A6-3-1 課程網頁國際化之建置－授課目標

系所：資訊與通訊系

學程：學士四年制

Course Descriptions of Undergraduate Program

Department of Information and Communication Engineering

Code	Credits	Course Name	Course Description
FC1001	3	Calculus(I)	Functions, Limits, Differentiation, Integration, Applications of Calculus, Series and Taylor Polynomials.
FC1002	3	Calculus(II)	The goal is to train the students to have good calculation skills. Calculus is a very useful mathematical tool in various fields. Students might have to apply what they have learned in this course in many other applications. So they got to have well trained problems solving skills for handling various upcoming situations.
FC1003	3	Physics	According to what the students to know in Physics, link textbook to practical phenomena to teach the students the overall pictures of Physics.
FC1004	3	Introduction to Computers	The content includes introduction of computer, number representation, OS, algorithms, data structure, file systems, database systems, networks and etc.
FC1005	3	Introduction to Networks and Communications	Introduction, Network Models, Domain Name System, Digital and Analog Transmission, Switching, Data Link Control, and WLAN
FC1006	3	Computer Programming	This course will introduce computer programming in C and C++.
FC1007	3	Discrete Mathematics	This course will introduce the concept of logic, the language of mathematics, mathematical induction, set theory, function, counting methods, the pigeonhole principle, recurrence relation, and graph theory.

FC1008	3	Advanced Computer Programming	Structures or class, File input/output, Object-Based Programming, Object concept, Define Classes, Overloading, Inheritance, Encapsulation, and Polymorphism.
FC1009	3	Digital Logic Design	1. Binary Systems 2. Boolean Algebra and Logic Gates 3. Gate-Level Minimization 4. Combinational Logic 5. Synchronous Sequential Logic 6. Registers and Counters 7. Memory and Programmable Logic 8. Register Transfer Level 9. Asynchronous Sequential Logic 10. Laboratory Experiments
FC2001	3	Engineering Math	This course covers the basic concept of engineering analysis. Selected topics from ordinary differential equations, series expansion method for variable-coefficient equations, and Laplace transform are introduced. Content is correlated with topics on other engineering courses and applications.
FC2002	3	Computer Networks	The main topics include networking introduction, Physical Layer of Networks, Data-link Layer of Networks, Network Layer of Networks, and Application Layer of Networks.
FC2003	3	Electronic Circuits(I)	Frequency Response, Differential Amplifier, Current Mirror, and Oscillator Circuit.
FC2004	3	Electronic Circuits(II)	Feedback Circuits, Filter, Power Amplifier and CMOS Logic Families.
FC2005	3	Data Structure	This course will focus on data structures for manipulating them. Data structures for storing information in tables, lists, trees, queues and stacks will be covered. Some basic graph, sorting and searching algorithms will also be discussed.
FC2006	0	Information and Communication Ability	The objective of this course is training students' ability of information and

			communication.
FC2007	3	Linear Algebra	1. Brief introduction of matrices and linear system 2. Determinant 3. Two-dimension and vector space of three-dimension 4. Euclidean Spaces 5. Vector space 6. Inner vector space 7. Eigen values and eigenvectors 8. Linear transformation
FC2009	3	Microprocessor System	LED/LCD display, keyboard, ADC/DAC, timer and interrupt, Network interface experiments.
FC2104	3	Database Systems	
FC3001	1	Special Project (I)	The goal of this course is to implement a project. The students can learn how to do the teamwork on the design of an information system. They must integrate all the knowledge they have learnt to design and finish the project.
FC3002	1	Special Project (II)	The goal of this course is to implement a project. The students can learn how to do the teamwork on the design of an information system. They must integrate all the knowledge they have learnt to design and finish the project.
FC3004	3	Communication System	The goal of this course is to provide the students with a basic knowledge of system and signals. The main topics include the time domain and frequency domain of analog signal、discrete signal、analog system and discrete system.
FC4001	1	Special Project (III)	The goal of this course is to implement a project. The students can learn how to do the teamwork on the design of an information system. They must integrate all the knowledge

			they have learnt to design and finish the project.
	2	Technology English Reading	1. Vocabulary 2.Sentence structure 3. Paragraph structure 4. English Composition
	1	Technology English Writing	1. Vocabulary 2.Sentence structure 3. Paragraph structure 4. English Composition
FC1101	3	Linux/Unix	This course starts from the basics, explaining how to install and manage the Linux hard disk, processes, and packages for Linux system.
FC1102	3	Introduction to Multimedia	The course will introduce how to develop a multimedia system.
FC1103	3	Introduction to RFID	The technology of Radio Frequency Identification (RFID) has been widely applied in the various industries. The objective of the course is to introduce the basic elements for applying RFID technology to industries. These basic elements will include the RFID system framework and devices, various standards for applying RFID, and the application of the RFID technology.
FC2008	3	Signals & Systems	
FC2101	3	Windows Programming	This course will guide students how to design program in windows environment. First we will choose one development tool, focus on this tools to develop graphic user interface program, MDI application, and database application.
FC2102	3	Object-Oriented Programming	The goal of this course is first to explore and study what a well-developed information system is and how to build it. And then the object-oriented analysis and design, design pattern techniques are discussed.
			Review of Underlying Network Technologies;

FC2103	3	Network Application Programming	OSI 7- Layer; LAN、MAN、WAN; Ethernet Technology, IP Protocol; ARP; RARP; Internet Protocol Operation TCP Protocol Operation, Packet Driver Interface; Network Programming over Packet Driver Interface, Socket Interface; Network Programming over Socket Interface.
FC2201	3	Numerical Methods	1.Mathematical Preliminaries 2.Computer Arithmetic Background 3.Solution of Nonlinear Equations 4.Solving Systems of Linear Equations 5.Eigenvalue Problems and Squares Problems 6.Approximating Functions
FC2202	3	Fourier analysis	1. Introduction 2. The Fourier Transform and its properties 3. Convolution and correlation analysis 4. Fourier series and sampled waveforms 5. The discrete Fourier transforms 6. The Fast Fourier transform
FC2203	3	Simulation and Analysis of Communication Systems	Modulation Impairment, Linear Distortion, and Non-linear Distortion
FC2204	3	Linear Electronic Circuits	Course Title: Linear Electronics Description: This course is to study the characteristics of the semiconductor devices and design of the electronic circuits.
FC2205	3	Complex Analysis	1.Complex Numbers 2.Complex Functions 3.Harmonic Functions 4.Complex Integration 5.Cauchy Theory of Integration 6.Complex Power Series 7.Laurent Series, Residues 8.Conformal Mapping
FC2206	3	Communication Application Programming	Programming Techniques with C for Wireless Communications, Embedded OS, Bluetooth and Wireless LAN Development Platform, and SMS/EMS/MMS
FC3003	3	Probabilities and Statistics	1. Introduction. 2. Basic Probability. 3. A Single Random Variable. 4. Functions of a Random Variable and

			Expectations. 5. Two Random Variables. 6. Expectations and Functions. 7. Characteristic Function. 8. Multiple Random Variables.
FC3004	3	Communication System	Course title: communication system description: this course is a first course in the area of communication. It primly contains the concept of communication system and the analogy communications.
FC3101	3	Information Networks	Introduction to network management concepts. Topics include fault, accounting, configuration, performance, and security management; SNMP protocols, agent-manager application software design and implementation.
FC3102	3	Database Programming	Java, Flow Control, Exception Handling, Connection Pooling, Binary Large Object.
FC3103	3	Neural Networks and Its Applications	Fundamental Concepts and Models of mental processes ,Single-Layer Perception ,Multilayer Perception ,Hopfield model ,Recurrent Network ,Associative Memories ,Self-Organizing Networks ,Reinforcement learning
FC3104	3	Artificial Intelligent	1. Searching Strategies 2. Planning Method 3. Knowledge Representation 4. Learning
FC3105	3	Distributed Information Systems	1.Digital signal processing overview 2.Discrete Fourier transform(DFT) and fast Fourier transform(FFT) 3.Discrete Cosine transform(DCT) 4.z-transform and its applications 5.Digital filter overview 6.Finite impulse response (FIR) digital filter design 7.Infinite impulse response (IIR) digital filter design

FC3106	3	Fuzzy Theory	The important topics includes logic concepts, set theory, fuzzy set theory, fuzzy relation, fuzzy arithmetic's, fuzzy logics , fuzzy inference rules, fuzzy logic control and other important theories and their applications.
FC3107	3	Combinatorial Math	Topics include permutations, combinations, binomial and multinomial theorems, Sterling numbers, ordinary and exponential generating functions, inclusion and exclusion theorems, recursive relation, and Polka's theory of enumeration.
FC3108	3	Introduction to Algorithms	This course investigates several important algorithm topics.
FC3109	3	Introduction to Operating Systems	The goal of this course is to provide the students with a basic knowledge of the kernel of operating systems. The main topics include system structure, user interfaces, process management, and memory management, file systems, and distributed systems.
FC3201	3	Electromagnetic	Course Title: Electromagnetism Description: This is an introductory course of electromagnetic bias on its Engineering applications. The course is divided into five parts (1) the static electric field (2) the steady electric current (3) the static magnetic field (4) the quarry-stationary electromagnetic field.
FC3202	3	RF Circuit Design	1. Basic concepts for filter design. 2. Designs for RF low pass filter prototype. 3. Designs for RF band pass filter. 4. Filter design using distributed elements. 5. Filter design using multilayer configuration. 6. RF switches module design. 7. Coupler and power divider. 8. Mixer design. 9. Introduction for wireless RF system

			configuration.
FC3203	3	Introduction to Digital Signal Processing	1.Digital signal processing overview 2.Discrete Fourier transform(DFT) and fast Fourier transform(FFT) 3.Discrete Cosine transform(DCT) 4.z-transform and its applications 5.Digital filter overview 6.Finite impulse response (FIR) digital filter design 7.Infinite impulse response (IIR) digital filter design
FC3204	3	Digital Communication Techniques	The goal of this course is to provide the students with a basic knowledge of digital communications. The main topics include terminology of digital communications and the concept of digital communication basics. The students will realize the following digital communication basics after finishing this course: 1. the functions and operation of pass band digital transmission 2. the spread-spectrum modulation 3. the multi-user radio communications 4. the fundamental limits in information theory 5. error-control coding
FC3205	3	Telecommunication Networks	Introducing various aspects of networks: including transmission media, types of telecommunication networks, and architectures of telecommunication networks.
FC3206	3	Coding Theory	1. Introduction to error-correcting codes 2. The main coding theory problem 3. Finite fields 4. Vector spaces over finite fields 5. Linear Codes 6. Encoding and decoding with a linear code 7. Dual code, the parity-check matrix and syndrome decoding

			8. Hamming codes 9. Perfect codes 10. Double-error correcting codes 11. Cyclic Codes
FC3301	3	Computer Software Application	Introduce how to deal with the commerce, financial, and accounting problems by the application of computer software's
FC3302	3	Digital Image Processing	Digital image fundamentals, Enhancement in the spatial domain and the frequency domain, Image restoration, Color images, Wavelets, Image compression, Morphology, Image segmentation, Image representation.
FC4101	3	High Speed Broadband Networks	This course is aimed at introducing the concepts of wireless networks. The following topics will be covered in this class. 1. PCS, GSM, GPRS 2. Wireless LAN, Mobile IP, Bluetooth 3. 3G Mobile Systems 4. Beyond 3G Mobile Systems 5. Mobile Ad Hoc Networks 6. Wireless Sensor networks
FC4102	3	Introduction to Queuing Theory	(1) Introduction, (2) Probability Theory, (3) Stochastic Processes, (4) Markova Queues, (5) Advanced Queues, (6) Simulation, (7) Queuing Networks, (8) Multi-class Queuing Networks, (9) Approximate Methods, (10) Blocking in Queues, (11) Queue Design.
FC4103	3	Information Security	This course will introduce the basics of number theory, symmetric key/public key cryptosystem, and the applications. The applications includes secret sharing, authentication, e-mail security, signature, blind signature, etc.

FC4104	3	Wireless Networking	The course introduces the telecommunication systems. It covers the field of concepts to Telecommunication, Wireless Communication Technology, Wireless Networking, Circuit Switched Network Systems, Satellite Communications, and Wireless Local Area Networks (Weans).
FC4105	3	Network Voice Phones	This course will discuss the Voice over Internet Protocol (Void) issue and related topics. Some hands on experiment, such as implementing RTP, SIP as well as MGCP simulation program, will be conducted to help students to understand the Void principle and applications.
FC4106	3	Network Performance Analysis	Asynchronous Transfer Mode Networks；Performance Analysis ；Delay Models in Data Networks；Multiple access Communication Protocols；Routing in Data Networks；Flow control
FC4107	3	Multimedia Transmission	Compression, Caching, IP Multicast, Network Monitoring and Routing, Quality of Service, Searchable Video
FC4108	3	Introduction to Cryptography	This course is aimed to introduce students to a broad exposure to advanced operating systems topics. Topics to be discussed in the course include protection, security, memory management, operating system kernels, file systems, synchronization, naming, and distributed systems.
FC4109	3	Mobile Computing Technologies	This course is designed to teach students various technologies for wireless networks. The topics discussed in the course include (1) Wireless LAN and its research in 802.11, WLAN security, (2) GPRS wireless network, (3) Wireless Application Protocol (WAP) (4) Bluetooth Issues and Applications.
			1. The Axioms of Probability

FC4110	3	Theories of Random Process	2. Random Variables 3. Sequences of Random Variables 4. Statistics 5. Stochastic Processes 6. Estimation
FC4111	3	Advanced Networks	This course will provide an up-to-date survey of current developments in high speed networks. We will cover the multimedia, congestion control, and Quest issues based on the Internet Protocol, the entire TCP/IP protocol suite, and ATM networks.
FC4112	3	Network Programming	Review of Underlying Network Technologies; OSI 7- Layer; LAN、MAN、WAN; Ethernet Technology, IP Protocol; ARP; RARP; Internet Protocol Operation TCP Protocol Operation, Packet Driver Interface; Network Programming over Packet Driver Interface, Socket Interface; Network Programming over Socket Interface.
FC4113	3	Network Protocols	This course covers the fundamentals of protocol engineering. Tentative topics include communication protocols: architecture, requirements, and validation; protocol design; finite state machine design and closure check; and protocol suite design, validate, and specifications.
FC4114	3	Broadband Network Technologies	This course is aimed at introducing the concepts of wireless networks. The following topics will be covered in this class. 1. PCS, GSM, GPRS 2. Wireless LAN, Mobile IP, Bluetooth 3. 3G Mobile Systems 4. Beyond 3G Mobile Systems 5. Mobile Ad Hoc Networks 6. Wireless Sensor networks
			This course attempts to provide a unified overview of the broad field of wireless technology and computer communication. We

FC4201	3	Mobile Communication Technologies	will introduce this course that includes basic communication properties, computer networks, wireless technologies, and applications
FC4202	3	Spread Spectrum Communication Technologies	The modern communication in multiple access technology is presented in this course. The contents are (1)Introduction (2)Basic multiple access spectrum
FC4203	3	Theories of Error Control Coding	1.Introduction to Algebraic codes 2.Mathematical foundations 3.Introduction to BCH codes and Finite Fields 4.Finite Fields 5.Cyclic codes 6.BCH, RS codes and their decoding 7.Convolutional codes and Iturbi decoding 8.Reed Muller codes and Reed decoding
FC4204	3	System On Chip	Cell-based Chip Design Concepts, Virology Hardware Description Language, Logic Synthesis, Hospice, Layout Implementation, SyQuest-Rate A/D Converter Design, RF CMOS IC Design Flow
FC4205	3	Sensor Network Technologies	Introduction to Wireless Sensor Networks, Wireless Sensor Network Programming, Platform Design, Energy Harvesting, Routing.
FC4206	3	Advanced Digital Communication Systems	Advanced communication concepts and techniques, Boundary of communications, Continuous phase modulation, Convolutional code and Iturbi decoding, Trellis coded modulation, OFDM system
FC4207	3	Digital Filters	DFT and FFT, IIR filter, FIR filter, Application of Audio and Image Processing, Paper and correlation research discussion
FC4208	3 3	Wireless communication Technologies	This course provides a general overview of wireless communication systems and addresses fundamental concepts in this field. After a review of spread spectrum systems and their application to multi-user

			communications, advanced wireless communication systems and general concepts of wide and local area wireless networks are described
FC4209	3	Adaptive Signal Analysis and Processing	The Wiener Filter，Properties of Quadratic Performance Surface，Minimization of Mean Square Error，Applications on System Modeling，Applications on Noise Cancellations，Paper discussion
FC4210	3	Radio Frequency Circuit Analysis	The studies on RF fundamentals, Smith chart and its applications, Impedance matching techniques, Network parameters, Passive networks design, and Filters design.
FC4301	3	VLSI Design	Introduction to CMOS circuits, MOS transistor theory, CMOS processing technology, Circuit characterization and performance estimation, CMOS circuit and logic design, CMOS subsystem design
FC4302	3	Cross-Layer Protocols Design	Network Communication Protocols, Wireless LAN, Communication Protocols for Mobile Internet, Cross- Layer design
FC4303	3	Embedded System Overview	1. Introduction to embedded systems and Sock platform 2. Embedded processor and memory organization 3. Devices and buses device networks 4. Device driver and interrupts servicing mechanism 5. Programming modeling concepts n single and multiprocessor systems 6. Software engineering practices in the embedded software