Descriptions of Courses

SEP501 Computing System Overview   3:0:3

This course offers introductory overview of computing systems, which includes computer architectures, operating systems, current trends and future of computer systems. Relevant technologies are investigated and analyzed in depth from the viewpoint of computing systems. Participating students will develop base knowledge of computing systems required for software engineers.

SEP502 Software System Overview   3:0:3

This courses will introduce the principles and practices of software systems for software developers: programming languages, database system, and artificial intelligence. The basic concepts and technical issues of system software will be briefly discussed, and their applications in the industries will help the software engineers to apply the principles to the real problems.

SEP521 Principles of Software Engineering   3:1:3

This course introduces fundamental software engineering principles. Specific topics to be covered include software development life-cycle phases, various process models, and various technical and managerial activities to be carried out during software development. In addition, recent trends on software industry and technical advances on software engineering are to be introduced.

SEP522 Requirements Engineering   3:1:3

SEP 522 focuses on how various software requirements are to be specified and analyzed for completeness and consistency. Topics include feasibility study, business modeling and analysis, notations that are known to be useful in describing complex software requirements and analyzing them. In particular, formal modeling and analysis techniques, aided with state-of-the-art CASE tools, are emphasized so that students can gain practical knowledge on requirements of engineering.

SEP523 Software Design   3:1:3

This course covers software design principles and concepts, software architecture & architectural styles, software design notations, object-oriented method, component-based development method, design patterns, software refactoring, design quality evaluation issues, and the students will get hands-on experience by practical modeling projects using the state-of-the-art CASE tools.

SEP524 Software Quality Assurance   3:1:3

Verification techniques in software development phases are introduced and capability of quality assurance practices are exercised through case studies. Static testing techniques such as inspection, walk-through and dynamic techniques which are applied to codes are presented. Methods of test data generation, test execution and test reporting corresponding to each testing phase are studied using the state-of-the art tools.

SEP525 Software Process   3:0:3

This course covers software process and its improvement models, such as ISO9000, ISO12207, ISO15504, CMM, CMMI, etc. Each of those quality and process models will be compared and analyzed. Also, practical application of such models will be introduced in terms of the assessment methods and implementation techniques. In addition, the future trends of these international standards will be discussed.

SEP526 Software Product Line Engineering   3:1:3

Software product line engineering is a technique to develop similar software products simultaneously, which is

essential in software market environment, where only the softwares characterized for various customers' needs earn competitive power. Nonetheless, Korea is experiencing difficulty in getting software competitive power, because of low product line technique. This course aims to train the ability to lead and utilize the software product line development on the field by studying and applying the state-of-the-art theories and techniques of software product line engineering.

SEP527 Mobile Software Development   3:0:3
The objective of this course is the overall analysis of the characteristics of the software in the mobile computing environment. First, we will examine the structural characteristics of mobile devices and analyze the peculiarity of the operating system. Then, examine the influence of this mobile environment on applications. We will design the applications or applicable services for the exercise.

SEP531 Information Retrieval   3:1:3
This course covers the storage and retrieval of unstructured digital information. Topics include automatic index construction, retrieval models, textual representations, efficiency issues, search engines, text classification, and multilingual retrieval.

SEP532 Theory and Practice for Artificial Intelligence   3:1:3
This course introduces students to essential theories and practices for building artificial intelligence and machine learning systems to be deployed in real world applications. Students will learn mathematical foundations behind modern machine learning and deep learning techniques, and carry out homeworks and projects implementing software and running in cloud computing environments.

SEP533 Representation of Knowledge and Semantics   3:1:3
This course is about investigating the next generation of the Web whose key distinguishing characteristics will be the support for and use of semantics in new, more effective, more intelligent, ways of managing information and supporting applications.

SEP542 Enterprise System Integration   3:0:3
This course overviews current trends in electronic commerce and teaches component technologies to construct and manage electronic commerce systems. By giving integrated understanding of overall system structures, this course will have students identify technical and structural limitations in each component technology. Students will further try to propose alternatives for those limitations. Through course projects, students get experiences in the design and development of alternative technologies or systems.

SEP543 Computing Security   3:0:3
The principles and practice of cryptography, network security, and authentication will be covered first. Then, various other topics, such as authentication applications, e-mail security, IP security, Web security, security issues in wireless networks, and firewalls will also covered.

SEP544 Internet Service and Infra   3:0:3
Internet Computing includes all kind of computing on the Internet; most areas in computer engineering are Internet computing. This course aims to study core Internet computing technologies such as GRID Computing, Web-Centric Applications, Multimedia Streaming and Networking Middleware.

SEP545 Database Design   3:1:3
This course introduces an overall methodology of the database design. Especially process modeling is dealt

with in addition to data modeling. A design method independent of a data model is discussed, and then the resulting design is transformed into a design specific to a data model. Students will practice using a commercial database design tool.

SEP547 IT Service Engineering   3:0:3
The course introduces modern IT service engineering principls and methodologies across the whole life cycle of information systems, including requirement engineering, process analysis and innovation, system design, development, implementation, operation, and after service. We introduce not only baseline methods in IT service engineering but also best practices from leading system integrators (SI) covering various industries such as manufacturing industry, financial industry, logistics industry, and telecom-service industry.

SEP561 Embedded Computing   2:3:3
Embedded systems are found everywhere, and their huge numbers and new complexity call for a new design approach, one that emphasizes high-level tools and hardware/software tradeoffs, rather than low-level assembly-language programming and logic design. This course presents the traditionally distinct fields of software and hardware design in a new unified approach. It covers trends and challenges, introduces the design and use of single-purpose processors ("hardware") and general-purpose processors ("software"), describes memories and buses, illustrates hardware / software tradeoffs using a digital camera example, and discusses advanced computation models, control systems, chip technologies, and modern design tools.

SEP562 Embedded System Software   3:0:3
This course provides students with a comprehensive, in-depth treatment of background materials and fundamental concepts for embedded system softwares with practical hands-on experiments. Topics covered in this course include embedded operating systems, real-time scheduling, device drivers, and low power computing.

SEP564 Embedded Operating System   3:0:3
The goal of this course is to provide in-depth design concepts and implementation skills required for designing and developing embedded operating systems. Topics covered include boot loader, process management, memory management, I/O device management, and file systems in embedded operating systems.

SEP565 Mobile Software   3:0:3
In this course, we study mobile systems based on embedded systems. Topics in this course are including software for wireless networks (s/w for cellular phone, s/w based on wireless LANs), sensor networks, and s/w for ubiquitous computing.

SEP581 Project Management and Professional Practice   3:0:3
This course addresses issues related to software project management and professional practice. Specific topics to be discussed include how to best organize and manage software projects, communication and presentation issues, ethical issues. Each student is expected to study software project data in depth and develop strategies on and how to address them so that students will have the ability to deal with dynamic issues that occur in practice.

SEP582 IT Organization and Leadership   3:0:3
This course intends to provide graduate students with IT leadership ability. The topics in IT leadership include CIO's roles and responsibility, IT organizational management, strategic use of IT technologies, innovation, vision, and leadership. A variety of CIO case studies will be investigated.

SEP583 Software Industry and Ecosystem   3:0:3

In this course, students learn the structure of software industry, software ecosystem, global IT business environment including software service business and software product business. It covers current technologies and trends, software skills and talents, national software industry development strategies, human resource global supply and demand, software law, history of software platform and programming tools as well as intellectual property and open source software will be covered. A survey will be made how IT is used to enhance the competitiveness of traditional industries.

SEP584 Management of Software Business   3:0:3

First of all, we will examine the operating principles of software industry and base economics theories, and then, will discuss about the management strategy for software enterprise in depth. We also will case study successful and failed software enterprises. Finally, we will discuss in specifics about the things should be considered when you start a new software enterprise or manage one.

SEP592 Special Topics in Software   3:0:3

Big data and data science have been widely discussed in the industry, however they are not well defined as academic subjects. In this course, we will try to explore the core question of "What is big data and data science?" based on case studies.

SEP701 Software Development Project (1)   1:15:6

This course offers to practice the knowledge obtained from the program applying to real application domain. The problem would be defined and analysed. The system would be designed and the development activities should be refined. This course would be considered as the first phase for SEP702. The proposal should be presented to the committee including advisor and if SEP701 is successfully completed, the next course SEP702 can be taken.

SEP702 Software Development Project (2)   1:15:6

After passing the course SEP701, the proposed system would be implemented and tested. The final report should be written and submitted. Also, the system should be presented to a committee.

SEP965 Independent Study in M.S.   0:6:1

This course emphasizes the aspects of professional practices and experiments. Students are provided with projects to be performed individually. Consult instructors before taking the course.

SEP966 Seminar   1:0:1

In this course, seminars about current trends and future research directions in various software-related areas are offered by invited speakers inside or outside the Software Expert Interdisciplinary Program. Students are required to actively participate in the seminars.