Department of Computer Engineering

▶ General Introduction

Computer engineering is indispensable for the information society. It enable the design and manufacture of high performance computers, and the development of the software needed to operate and apply them over the whole range of industry.

▶ Education Objectives

The computer industry is a typical technology-intensive industry. However there is a serious shortage of highly-qualified people in the computer industry, and it is expected that this situation will continue for quite some time in the future. Accordingly, we aim to educate students with the necessary background and technical knowledge for successful careers in computer engineering.

▶ Course Descriptions

Category	Seme-ster	Years	Code	Courses	Credit	Hours		Note
						theory	practice	
Basic Courses	1	Freshmen	02939	Introduction of Computer Engineering	3	3		
			01538	Engineering Mathematics	3	3		
Basic Courses	2	Freshmen	01539	Elementary Electronic Engineering	3	3		
			02495	Introduction to Programming	3	3		
Required Courses	1	sophomore	01693	Computer Programming	3	3		double major
			02126	Digital System	3	3		double major
Elective Courses	1	sophomore	01540	Discrete Mathematics	3	3		
			01646	Multimedia Engineering	3	3		
			01684	Computer Statistics	3	3		
			02049	Computer Aided Design & Practice	2	1	2	
			02133	Digital Communication	3	3		
Required Courses	2	sophomore	01680	Data Structure	3	3		double major
			01691	Computer Architecture	3	3		double major
			01638	Database	3	3		double major
Elective Courses	2	sophomore	02129	Unix Programming	3	3		
			02130	Linear Algebra	3	3		
			02131	Digital Circuit & Lab.	2	1	2	
			01628	Advanced Programming	3	3		

Required Courses	1	junior	01668	Operating Systems	3	3		double major
			01692	Computer Network	3	3		double major
Elective Courses	1	junior	01671	Windows Programming	3	3		
			01546	Numerical Analysis	3	3		
			01642	Microprocessor	3	3		
			01664	Algorithms	3	3		
Required Courses	2	junior	01544	Theory of Programming Languages	3	3		
Elective Courses	2	junior	02144	Application of Window Programming	3	3		
			01670	Web Programming	3	3		
			01643	Microprocessor Application and Practice	2	1	2	
			01662	Systems Programming	3	3		
			02136	Image Processing	3	3		
			03147	ERP Programming	3	3		
Elective Courses	1	senior	01689	Intelligent Information Systems	3	3		
			01941	Computer Security	3	3		
			02404	Object-Oriented Windows Programming	3	3		
			02833	Embedded System	3	3		
			02424	Database Programming	3	3		
			01660	Software Engineering	3	3		
			02941	Internet Ethics	3	3		
Elective Courses	2	senior	02407	Design Pattern	3	3		
			02406	Advanced System Programming	3	3		
			02139	Special Lecture for Computer Engineering	3	3		
			01695	Field Practice	3		6	

▶ 02939 Introduction of Computer Engineering
This is the main introductory course in the computer engineering department and is taken by students from a variety of disciplines wishing to have an understanding of computer engineering. Also it covers general concepts and relations of information and society, and the establishment of the system.

▶ 01538 Engineering Mathematics
Calculus plays an increasing role in the applied sciences as well as in mathematics itself. Calculus contains the basic concepts, principles of differential and integral analysis and its applications.

▶ 01539　Elementary Electronic Engineering
Basic electronics is intended for students taking their first course in the fundamentals of electricity and electronics. This course aims study a basic electronics, design of electronic circuits(AC & DC), connected RLC elements, circuit networks, electronic measurements, semiconductor(TR, Diode etc).

▶ 02495　Introduction to Programming
This course is an introductory programming course in the vb language. Upon completing this course, students should have a good understanding of the basic concepts of programming language and know the syntax of the vb language for developing software. This course will teach them the concepts of programming including memory storage, flow control, and the object orient paradigm.

▶ 01693　Computer Programming
This course is an introduction to programming computers. It is taken by students from a variety of disciplines wishing to have an understanding of computer programming as well as students wanting to continue on to further studies in Computer Science. We teach programming using the basic language C. The main focus is on learning to understand the detailed requirements of a programming task, and writing programs that are well structured, correct, easy to read, and to maintain.

▶ 02126　Digital System
This course aims to study a basic knowledge of digital logic circuit system. Students will learn the numeric system, binary code, logic element, combinational logic circuits based on gates, sequential logic circuit based on flip-flop, counter, register, and memory.

▶ 01540　Discrete Mathematics
The goal of this course is to introduce students to concepts and techniques from discrete mathematics that are widely used in Computer Engineering. Topics include logic, methods and proof, algorithm, integer and matrices, reasoning, counting, discrete probability, graph, and relations.

▶ 01646　Multimedia Engineering
This course study theory and latest technique for text, graphic, audio, video, animation of multimedia components. It also study concept of multimedia, component of multimedia, standard type of multimedia, compression and synchronism of multimedia, network/communication technology, multimedia database, multimedia information search.

▶ 01684　Computer Statistics
Statistics course is offered for students preparing for professions in statistics, for students who need statistical tools to engage in scientific research, and for students who want to acquire knowledge of the important concepts of probability and statistical inference.

▶ 02049　Computer Aided Design & Practice
This course serves all disciplines that require methods of visualization and drafting. Students gain hands-on experience with the world's most widely used computer-aided design (CAD) software. They gain valuable insights about how computer-aided design is applied in industry, using specific examples from a variety of disciplines.

▶ 02133 Digital Communication

This course understand basic protocol for data communication and network structure. It also study a concept of data communication, difference and merits and faults of various medium, analog/digital signal, Modem method, interface standard, data link control protocol and local area network protocol.

▶ 01680 Data Structure

This course investigates abstract data types(ADTs), recursion, algorithms for searching and sorting, and basic algorithm analysis. The ADTs to be covered include lists, stacks, queues, priority queues, trees, sets, and dictionaries. The emphasis is on the trade-offs associated with implementing alternative data structures for these ADTs.

▶ 01691 Computer Architecture

This course introduces the main components of digital computers, their functionalities, and interactions among them, and studies various design techniques for implementing modern computer systems. The main topics covered include instruction set architecture, CPU, pipelining, hierarchical memory organization, input/output devices, and multiprocessors. A history of computer development and basic performance evaluation techniques are also covered.

▶ 01638 Database

Database had been thought for specialized implement only to computer expert until now. In fact, it is important field of science which largely placed relative importance of weight to the computer engineering and difficult region calling for the expert knowledge. Also, database is used for not only managing to mass storage data utilizing the advanced database program like the Oracle or Sybase but systemizing or computerizing the work process by the database program.

▶ 02129 UNIX Programming

In the course of the development of UNIX, hundreds of functions were written to give access to various facets of the system. These functions are available to the programmer in libraries. By writing in C and using the UNIX system libraries, very powerful system programs can be created. These libraries are less easy to access using other programming languages. C is therefore the natural language for writing UNIX system programs.

▶ 02130 Linear Algebra

Linear algebra has in recent years become an essential part of mathematical background of mathematicians, engineers, physicists and other scientists. It contains vector space, matrices, basis, linear mapping, determinants, eigenvalues and eigenvectors.

▶ 02131 Digital Circuit & Lab

In this laboratory course, various design problems are solved and implemented through hands-on lab sessions. Each session is tightly integrated with important concepts covered in the Digital Logic Design course. This course also teaches practical skills for handling various hardware instruments as well as various design representation techniques.

▶ 01628 Advanced Programming

This course presents the principles of computer programming using the C++ language. Topics covered include the use of variable types, expressions, control structures, pre-processor commands, functions, arrays,

strings, pointers, structures, classes, objects, and files.

▶ 01668 Operating Systems

Operating systems are an essential part of a computer system. They provide an interface to the users and manage system resources. Major goals of this course are to provide a firm foundation in the principles and concepts that underlie operating systems and to study in detail major issues in operating systems such as process synchronization, process management, storage management, file system organization, and distributed operating systems.

▶ 01692 Computer Network

This course understand basic principle and structure and standard type of computer network based on data communication technology. It also understand operation principle of OSI(Open Systems Interconnection) 7 layer and TCP/IP Internet protocol.

▶ 01671 Windows Programming

This course will teach students the fundamental skills that are required to design and develop object-oriented applications for the Web and Microsoft Windows by using C# and the Microsoft Visual Studio .NET development environment.

▶ 01546 Numerical Analysis

Numerical Analysis is the area of mathematics and computer science concerned with the solution of mathematical problems using a computer. Such problems include data fitting, evaluation of various types of integrals, solution of algebraic equations and systems of equations, solution of ordinary, partial, integral and integro-differential equations.

▶ 01642 Microprocessor

This course provides principles and design of microprocessor-based computer system. It covers both hardware and software aspects of microprocessor system design, including standard and special interfacing techniques. Ability of system design and trouble-shooting will also be covered.

▶ 01664 Algorithms

This course provides detailed understandings for time/space complexity, recurrences, algorithm design technique, lower bounds, graph/matrix/set algorithms, sorting, algebraic and geometry algorithms, intractable problems. The recommended prerequisite course for this study might include data structure and C language.

▶ 01544 Theory of Programming Languages

This course is an introduces to various programming languages and their characteristics, and study the components of each language. The languages learned in this course are imperative languages, declarative languages and object oriented languages. The main focus is on learning to understand the detailed requirements of a programming task, and writing programs that are well structured, correct, easy to read, and to maintain.

▶ 02144 Application of Window Programming
A course in writing Windows 95/98/NT programs using Microsoft's Visual C++ and the Microsoft Foundation Classes. The course will cover basic Windows API programming, MFC, the AppWizard, the ClassWizard, event handling, graphics, the Doc View architecture, database and Internet applications.

▶ 01670 Web Programming
This course introduces the basic concepts of web programming by using C# and ASP.net programming language. It practices design and implementation of software by using ADO.NET and web service.

▶ 01643 Microprocessor Application and Practice
This course provides topics which will include basic microcomputer hardware, software and the usage of recent popular applications. Hardware organization, memory addressing, input / output interface, interrupts, assembly language programming, peripheral support, hardware and software development.

▶ 01662 Systems Programming
System program is interconnection between user and computer hardware. Computer engineer is necessary to understands system software, so this course study machine language, assembler, macro, loader, compiler, OS, etc. And It also understand general concent of system programming.

▶ 02136 Image Processing
Mathematical representation of continuous and digital images; models of image degradation; picture enhancement, restoration, segmentation, and coding; pattern recognition, tomography.

▶ 03147 ERP Programming
This course provides the student with the concepts behind the design and programming methodology of Enterprise Resource and Planning systems. The architecture of ERP's, as well as the object-oriented hierarchy of ERP systems are explored in depth. The student will learn to design, code, and implement custom programs for enterprise information systems.

▶ 01689 Intelligent Information Systems
This is course on Intelligent Systems which includes Robotics, Artificial Intelligence, and Cognitive Science. The course will cover basic concepts such as search, knowledge, representation, memory, inference, and control.

▶ 01941 Computer Security
This course is designed for seniors to learn computer and network security theories and practices that can be used to significantly reduce the security vulnerability of computers on internal networks or the Internet. The course assumes some familiarity with various operating systems and computer networks. Topics include cryptography, program security, operating systems security, database security, network security, security administration, computer ethics and legal issues.

▶ 02404 Object-Oriented Windows Programming
This course teaches the fundamental ideas behind the object-oriented approach to programming through the

widely-used Java programming language. Students will gain a solid basis for further study of the Java language, and of object-oriented software development.

▶ 02833 Embedded system
This course teaches students how to design and analyze embedded hardware and software. From the basic electronics and MPSoC architectures are covered in hardware side. Software design methods are covered including recent approaches. Basic experiments related on VLSI design and understanding of structural VLSI methodology, Structural modelling using hardware description language(VHDL), synthesizing, target fitting in target device.

▶ 02424 Database Programming
This course teaches the relational data model, Structured Query Language (SQL), Data Definition Language (DDL), Data Control Language (DCL), Data Manipulation Language (DML) commands, database programming, event triggers, stored procedures, query plans and query optimization techniques.

▶ 01660 Software Engineering
Developing a big software is fairly difficult and complicated job. This undergraduate level software engineering class covers the issues regarding software requirement analysis, various software design methodologies, and software project management.

▶ 02941 Internet Ethics
This course aims to study a basic internet ethics, psychology of cyberspace, law of internet society(ITU & ITC), NEtiquette, internet reverse ability(internet addiction, cyber bullying, hacking, virus, video blogging, stalking, privacy invasion cyber terror, internet fraud etc)), intellectual property right, cyber ethics, etc.

▶ 02407 Design Pattern
This course consists of supervised independent research or development work on a topic related to Computer Science and the special issues in computer engineering are discussed in the class. Especially, this course is concentrated on the functional design of the system, structural design, and other various design methods needed to represent data structures and flows within the system.

▶ 02406 Advanced System Programming
In-depth training for software developers on Linux and UNIX system programming facilities. Learn how to develop sophisticated multiprocess applications using system calls and library routines.

▶ 02139 Special Lecture for Computer Engineering
This course is an introduces to various web programming language and their characteristics, and study the components of each web programming language. Specially, Puts the focus in JSP. Java Server Pages(JSP) is a Java technology that allows software developers to dynamically generate HTML, XML or other types of documents in response to a Web client request. The technology allows Java code and certain pre-defined actions to be embedded into static content.

▶ 01695 Field Practice

This course helps students visit industries located at Busan and Gyungnam, and perform real world projects by applying principles, theory, and techniques that were acquired in computer science.