

Major: Electronic IT Convergence Engineering

Introduction (Opening):

The Department of Electronic IT Convergence Engineering is a convergence of the fields of electronics and ICT (information and communication technology), and is designed to foster creative convergence talents with the ability to adapt to various fields as well as existing electronics-related fields in the era of the Internet of Things, where all devices are connected to the Internet. To achieve this, we operate an intensive education program that enables electronic engineering students to cultivate practical skills in hardware design, system software design, and knowledge and use of wired and wireless communications throughout the entire school year. Specific areas of study include automation systems, Internet of Things, energy, defense, and intelligent robotics, and you can also gain research experience in these areas.

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Course outlines

EL5001 Circuits Theory 3-3-0-0

This is the first course in electric and electronic engineering. This lecture includes analysis of resistance circuits and mesh, loop analyses, the characteristics of R, L, C, and sources, circuits analysis including op-Amp, Laplace transform and its application, the transient response of first circuits.

EL5002 Creative Thinking and Innovation (Basic Design) 2-0-2-0

This course helps students to bring up some problems for themselves on the basis of the basic knowledge in the field of electronics, to learn the way to solve them.

EL5003 Introduction on Electronic IT Convergence 2-2-0-0

This course helps to know the 4th Industrial Revolution, Internet-of-things trends, and research on electronic IT convergence. And this shows the variable and challenging issues.

EL5004 Digital Circuits 3-3-0-0

In this course, basic theories of the binary system, the boolean algebra, the boolean function minimization, logic gates and flip-flops are studied. And design and analysis methodologies of combinational logic circuits, sequential logic circuits and counters using basic theories are studied.

EL5005 Electronic Circuits 3-3-0-0

This course helps students to understand theory and operation of diode, transistor and operational amplifier. Also, students understand simple electronic circuits.

EL5007 C Programming Application Practice 3-2-0-2

Students study the principles and techniques of windows programming using MFC. In order to learn MFC programming, students study the basic knowledge of C++ programming language. Students are assigned a project of programming an application using MFC.

EL5014 μ -Processor and Practice 3-2-0-2

Students study hardware architecture of a real microcontroller. Students study the programming skills and interfacing methods for the microcontroller by lectures and laboratory exercise.

EL5015 Data Structures and Algorithms 3-2-0-2

This course includes important data structures such as Stack, Queue, and Tree, and explains various algorithms including sorting algorithm and searching algorithms.

EL5017 Practical TRIZ 3-3-0-0.

Students raise problems on their own based on logical methods and basic knowledge, and deal with ways to solve the problems. Study and apply the theory of creativity, creative thinking, and methods related to TRIZ.

EL5018 μ -Processor Application and Practice 3-2-0-2

Students learn hardware and software design methodology for an advanced microprocessor application system. Students are assigned a project to design and develop of a microcontroller application system.

EL5019 Object-oriented Programming Languages 3-2-0-2

This course explains the concept of object-oriented programming, and then the method and tool for object-oriented programming such as C++ and Java through many projects.

EL5021 Communication Engineering 1 3-3-0-0

An introduction to the core theories about analog communication systems. Topics include Linear Systems & Signals, Fourier Series, Fourier Transform, AM(Amplitude Modulation), FM(Frequency Modulation) and PM(Pulse Modulation).

EL5022 Control Engineering 3-3-0-0

Basically, this introductory course will provide the fundamental disciplines for frequency-domain and time-domain control systems and their design issues for mechanical and electrical engineering applications, specifically for mechatronics and embedded system engineering. The course will focus on the analysis and design of control systems. Emphasis will be on linear, time-invariant, single-input single output (SISO) continuous time systems. Tentative topics include open and closed-loop state-space representations, analytical solutions, computer simulations, stability, controllability, observability, and controller/observer design. For the better understanding of the control systems, the MATLAB/SIMULINK computer software package will be used extensively to assist students in the understanding of concepts and fundamentals of system dynamics and control, and also to analyze and design control systems.

EL5024 Design Thinking 3-3-0-0

Students learn theories for creative problem solving, develop creative problem solving skills, focusing on cases such as the concept of contradiction and elimination, solution evaluation techniques, and latent problem management techniques.

EL5025 Creative Idea and Patent Application 2-0-2-0

In this course, based on creative problem solving ability, students will learn practical ideas that can be applied in the major field and how to patent them. The derived ideas are processed for actual patent application, or afterwards, to realize implementation through the creative design project.

EL5026 Embedded Systems and Practices 3-2-0-2

To make a final decision on whether to select or reject an idea by identifying a method for discovering new ideas for start-up and identifying information on the possibility of success of a particular start-up idea discovered, business ability, marketability, technicality, economic feasibility, degree of risk, etc. Study the theory of business feasibility analysis.

EL5027 Data Networks 3-3-0-0

This course includes many data networks from LAN(Local Area Networks) such as Ethernet, Token Ring, Token Bus to WAN (Wide Area Networks) such as circuit switching networks and packet switching networks. And it shows brand-new issues about next-generation high-speed networks.

EL5028 Communication Engineering 2 3-3-0-0

Theoretical basis for digital communication systems. Topics include Probabilities, Random Variables, Digital Transmission & Modulation, Information, etc.

EL5029 Internet of Things (Internet of Things) 3-3-0-0

This course explains the techniques for hyper-connectivity IoT(Internet-of-Things), which all things will be connected to Internet. And it includes current issues for implementation and research about that. Through this, we can make new idea for the IoT world.

EL5030 Creative Design Project 1 2-0-2-0

Cultivate the ability of adaptation and ingenuity at the industrial field through the direct experience of the

process for the theoretical analysis, design/implementation and results deduction about the items selected by students

EL5031 Next-generation Mobile Communication 3-3-0-0

Based on the characteristics of electromagnetic wave propagation of mobile communication channels and knowledge of channel modeling and transformation, error correction code, coding modulation, the technology of antenna, wireless connection, call transfer, terminal and base station are understood. Understand cell network plan, mobile network structure and learn application to digital cellular, personal mobile communication, mobile data communication and advanced transportation system.

EL5032 Embedded Linux 3-3-0-0

Understand how to use the embedded Linux operating system and the development environment and the internal structure of the embedded Linux kernel, and describe the hardware and software element technology that constitutes the embedded Linux system. Also, the processor, bus, peripheral device, and device constituting the embedded Linux system hardware Learn the structure and operation principle of the kernel, learn the kernel structure of the kernel and the device driver, and implement the necessary elements for Linux porting and device driver creation.

EL5033 Network Programming 3-3-0-0

This course offers basics and essential programming skills for TCP/IP and its application. Specific topics will include the Socket programming, Internet protocols and their tools with basic programming techniques. This course offers design and implementation ability of network programming using winsock. Specific topics will include the advanced programming techniques and implementation of application program. All student have to present their idea and application devices through term projects.

EL5034 Android Programming 3-3-0-0

This course introduces mobile application development for the Android platform. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language. Students will learn skills for creating and deploying Android applications, with covering major Android topics such as Views, Activities, Intents, Broadcast Receivers, and Content Providers.

EL5035 Blockchain and Security 3-3-0-0

In this lecture, basic blockchain technologies such as public key cryptography, hash functions, digital signatures, and zero-knowledge proofs, as well as important concepts of blockchain such as consensus algorithms, data feeds, governance, and determinism are explained. And representative blockchain systems such as Bitcoin and Ethereum are explained.

EL5036 Creative Design Project 2 2-0-2-0

As a continual subject of the Creative Design Project 1, cultivate the design capacity through the completion of the advanced design/implementation and deduce the optimal results by making up for the problems

EL5037 Military Real-time Software System 3-3-0-0

This course helps to know the basics and cases of the real-time software system including distributed object-programming (ex. threads, RPC, Remote Objects), synchronization techniques, and distributed programming models.

EL5038 Artificial Intelligence 3-3-0-0

Machine learning is a key tool in a variety of fields, including big data, computer vision, natural language processing, and bioinformatics, to create a computer system that can be learned through experience. Implementing these systems requires a learning algorithm that specifies how the system should modify its behavior based on the results of experience. In this course, various learning algorithms and applications for machine learning are studied.

EL5042 IT Practical Project 1 3-0-3-0

Existing experiments only follow basic and fixed curriculum. This course aims for doing practical and realistic sub-projects from industry and research projects. So it drives more complete and useful results through continuous project-based courses. And our students can experience gaining intellectual property rights, joining a competitive exhibition, industry-university projects and internship.

This course focuses on existential and practical problems, their variable solution using creative thinking and methods.

EL5043 IT Practical Project 2 3-0-3-0

This course opens in the 2nd semester of the 2nd year going after IT Practical Project 1 course. It improves

the quality and market possibility of IT Practice Project 1 through discussion and analysis with corporations.

EL5044 IT Practical Project 3 3-0-3-0

This course opens in the 1st semester of the 3rd year going after IT Practical Project 2 course. It improves the quality and market possibility of IT Practice Project 2 through discussion and analysis with corporations. As the previous stage of creative design projects, students can apply their works in the field, analyze the performance, and get the patents related on them by comparing existing with patents.

EL5045 ROS based autonomous flying UAV 3-3-0-0

The class aims to train developers who can carry out projects and develop prototypes by utilizing the elements technology required to develop ROS-based autonomous flight drones. It will train ROS utilization using reference platform, ROS Node Package development for drone platform control, and applied ROS drone project. It covers the contents of Robot Operating System utilization, Python programming for UAV control, ROS utilization Drone control, Drone SLAM / Navigation, etc.

EL5047 HDL Design 3-0-3-0

This course includes the desing and implementation of hardware system using HDL languagle.

EL5048 XR(Metabus) Programming 2-2-0-0

This course learns about the XR concept and technology status such as virtual reality and mixed reality, and deals with programming that can implement metaverse services.

EL5049 Signal and Systems 3-3-0-0

The aim of this course is to study and analyze characteristics of continuous, discrete signals and systems. The expected course objectives of signals and systems are three fold: understanding the properties and representation of discrete and continuous signals being familiar with sampling process and analysis of discrete systems using z-transforms and recognizing the analysis and synthesis of discrete time systems.

EL5050 C++ Programming 3-2-0-2

In this lecture, you will learn and learn C++, a representative object-oriented programming language developed to handle various kinds of information handled by computers. Based on the understanding of the basic differences between C and C++ languages, we will learn various syntax elements such as

encapsulation, classes, inheritance, etc. that constitute C++.

EL5051 운영체제 (Operating System) 3-3-0-0

Operating system is the most importance software for computers and variable devices. From the late 1960, time-sharing operating system has advanced considerably. Now operating system includes all issue of devices as well as resource management, so it is impossible for engineers to implement and use variable devices without understanding the operation system. This course covers components of the operating system and their functions, and management issues.