Major: Electronic Communication Engineering

Introduction (Opening):

The Department of Electronic and Communication Engineering aims to offer and nurture students with both practical theories and field experience by covering signal processing, information and communication technology (ICT), a combination of electronic engineering and telecommunication engineering, and its applied fields, from basic theories to applications and convergence systems. In detailed fields, various subjects and researches are being handled by dividing the materials into statistical signal processing, basic analog circuit design, primitive digital system design, embedded systems, wired/wireless communication and security, and convergence of mechatronics, machinery, medical, and defense. In particular, it provides interdisciplinary and systematic education courses on the latest technology fields such as random processing, artificial intelligent, mobile communication, smart phones, smart cars, and the Internet of Things(IoTs) to cultivate relevant hardware and software development capabilities and has a future-oriented education and research environment that combines theories and practices required.

Professors:

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Course outlines

- **EL3018 Control System 1, 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.

- **EL3021 Probability and Statistical Signal Processing, 3-3-0-0**

This is a follow-up course of the fundamental and principle for probability and statics which the first year subject and it is intended for the second year under grade students. The objective of this course is to present essential fundamental concepts of discrete-time and continuous-time statistical and random processes and their piratical applications to hybrid systems, communications, control, and signal processing.

- **EL3024 Digital Signal Processing, 3-3-0-0**

This course will review the concepts of signals, confirm discrete Fourier transform(DFT) and fast Fourier transform(FFT), introduce the basic design of IIR & FIR filters, and discuss typical applications of digital signal processing. Upon completion of this course, students should be able to: hot to use Z-transform in solving deference equations; develop fundamental discrete algorithms; convert discrete time signal(sequence) to frequency domain using FFT; design primitive low pass digital filters.

- **EL3026 Control System 2, 3-3-0-0**

This course will offer the way how to design and estimate the relative stability for the given linear dynamic systems with helps of conventional concepts such as Bode plot, Nyquist, and root locus.

- **EL3034 Intelligent Embedded Systems Theory, 3-1-2-0**

Embedded Systems is a subject that deals with the design and implementation of computer systems that are integrated into devices or products to perform specific functions. It covers topics such as hardware design, software development, and real-time operating systems to create efficient and reliable systems. Embedded systems are used in various applications such as automotive, aerospace, and medical devices. The subject is critical to modern technology and plays a vital role in the development of new products and services.

- **EL3032 Digital Communication System, 3-3-0-0**

In this course, the applications of the source coding, channel coding, modulations and demodulations such as MPSK, MSK, QAM, OFDM are provided. This course also deals with the design and alalysis of digital communications for the better understanding of the current various mobile communication systems.

- EL3037 Mobile Communication, 3-3-0-0

The course provides important concepts such as cellular concept and various modern technologies in wireless mobile communication systems. This course also addresses 3G, 4G, and 5G mobile communication systems to improve the system design capability.

- **EL3025 Coding Theory, 3-3-0-0**

The course provides basic concepts of coding theory and their applications to mobile communication systems, digital communication systems, computer systems, and data networks. This course includes cyclic codes, BCH/RS codes, convolutional codes, Turbo codes, LDPC codes, PN codes, and Walsh codes.

- **BA0025 Engineering mathematics ,1 3-3-0-0**

Engineering Mathematics is the application of mathematical principles and techniques to solve complex problems in engineering. It involves the use of calculus, linear algebra, differential equations, and other advanced mathematical tools to analyze and design engineering systems. It plays a critical role in developing new technologies and improving existing ones in various fields such as aerospace, civil, mechanical, and electrical engineering.

- **BA0026 Engineering mathematics 2, 3-3-0-0**

Students will delve into topics such as transforming differential equations, calculating Fourier series and integrals, and examining partial differential equations. Additionally, the course will cover complex numbers and functions, complex integration, and power and Taylor series.

- **EL3009 Electromagnetics 1, 3-3-0-0**

Throughout this course, students will gain a deep understanding of the physical concepts underlying vector operators (curl, divergence, gradient) in electromagnetics, as well as their applications in electrostatics and magnetostatics. By the end of the course, students will be equipped with the tools and knowledge necessary to model and solve a wide range of electromagnetic problems commonly encountered in engineering and technology.

- **EL3046 2 Electromagnetics 2, 3-3-0-0**

This course covers the principles and applications of time-varying electromagnetics and the theory of planar electromagnetic waves. Students will learn about the behavior of electromagnetic fields under time-varying conditions, and how to analyze and design planar electromagnetic wave structures. The course provides a solid foundation for further study in electromagnetic theory and its applications in various fields of engineering and technology.

- **EL3005 Logic Circuits and Lab, 3-2-0-2**

A logic circuit is an electronic circuit that performs logical operations using Boolean algebra to process and control digital signals. It consists of basic logic gates such as AND, OR, NOT, and XOR gates, which are combined to create complex digital circuits. Logic circuits are the building blocks of digital electronics and are used in a wide range of applications such as computers, calculators, and digital watches.

- **EL3040 Smart Vehicle Engineering with Toy Car, 2-2-0-0**

Smart Vehicle is a subject that deals with the development of advanced technologies and systems for vehicles to enhance their performance, safety, and efficiency. It involves the integration of sensors, communication systems, artificial intelligence, and other technologies to enable features such as autonomous driving, advanced driver assistance systems, and connected cars. Smart Vehicles have the potential to revolutionize transportation and make it more sustainable, efficient, and safe.

Closing by Prof. Wansu Lim:

Our Electronics and Communications Engineering department is at the forefront of the latest technological advancements, including 5G and 6G networks, the Internet of Things (IoT), blockchain technology, deep learning, and semiconductors. Our curriculum emphasizes a deep understanding of the fundamental principles that underlie these cutting-edge technologies, while also providing hands-on

experience with state-of-the-art tools and equipment. Our faculty includes renowned experts in the field, who are actively engaged in research and development in areas such as wireless communications, signal processing, and computer networks. Through a combination of rigorous coursework and practical projects, our students gain a comprehensive understanding of the field and are well-prepared to tackle the challenges of the rapidly evolving technology landscape. Whether your goal is to work in industry, pursue further academic study, or become an entrepreneur in the technology sector, our Electronics and Communications Engineering department provides the knowledge and skills you need to succeed. Join us and be part of the next generation of innovators in this exciting and dynamic field.