and design of control systems.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205313	Electrical Engineering Mathematics	3	Fri 13-16

Course Description

Matrices and systems of linear equations. Vector spaces. Orthogonality. Orthogonalization. Inner product spaces. Linear transformation. Eigenvalues and eigenvectors. Diagonalization. Applications to optimization problems in electrical engineering. Numerical analysis. Numerical methods for linear algebra. Applications of numerical methods in electrical engineering.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205321	Principles of Communications	3	Tue / Thu 13–14.30

Course Description

Communication models, wire/cable and wireless/radio. Introduction to signal and system. Spectrum of signal and applications of Fourier series and transform. Analog modulation, AM, DSB, SSB, FM, NB/WBFM, PM. Noises in analog communication. Binary baseband modulation. Nyquist's sampling theory and quantization. Pulse analog modulation. Pulse Code Modulation (PCM). Delta Modulation (DM). Multiplexing techniques. Introduction to transmission lines, radio wave propagation, microwave components and communication, satellite communications, optical communication.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205323	Digital Signal Processing	3	Tue / Thu 9-10.30

Course Description

Introduction to digital signal processing (DSP). Continuous-time and discrete-time signals. Discrete-time systems. Discrete-time Fourier transform (DTFT) and discrete Fourier transform (DFT). Z-transform. Sampling theory and sampling rate conversion. Multi-rate systems and filter banks. Discrete wavelet transform (DWT). Spectral analysis of linear-time Invariance (LTI) system. Finite impulse response (FIR) filter design and infinite impulse response (IIR) filter design. Probabilistic methods in DSP. Introduction to current DSP applications.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205326	Data Communications and Networks I	3	Mon / Wed 10.30–12

Course Description

Introduction to data communications and networks. Layered network architectures. Point-to-point protocols and links. Delay models in data networks. Medium-access control protocols. Routing in data networks. Flow control. Network security. Cloud network. Architecture and system.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205351	Electromechanical Energy Conversion II	3	Tue / Thu 13–14.30

Course Description

Single phase and three phase transformers. AC machine structure. Synchronous machines. Single phase and three phase induction machines. Steady state performance and analysis of induction machines and synchronous machines. AC single phase motor structure and performance. Protection of machines.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205352	Electric Power System Analysis I	3	Mon / Wed 10.30–12

Course Description

Electrical power generation systems. Electrical power transmission and distribution systems. Electric power utilization. Fundamental of energy storage systems. Fundamental of electric power systems calculation and analysis. Generator characteristics and models. Power transformer characteristics and models. Transmission line parameters and models. Fundamental of fault calculation.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205357	Electric Drivers	3	Mon 16–17.30 Thu 9–10.30

Course Description

Applications of electric drives in industrial automation. Electric drive components. Load characteristics. Four quadrant operating regions of electric drives. Accelerating and braking methods of motors. Power transmission and sizing calculation. Torque–speed characteristics of electric motors. Power electronic devices for drive applications. DC motor drives. AC motor drives. Servo drives systems.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205359	Power Electronics	3	Tue / Thu 14.30–16

Course Description

Characteristics of power electronics devices. Principles of power converters. AC to DC converter. DC to DC converter. AC to AC converter. DC to AC converter.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205374	Industrial Automation and Control	3	Mon / Wed 14.30–16

Course Description

Logical sensors and actuators. Relay and relay circuits. Timer and counter in relay circuits. Programmable logic controllers. Basic programmable logic controller instructions. Timer and counter programmable logic controller instructions. Control programmable logic controller instructions. Design techniques and programmable logic controller programming for industrial automation controls. Analog sensors and actuators. Introduction of Analog controls, programmable logic controller networks, human-machine interfaces.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205375	Machine Vision in Robotics	3	Tue / Thu 14.30–16

Course Description

Fundamental image processing. Homogeneous transformation. Kinematics. Sensors related to machine vision. Homography. Image warping. Kinematic relationships between cameras and robots, objects, and sensors. Machine vision programming.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205377	Artificial Intelligence in Robotics	3	Wed 13-16

Course Description

Robot system. Sensors. Concept of rationality. Intelligent agents. Finite state machine. Searching algorithm. Fuzzy logic. Genetic algorithms. Machine vision. 3D image via stereo vision camera. Image processing. Natural language processing. Machine learning. Decision trees. Neural network. Applications of artificial intelligence in industrial robots and service robots.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205431	Data Communications and Networks II	3	Tue / Thu 10.30–12

Course Description

Protocols and architectures of data networks. Broadband networks. Client–server computing. Naming and addressing. Media access protocols. Routing and transport protocols. Flow and congestion control and other application–specific protocols. Network security. Multicasting. Network planning and design. Traffic management.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205478	Human–Robot Collaboration System	3	Tue / Thu 10.30–12

Course Description

Industrial Robot. Cobot. Controller design. Human–robot interaction. Mechatronics. Sensor fusion. Force control systems. Force measurement. Force estimation. Observer design. Robot programming. Control of robot and real–world applications. Robot safety.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205479	Internet of Things for Electrical Engineering	3	Wed 13-16

Course Description

Basic data communication. Computer network. Short-range wireless communication engineering. Personal area network and cloud computing. Internet of Things architecture and protocol. Smart sensor. Smart Actuator. Electronic circuit and radio frequency circuit for Internet of Things devices. Embedded systems for Internet of Things devices. Application of Internet of Things in electronic engineering, control system engineering, power system engineering and communication engineering.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205489	Principles of Deep Learning and Applications	3	Tue / Thu 13–14.30

Course Description

Overview of machine learning. Concept of predictive modeling. Fundamentals of deep learning. Neural networks. Convolutional neural networks. Recurrent neural networks. Fine tuning deep learning models. Transfer learning. Implementation of deep learning models. Applications to object recognition, speech recognition, object detection, and sentiment analysis.

International Undergraduate Program
Faculty of Engineering, Kasetsart University

First Semester

Course ID	Course Name	Credit	Date / Time
01205492	Selected Topics in Power Engineering	3	Tue / Thu 10.30-12

Course Description

Study in selected topics in power engineering.