



Course List for Graduate Students

Course Number	Course Name	Duration	Credits	Course Time		Courses Property
				Fall	Spring	
22010016	Basic Level Chinese	64	4	√		Required
22010017	Spoken Chinese	32	2	√		Required
22010045	High Level Chinese	64	4		√	Required
22010046	Software Project Management	32	2	√		Electives (≥12.0 Credits)
22010047	Software Requirement Engineering	32	2	√		
22002402	Advanced Software Architecture	32	2	√		
22010048	Software Quality Assurance	32	2		√	
22010035	Advanced Operating system	32	2		√	
22010027	Software Process Management	32	2	√		
22010049	Software Metrics	32	2	√		
22010040	Web Service Development Technology	32	2		√	
22010059	Embedded Operating System	32	2	√		
22010060	Embedded System Application Development	32	2	√		
22010034	Internet of Things Technology	32	2		√	
22010057	Database development, management, and optimization	32	2	√		
22010058	Big data fusion and data warehouse	32	2	√		
24010028	Data Mining and Data Analyzing	32	2		√	
24010056	Mobile Application Development	32	2	√		
24010033	Embedded Software Development based on Android	32	2		√	
24010031	Game Tool Development	32	2		√	
24010035	Game Design and Implementation	32	2		√	
24002406	Information Security: Technology and Application	32	2		√	
23010017	Web Full Stack Development	32	2	√		
23010016	Enlighten Entrepreneurship	16	1		√	
24010057	Career Planning and New Technology Seminar	16	1		√	
24010055	General Introduction to Chinese Socialism	16	1		√	
23010012	Software Project Training I	64	4	√		Required
23010013	Software Project Training II	64	4		√	Required



22010046. 《Software Project Management》

The development of information systems is an important activity that consumes large amounts of organizational resources. These systems are usually developed by project teams of information systems and information technology professionals who are able to communicate and work closely with business people while developing new IT solutions.

Project management offers an interesting and challenging career with high rewards for those who can excel at managing IT projects. Above all, IT project management is about creativity, designing new ways of implementing technology. This is a profession for builders and doers. Yet, it also requires both a rigorous methodology and the ability to adjust and be flexible in order to accommodate unexpected circumstances and to enhance the creativity and efficacy of our teams.

In this course we take a “hands on” approach to learning and teaching. On the one hand, students work during the semester in a full project plan for the implementation of innovative IT systems supporting business activities in an emerging sustainable industry. On the other hand, the teacher acts as a program director and mentor, as well a presenter and facilitator.

By the end of the course, students will be able to demonstrate their ability to plan the following aspects of project management: Project Integration Management, Project Scope Management, Project Time Management, Project Cost Management, Project Quality Management, Project Human Resource Management, Project Communications Management, Project Risk Management, and Project Procurement Management.

The adopted teaching philosophy is based on the principle that project management knowledge has to be gained from experiential activities and supported by solid theoretical underpinnings. Therefore, INFS3059 endeavours to bring as much reality to the classroom as is possible.

22010047. 《Software Requirement Engineering》

1. Course Introduction

The course will discuss concepts for systematically establishing, defining and managing the requirements for a large, complex, changing and software-intensive systems, from technical, organizational and management perspectives. The course will consider the past, present and future paradigms and methodologies in requirements engineering. The course will cover informal, semi-formal and formal approaches, while striking a balance between theory and practice. The course will involve building models of both requirements engineering process and requirements engineering product, concerning both functional and non-functional goals/requirements/specifications, using a systematic decision-making process.

2. Course objective and basic requirement

After this course, students will be able to understand the need for requirements for large-scale systems, understand the stakeholders involved in requirements engineering, understand requirements engineering processes, and understand models of



requirements.

22002402. 《Advanced Software Architecture》

Software architecture is the description of whole system design structure, including global composition, control structure, communication and parallels between components, functions distribution, physical allocation, design elements integration, expandability, capability and design choices.

The goal of this course is: under support classes of “software System Analysis and Design”, “Requirement Engineering”, “Quality Assurance System”, “Software Project Management”, students can learn more about software system structure design, especially some modern methods, which can help students grow into an excellent system analyst in three to five years after graduation.

Under this goal, at the very beginning of this course, we need to change students’ way of thinking to a system engineering level, and according to classical case studies, and study the differences between incremental model process and agile process, promote several design plans and ways to solve problems. This course will be based on the nonfunctional requirements, discuss solutions by studying cases, in order to have the students solve problems theoretically and practically.

This course will discuss system structure from three aspects, concepts, rules and patterns. Students should have a deep understanding of problems, lay solid a foundation, master the base routine to solve a problem and can make flexible changes according to real situations.

Since software engineering has been developed rapidly, some newer contents have been added to this course, like “Service-Oriented Architecture”, “Aspect-Oriented Software Design”, etc. This can help the students to keep pace with modern software industry demands.

This course also discusses application problems occurring in each procedure of software development, including business patterns, requirement patterns and design patterns, but mainly focuses on design patterns. This course is a theoretical course, aims guide the students’ way of thinking, and bring in modern ways of design, broaden their view, promote their ability, in order to lay solid foundations, and help students go further in their future career.

22010048. 《Software Quality Assurance》

Software Quality Assurance (SQA), builds systematic methods, to assure management that the standards, procedures, experiences and methods can be used by the project correctly. SQA is an activity to ensure the software system or product can satisfy the customers’ requirements. The main goal is to produce high quality software.

The basic goal of SQA is:

The software quality assurance work is organized by procedure

Objectively evaluate the software product and relevant work to see if proper standards, procedures and requirements have been followed.

Inform relevant work and results of SQA to related groups and individuals



Higher level management have access to a problem that can't be solved in the project team

This course is a specialty course for students in the major of software engineering, students should be able to solve problems below:

1. Understand the basic rules to build software quality assurance system
2. Master systems and ways to implement software quality assurance
3. Master the concept and principles and tools of software configuration management
4. Understand methods to control quality by project risk analysis management
5. Understand the quality control issue in software analysis and design
6. Master testing management in software quality control

Finally, by studying the software quality assurance case of Boeing outer space transportation system, students will understand the characteristics of SQA in a real project.

Software Quality Assurance is now regarded as the life of modern software organizations, and quality awareness has become a culture. This course has covered most problems modern software industries will come up against, and have offered procedures as references. The goal is to help students to build the concept of quality management as soon as possible, and the value of quality control. At the same time, the students will learn relevant concepts, skills and techniques, which are very helpful in their future development.

22010035. 《Advanced Operating system》

1. Course Introduction

Operating systems is a core specialty fundamental course for graduate students in the major of software engineering. It's the basic knowledge and technique for cultivating graduate students to research in software related fields and product development.

2. Course objective and basic requirement

This course aims at guiding the students to master basic theory and philosophy of computer operating systems. Through basic practice, the course will help students form correct and specialty knowledge and structure, and gradually cultivate students to maintain solid professional theory and practical ability. After learning this course, students should build scientific ways of thinking and consciousness.

Concern about specialty needs for the major of software engineering, upon the basic theory and philosophy, lectures should combine with engineering practice, in order to widen students' understanding in software engineering, and to promote their practical ability and creativity.

3. Content Overview

The content of this course covers the concepts, structure and implementation mechanism of modern computer operating system. There are six subjects within: background knowledge of computer system and structure related to operating systems; process management; memory management; dispatch management; input-output subsystem; file system; distributed system and security. In all the above,



the process management, memory management, dispatcher management, input-output subsystem and file system are the core content.

22010027. 《Software Process Management》

This course is a required course for undergraduate students whose major is software engineering. It gives students a general introduction to software Process. The course covers relevant process models and the relations among them. The key point should introduce the basic concepts, principle, thinking method of the process, and application about many process models. So the students will build and grasp the thinking method of software process, and this will help to build the base for later study or work.

The course includes many fields and models of software involved process. The course covers a broad range of knowledge, but key points should be emphasized. The key content is marked with a star.

22010049. 《Software Metrics》

This course is a step by step description of the software metrics. It includes introduction to foundations of measurement theory, models of software engineering measurement, software products metrics, software process metrics and measuring management. The course is composed of the following basic modules:

- Measurement theory (overview of software metrics, basics of measurement theory, goal-based framework for software measurement, empirical investigation in software engineering)
- Software product and process measurements (measuring internal product attributes: size and structure, measuring external product attributes: quality, measuring cost and effort, measuring software reliability, software test metrics, object-oriented metrics)
- Measurement management

22010040. 《Web Service Development Technology》

In this course, students learn about the role of Web services in service-oriented architectures (SOA) and the enterprise, in addition to the technologies that are typically used in Web services. Students start by learning about the components of Web Services Description Language (WSDL) documents and SOAP messages in Web services.

This course is a thorough introduction to web services. Students will learn to create and consume web services, as well as the web services standards, technologies, platforms, and development tools.

22010059. 《Embedded Operating System》

This course introduces the knowledge of embedded systems and applications. After studying this course, students will be able to know the architecture of a classic embedded system, the embedded operating system mechanism, and the development



skills in embedded systems. Students will be able to master the knowledge of the system kernel, file system, task/process operation, memory management, interrupt and IO operations. The students should also learn how to port & optimize an embedded operating system and bootloader.

Prerequisite: Computer Architecture, Operating System

22010060. 《Embedded System Application Development》

Embedded Linux is a very popular operating system which is widely used in various kinds of embedded devices. Learning Embedded Linux Application Development helps students to master basic knowledge in an embedded system and gain rich practical experience in developing embedded software.

The students need to spend more time in practical rather than theory. The course introduces embedded Linux operating system and development under Linux environment. Students will be able to build an embedded Linux environment themselves, learn programming skills using a GUI, hardware control, multimedia and network, learn QT framework in embedded Linux, master the foundation of designing & developing embedded products.

Prerequisite: C Programming Language

22010034. 《Internet of Things Technology》

This course explains the technology and application of the Internet of Things, including some key technologies, such as Web, sensors, cloud computing, etc. It describes a variety of key technologies and hot spots with the main clue—the Internet of Things. Firstly, it makes a definition of the Internet of Things, then explains the connotation of the Internet of Things in terms of its architecture, and also explains the establishment of the basis architecture of the Internet of Things following the hierarchical model (including perceptive layer, network layer, and application layer). After the establishment, it introduces the key knowledge of the Internet of Things, including sensors, RFID, short-range wireless communications technology, sensor network technology, etc. Application is the key for the development of the Internet of Things, thus this course further describes networking middleware platform technology and the instances. Then with hot spots like cloud computing, it describes the Internet of Things. The feature of this course is that it is a combination of technology and application, hardware and software, combining theoretical and experimental, academic and industry. At the end of this course, some network experiment of RFID and wireless communications are set to help the students further understand the Internet of Things.

22010057. 《Database development, management, and optimization》

This course combines two main parts of Database Managements: database



development management and advanced database optimization.

The course is designed based on the entire data management lifecycle: design, develop, deploy, operate, optimize and govern data, databases, and data-driven applications, etc. which enables you to master the techniques of advanced data programming and to understand the concepts and framework of integrated data management clearly. Also, This course introduces database memory management, lock and log internal principle, database partition technology, fault diagnosis, data monitoring, parameter optimization, the optimizer principle and SQL statement optimization.

This course adopts combined teaching modes, including presentation, case study, demo, lab practices, etc. Through this way, students would not only learn the basic theories, but also master the whole process of Data Management and optimization based on IBM Database related products.

Objectives:

1.This course aims to enable you to understand and master the basic principles of the data management lifecycle. Through presentation, demo, you would learn knowledge of data modeling, JDBC programming, Advanced Java Programming with Database applications, as well as data backup and recovery, performance optimization. Through case study and lab practices, you would be able to design, develop, deploy, operate, optimize and manage data and data-driven applications based on IBM Infoshpere Data Architect and IBM Data Studio products

2.To make students understand and master the basic principles of database management, performance optimization. Through the theoretical and actual case analysis, make the students more in-depth study of the database technology and fully understand the database technology in data processing tasks in the status and the role.

3.Through the studying of this course, students should have the basic skills of the primary DBA. Learn how to manage the database, how to monitor the data operation, how to carry out fault diagnosis and how to optimize the application.

22010058. 《Big data fusion and data warehouse》

This course combines two main parts: Big Data Integration and Data Warehouse.

This course provides detailed steps of building a big data integration platform with deep analysis of the technologies used during this process. It enables you to master techniques of understanding data, cleansing data, transforming and delivering data, optimizing data quality, and securing sensitive data, etc. On the other hand, this course also focuses on the popular Hadoop and cloud computing solutions.

This course provides oral presentations as well as demos and lab practices, by which students would get a more intuitive comprehension while learning the technologies. This enables students, especially in this big data and cloud computing era, to master the techniques and theories of big data integration as well as Hadoop data analysis technologies.

Objectives:

1.This course aims to enable students, especially in this big data and cloud



computing era, to master the techniques and theories of big data integration. Via the demo and lab practices, students learn how to build a Big Data Integration platform based on IBM InforSphere Information Server, while understanding the key techniques as well as the detailed implementation steps

2.This course also introduces the basic technology of data analysis technology and also focuses on how to use Hadoop to solve the bottleneck problem of large amount of data and high concurrent access in order to achieve efficient data analysis system.

24010054. 《Data Mining and Data Analyzing》

Data that has relevance for managerial decisions is accumulating at an incredible rate due to a host of technological advances. Electronic data capture has become inexpensive and ubiquitous as a by-product of innovations such as the internet, e-commerce, electronic banking, point-of-sale devices, bar-code readers, and intelligent machines. Such data is often stored in data warehouses and data marts specifically intended for management decision support. Data mining is a rapidly growing field that is concerned with developing techniques to assist managers to make intelligent use of these repositories. A number of successful applications have been reported in areas such as credit rating, fraud detection, database marketing, customer relationship management, and stock market investments. The field of data mining has evolved from the disciplines of statistics and artificial intelligence.

This course will examine methods that have emerged from both fields and proven to be of value in recognizing patterns and making predictions from an applications perspective. We will survey applications and provide an opportunity for hands-on experimentation with algorithms for data mining using easy-to- use software and cases.

To develop an understanding of the strengths and limitations of popular data mining techniques and to be able to identify promising business applications of data mining. Students will be able to actively manage and participate in data mining projects executed by consultants or specialists in data mining. A useful takeaway from the course will be the ability to perform powerful data analysis in Microsoft BI Studio, Oracle SQL Developer, and Hadoop/MapReduce.

24010056. 《Mobile Application Development》

iPhone is the most popular mobile phone in the world while the iPad is most popular tablet computer, both of them are running iOS operating system and are able to run applications which are developed for iOS. This course will teach students how to write applications based on iOS platform.

The goal of the course is to teach students how to use Mac OS and XCode tool, learn the basic Objective-C language, learn the framework and message mechanism based on iOS SDK, learn the whole procedure of developing an iPhone/iPad application. Students will gain the ability to develop UI, network, multimedia and 2D animation applications on iPad/iPhone..



Prerequisite: C Programming Language

24010033. 《Embedded Software Development based on Android》

Android is an open source software platform for mobile phones based on the Linux kernel. The Android platform includes the operating system, middleware framework, user interface and application software. This course introduces the knowledge of developing application software based on the Android platform.

The goal of the course is to teach students about the development environment of Android platform, and the elements on android platform: Layout structure, XML parsing, gadgets, memory management, file system, GUI, multimedia, network operation, communication management and hardware sensor operation. After this course, the students will be able to build Android applications.

Prerequisite: JAVA Language Programming.

24010031. 《Game Tool Development》

This course introduces the concepts and techniques of various editors in game development, which helps students to design and implement commonly used tools in games. There are tools such as a 2D Map Editor, a 3D Scene Editor, a 3D Terrain Editor and a Particle effects editor. This course includes basic knowledge on MFC, various control component techniques of MFC, integration of MFC and DX, CEGUI framework and the functions of 2D and 3D map editor. For example, free transform and pickup of scene elements, the mixture of terrain texture, terrain editing, terrain management, loading and saving of terrain and scene files, and functions of Particle effects editor.

24010035. 《Game Design and Implementation》

The prerequisite of this course is Graphic Program Design. This course will introduce the techniques to develop each module in 3D games, including Sky Effect, Natural Environment stimulation, SkinMesh, Indoor Scene Management, Outdoor Scene Management, CLOD, Normal Mapping, Camera modes (first person, third person, flight), the advanced HLSL, etc. During the course, the students are required to design and implement a 3D game.

24002406. 《Information Security: Technology and Application》

The prerequisite of this course is Programming, Some Mathematics background especially number theory is useful. This course enables the students to grasp the basic concepts of designing and implementing secure information systems. The basics of cryptology are discussed as well as some well-known implementations. Digital signatures and verification algorithms are covered. Some well-known implementations such as SHA-x and RSA are studied. Based on these foundations it



will examine the major cryptographic protocols, their weaknesses and how to overcome them. In the end the course will cover some of the popular implementations will be studied and discussed. Laboratories will put all of the above into practice.

23010017. 《Web Full Stack Development》

The prerequisite of this course are HTML5, CSS, JavaScript, NodeJS, Express, AngularJS, Bootstrap, MongoDB, Jenkins, AWS. The barrier of entering the web development industry as a web developer is still low, but it's getting increasingly complex.

Being a full-stack developer means to have an open mind towards new technologies, having your hands dirty in each one and to have an understanding of how a web application gets done from a concept to design to the finished product.

Course Topics:

- Web basis
 - The Internet
 - The Web
 - The Web Apps
- Continuous Integration with Jenkins
 - Agile and Scrum Team
 - Jenkins Fundamental
 - GitFundamentals
 - Yeoman and Gulp
 - Hosting Service with AWS EC2
- HTML5 Fundamentals
 - HTML5 basis
 - CSS Fundamentals with Bootstrap
 - JavaScriptFundamentals
 - JavaScriptandThe browser
 - JavaScript and ASYNC Programing
- Build a Web App with HTML5/CSS/JS
- Server-Side Programming with Node | Express and MongoDB
 - NodeJS Fundamentals
 - Express Framework Basis
 - SQL vs NoSQL
- Build a Node App and Deploy to AWS EC2
- Client-Side Programming with AngularJS
 - MVVM and Data Binding
 - AngularJS Framework Basis
 - ReactJSFramework Basis
- Build aSingle-Page App to consume the APIs from the node

23010016. 《Enlighten Entrepreneurship》

This course will lead you through the practice of business startup, including an idea creation, proven of concept, BP, angel funding, founding a team, product



development, marketing and sales, all these will be told with case studies. With 2 or 3 case on the enterprises the professor is being working for as super advisor, this course will tell you the right thing to do with in-depth analysis on the problem or root causes with cause the startup company's trouble or even failure.

There are numerous startup arising every day and more than 90% of them will dead after 2 or years, a lot of money and energy will be lost due to this. This course will tell you how to avoid the problems with will cause failure during a startup business.

24010057. 《Career Planning and New Technology Seminar》

This workshop will train participants in all aspects of development as Graduates and future career-seekers. Learn the concepts of leadership from a psychological perspective and how they can understand their strengths & weaknesses as Future Career-Seekers.

- Recognize the critical skills that will enhance their abilities as corporate employees such as time management, personal development
- Explain how to cultivate effective leadership qualities relevant to their future duties and roles.
- Use proper and effective communication as employees.
- Use the Whole-Brain Model to understand the dynamics of Personality and its effect on personal performance
- Describe the mission-imperative thinking skills such as critical, analytical and creative thinking skills.
- Recognize the importance of Talent Management and learn several skills in defining, selecting, retaining effective talent.

24010055. 《General Introduction to Chinese Socialism》

This course will introduce you Chinese socialism. What Chinese socialism combines? How it comes? The thoughts of great leaders in Chinese history, Mao Zedong, Deng Xiaoping, etc. You will have a general idea of Chinese history and understand more of Chinese society through these lectures.

- Mao Zedong Thought 1
- Mao Zedong Thought 2
- Mao Zedong Thought 3
- Mao Zedong Thought 4
- Deng Xiaoping Theory
- Three Represents Theory
- Scientific Development Concept
- Chinese Dream



24002406. 《Information Security – Principles and Applications》

This course enables the students to grasp the basic concepts of designing and implementing secure information systems. The basics of cryptology are discussed as well as some well-known implementations. Digital signatures and verification algorithms are covered. Some well-known implementations such as SHA-x and RSA are studied. Based on these foundations it will examine the major cryptographic protocols, their weaknesses and how to overcome them. In the end the course will cover some of the popular implementations will be studied and discussed. Laboratories will put all of the above into practice.

- Introduction
 - Classic Cryptography
 - Symmetric Cryptosystems
 - DES&AES
- Modern Cryptography:
 - Data encryption Standard
 - Advanced Encryption Standard
- Modern Cryptography:
 - Cryptographic Hash Functions
 - Message Digest Functions
 - Message Authentication Codes
- Cryptosystems and Digital Signatures:
 - RSA
 - Digital Signatures
- Various cryptographic protocols
- Network Security
- Applications of Information Security
- Revision/Exam/Remaining Labs