

## Course Description (전체 개설 교과목 개요)

### **Real-time System**

This course provides basics and research on characteristics related to the real-time system. Course covers real-time applications and system design methodologies and support software for real-time systems.

### **Pattern Recognition**

This course provides concepts, methods, and algorithms about the overall pipeline of pattern recognition systems. Various steps including HMM, probabilistic methods, and neuron networks are discussed in the course.

### **Computer Vision**

This course introduces basic theories for computer vision. Topics include analog and digital image characteristics, image pre-processing such as point and neighbor processing, transform, restoration, image applications such as stereo vision, segmentation, recognition, optical flow and knowledge representation.

### **Computer Graphics**

This course provides mathematical methods on two-dimensions and three-dimensions of Computer graphics. Various algorithms of Scale-Conversion, Painting, Shading, Rotation, Clipping Windowing Hidden Surface Algorithms and their applications are discussed in the course.

### **Topics in SIP**

This course reviews the operating principle, message structure, and system components of the Session Initiation Protocol (SIP). And studies various event packages of SIP such as presence event package and conference event package, and also their application areas.

### **Mobile Computing**

This course is offered for those who are interested in understanding and building systems support mechanisms for mobile computing systems including client-server web/database/file systems, and mobile ad hoc and sensor networks for achieving the goal of anytime, anywhere computing in wireless mobile environments. While mobile computing covers many topics, in this course our main focus will be on mobility, data and service management, and security issues in mobile computing environments.

### **Advanced Database**

This course introduces the basic concept of database and its design. Topics include data modeling, database design, developing database applications, object-oriented database, object-relational database, XML database, security and integrity, concurrency control, transaction processing, distributed database systems.

### **Linear System**

This course provides linear model analysis in the physical world, the state variables and state equations, controllability and observability state feedback and state estimation, stability, system implementation of the minimum order.

### **Visual Programming**

This course focuses on helping C++ programmers to learn the programming concepts of Windows and the Microsoft Foundation Class application framework (MFC). The course provides insights into the MFC class library and especially the Document/View architecture. The participants will learn the basics of Windows programming applying the SDK and MFC architecture, class hierarchy, event handling, and persistent data objects. The course also introduces Windows API programming with many helpful examples.

### **Industrial Network System**

This course provides basics and theory for field-bus system and real-time networks for industrial and military applications.

### **Industrial Network Design and Verification**

This course provides multiple factors for design of an industrial communication network and analyzes the performance and reliability of the established industrial network.

### **Protocol Analysis of Industrial Networks**

This course provides the methodology for protocol analysis and performance evaluate of industrial networks.

### **Advanced Industrial Systems**

This course provides basics and theory of industrial network and systems.

### **Topics in Embedded Software Engineering**

This course introduces concepts, theories, tools and methods for the specification, development, management, and evolution of software systems in the perspective of embedded software engineering. Also, the development of simple system using the development tool is included.

### **Basics and Applications in IT System for Military**

In this class, learn the structure and theory of real-time systems related to warships, fighter planes, tanks, such as military equipment. Educate the basic and theory with a combination of military technology related real-time systems for database and distributed information processing.

### **Advanced Information Network for Power Plant**

This class will study about the basic and theory of control network related distributed control systems applied to the nuclear, hydro and thermal power plants, such as large-scale power generation system.

### **Computer Network and Applications**

Introduction to networks and digital communications with a focus on Internet protocols: Application layer architectures and protocols, Transport layer operation, Network layer operation, Data Link layer, Physical Layer. Some selected current topics such as security, multimedia protocols, Quality of Service, mobility, wireless networking, emerging protocols, network management, and network applications.

### **Special Topics In Embedded System**

Educate special challenge project for small embedded system design and application in wired and wireless communications, image processing and intelligent control area.

### **Probability & Random Process**

Interpretation and application of probability and random variables, characteristic functions, the convergence properties of the correlation function and power distribution, linear prediction, Gaussian, Wiener, Poisson, and Markov Process.

### **Wireless Communication Theory and Its Application**

This course presents the key concepts and principles used in the design of Third and Fourth Generation of wireless access technologies, i.e. 3G and 4G systems and networks. In addition to generic technology concepts the course also provides students with system level overviews of such key radio access systems from both radio interface and network architecture perspectives as well as deployment, evolution and service planning issues. More specifically PHY and MAC/signaling layer design of 3GPP2 technologies like CDMA 2000 and EV-DO as well as 3GPP standards such as WCDMA and HSPA will be the focus of this course. The course concludes with a technical introduction to OFDMA based 4G systems such as WiMAX and LTE and their deployment plans.

### **Networked Real-time Systems**

This class will study and learn design and basic information of network-based real-time systems. Design fieldbus-based vehicle, aircraft and ship system. Analyze that systems and discuss ways to improve performance. Learn simulation and actual techniques through examples and try to study other technology and comparative analysis.

### **Advanced Topics on Tactical Network**

This course covers wired/wireless tactical network used for military purpose. Students will study the concept, operating environment, and application of tactical network. Also this course presents the key research challenges for tactical network such as self-forming or self-healing networks, unreliable connectivity, limited bandwidth and latency issues.

### **Advanced Topics on Disaster Information Network**

This course covers wired/wireless disaster information network. Students will study the concept, operating environment, and application of disaster information network. Also this course presents the key research challenges for disaster information network such as self-forming or self-healing networks, unreliable connectivity, limited bandwidth and latency issues. PS-LTE will be introduced.

### **Network Simulation**

The aim of the course is to introduce simulations and use simulation tools to analyze computer networks, protocols, and data traffic especially focusing on OPNET. After completing the course the students should be able to:

- Understand the foundations of computer network simulations
- Use simulations tools to analyse computer networks and data communications
- Understand the interaction between simulation, planning, dimensioning, design, and implementation of computer networks

### **Innovation Theory and Practices**

This course intends to provide multi-faceted issues concerning on innovation. We examine innovation cases such as the first mover advantage, dominant design, open innovation and disruptive innovation.

### **New Product Development**

This course is designed to learn how to integrate consumer needs and technology and understand the new product process. It emphasizes how to lead the corporation in the rapid business environment changes.

### **Introduction to Entrepreneurship**

This course aims to prepare students to develop the leadership, pioneer-ship and entrepreneurship in a startup or a corporate setting by exposing them to a diverse group of entrepreneurs, their real life stories, and their thought process.

### **creativity and innovation management**

In this course, we understand creativity and develop creative thinking skills. Also, we examine the chain of value creation in the market through commercialization of new technology and also the success factors of those activities.

### **Creative Capstone Design(1) Creative Capstone Design(2)**

This course is interworked with the 'Creative Capstone Project' which is operated by ICT Convergence Research Center. This program has prepared well-organized educational infrastructure by running education program with 'industry-academic cooperation', and 'creative convergence open laboratory' so that the students can go through various experiences

### **Advanced System Engineering**

This course deals with the engineering processes required to carry out the system acquisition work, and learns the step-by-step activities and procedures so that the planning, development, production and delivery required for carrying out large-scale projects can be efficiently conducted.

### **Advanced Future Wireless Network**

The wireless networks technology is evolving to fifth generation network. The purpose of this course is to provide a broad understanding of the future wireless networks including an overview, network architecture, RF technologies , energy saving schemes, and security for 5G. Also, in this course, you will learn the latest developments and trends in 5G networks.

### **Big data and Cloud Systems**

It is more and more difficult to manage Big Data using traditional database technology because data is being generated explosively from IoT devices. The Big Data technology is composed of five basic sub-technologies that includes collection, saving, analytics, processing, visualization. This course introduces the basic concepts of Big Data and its enabling technologies.

### **Introduction to Intelligent robotics**

This course aims to introduce overview of autonomous mobile robots. Students will learn about mobile robot locomotion, kinematics, perception, localization, SLAM(simultaneous localization and mapping), and planning.

### **Concept and Application of Artificial Neural Network**

Artificial neural networks are attracting much attention to the researchers because it is one of core skills to expedite future industrial revolution. In the future, it will be applied more and more to the wider area of industries. Also, it is most widely used for data analysis and prediction through training. This course introduce the basic concepts and applications of artificial neural networks. The purpose of this course is to understand the basic theories and recent development of artificial neural networks.

### **ICT Convergence Seminar(1)** **ICT Convergence Seminar(2)** **ICT Convergence Seminar(3)**

The aim of this colloquium is focusing on the up-to-date research topics and state-of-the-art related to ICT convergence fields. Invited speakers will present the up-to-date researches, papers, or their experiences to the class on a specific topic related to ICT convergence.