Contents

Course Number: 0007078
Course Title: Freshmen Seminar Course
Credit: 1 **Total Credit Hours:** 16
Students: Software engineering for the first grade students
Prerequisites:
Evaluation Method:
The contents of the assessment: the practice is assessed through the paper.
The grading method:
Paper: the paper submitted after the practice should be more than 2000 words. It is 80% of the total score.
Attendance: it is 20% of the total score.
Course Description:
The course, though industry introduction, technical lecture and company visit, helps students to recognize the status and development of the related fields of software engineering and software industries, understand the status and development trend of the software industries, the content and function of software engineering, the curriculum of software engineering specialty, the function of all courses in practical work, the work environment and daily work content of typical software companies, initially establish the career planning of software industries. The course has three parts: the lecture part includes the overview about the software industry, the software industry segments and the emerging information technology, the demand and requirement for talent in software industry. The visit part includes visiting China Software International Company and other large software companies. The discussion part includes development prospects of software industry, personal career planning and individual learning plans.

Course Number: 0004758
Course Title: Programming Fundamental (C)
Credit: 3 **Total Credit Hours:** 48
Students: Freshman majored in Software Engineering, Digital Media
Prerequisites: None
Evaluation Method: Close book exam
Course Description:
This course is a fundamental course intended for freshman who majored in software engineering, the purpose of this course is to train students' programming and problem solving skills in C. Course Objectives include: a) The study of the C grammars, statement and flow of control and general method of programming in C. b) An introduction to data structures using C structs and pointers. c) The use of library routines and file operations using the C language.
Recommended Textbooks/References:
1. SU Xiaohong etc., C Programming – A Practical Approach for University, Publishing House of Electronic Industry, 2004
2. Brian W.Kernighan, Dennis M.Ritchie, THE C PROGRAMMING LANGUAGE (Second Edition),TsingHua University Press,1996

Course Number: **0007442**
Course Title: Object-Oriented Programming and Design
Credit: 2 **Credit hours:** 32
Learning Object: undergraduate students major in Software Engineering
Prerequisites: Programming Design Basics
Examination Form: Written Test
Course Description:
By analyzing the thought of object oriented programming and the realizing mechanism of C++ language to improve student's capability of analyzing and solving problems. In this course, students should master the basic thought, concepts and methods of object oriented programming, learn the thought of object oriented design and the realizing mechanism of C++ language, know the basic language rules of C++ and the programming technique in vision studio developing environment, can solve simple problems by using object oriented designing methods. This course including the following knowledge, the concept of object oriented Encapsulation, inheritance, polymorphism, class definition and object declaration, constructor and destructor, subclass and subtype, overloading function and function template, virtual function and pure virtual function, abstract base class, exception handling, class template and namespace, object oriented analyzing and designing methods.
Reference books:
1. TAN Haoqiang. C++ Programming Design, Beijing, Qinghua University Press. 2004
2. ZHENG Li, Dong Yuan, ZHANG Ruifeng. C++ Language Programming Design. Beijing, Qinghua University Press. 2003
3. YAO Xinyan. C/C++ Deep Discovery, People Posts and Telecommunications Press

Course Number: 0003173
Course Title: Discrete mathematics II
Credit: 3 **Total Credit Hours:** 48
Students: Software Engineering, Software Engineering (Embedded Software and Systems Specialty), specializing in Digital Media Technology, the second grade students
Prerequisites: Linear Algebra
Evaluation Method: close examination
Course Description:
Discrete mathematics is an important compulsory course for software engineering major in the universities of science and engineering. It is the study of discrete mathematical structures and is closely related to computer science theory and its practical applications. The methods of synthesis, analysis, induction, deduction, and recursion in discrete mathematics are all widely applied in computer science technology, and provide a necessary theoretical foundation for subsequent courses such as data structure, operating systems, and compilation theory. The course mainly consists of three parts: set and relation, graph theory and mathematical logic. Students are expected to maser the basic concept of set, expression of binary relation, equivalence relation, compatibility relation, partial ordering relation, definition of various graphs, Dijkstra algorithm, Euler graph, Hamilton graph, bipartite graph, planar graph, property and application of undirected tree, spanning tree, and directed tree, symbolic method of statement, rules of inference theory, and Predicate Logic.

Recommended Textbooks/References:

1. Discrete mathematics, second version, SHAO Xuecai, YE Xiuming, Electronics Industry Press, 2009.
2. Discrete mathematics, QU Wanling, GENG Suyun, ZHANG Li'ang, Higher Education Press, 2011.
3. Discrete mathematical structure, sixth version, Bernard Kolman, Robert C.Busby Higher Education Press, 2010
4. Discrete mathematics with application, kenneth h.rosen, translated by YUAN Chongyi, QU Wanling, ZHANG Guiyun, Mechanics Industry Press, 2011

Course Number: 0006207

Course Title: Data Structures and Algorithms Ⅰ

Credit: 4 **Total Credit Hours:** 64

Students: Software Engineering, Software Engineering (Software Systems), specializing in Digital Media Technology, the second grade students

Prerequisites: Object Oriented Programming, Discrete Mathematics

Evaluation Method: Written Examination

Course Description:

Courses to enable students to understand and grasp the concept of a variety of data structures and their algorithm; familiar with and understand the basic application of the commonly used data structures in many other areas of the computer; require students to grasp the skills of applied algorithm design from the interdependence between algorithms and data structures.

Specific knowledge include: representation and basic operations of linear list; representation and basic operations of tree and binary tree; representation and related algorithms of threaded binary tree, binary sorting tree, balanced tree, balanced tree and other common tree; representation, traversal and application of graph; common internal sorting methods and search algorithms; the concept of algorithm, the algorithm's time complexity and space complexity, worst and average time complexity, etc.; the methods of algorithm description and algorithm analysis; commonly used algorithms design methods: iterative method, exhaustive method, recursive algorithm, backtracking method, greedy method, divide and conquer method, and so on.

Recommended Textbooks/References:

1. YIN Renkun,Data Structure (Object-oriented Methods and C++ Language Description)(2nd Edition), Tsinghua University Press, June 2007
2. WANG Hongmei, HU MingData Structure (C++ Edition) Learning and experimental guidance, Tsinghua University Press
3. Mark Allen Weiss, translated by ZhANG Huaiyong etc.Data Structures and Algorithm Analysis in C++ (3rd Edition), Posts & Telecom Press
4. Anany Levitin, translated by Pan Yan, Introduction to the Design and Analysis of Algorithms （2ndEdition）, Tsinghua University Press

Course Number: 0006567

Course Title: Computer Organization

Credit: 3 **Total Credit Hours:** 48

Students: Sophomore majored in Software Engineering, Software Engineering (Embedded Software and System)

Prerequisites: Digital Logic Circuits

Evaluation Method: Exam

Course Description:

This is a technical fundamental course in Software Engineering major, it plays a very important role in teaching plan. The purpose of this course is to study the components of computing systems common to most computer architectures. In particular, this class is meant to introduce data representation, types of processors, memory types and hierarchy, assembly language, linking and loading, and an introduction to device drivers.

Recommended Textbooks/References:

1. Kelu Luo etc, Computer Organization, Publishing House of Electronics Industry, Aug.,2005

Course code: 0007443

Course Title: Database Principle

Credits: 4 Class hours: 64

Students: Software Engineering, Digital Media Technology the second grade students

Prerequisite: Data Structures and Algorithms

Examination form: Written Examination

Course Description:

Database Principles is the specialized required courses. Database Principles for software engineering, computer application technology professional and other relevant professional. This course is aim at helping students establish database concepts, grasping the basic principle, improving the data database application ability and ability to analyze the problems.

Through the study of this course, the students will master data model, database system structure, the relationship between the theory, the SQL language data and IBM DB2 general database application etc content, better able to data design and development, for the subsequent course of study to lay the foundation.

Recommended Textbooks/References:

1. Data model, database system structure, database system composition;
2. Relationship model, the relationship between the structure and data partition. formal definition, the integrity of the relationship, the relational algebra, calculus relationship;
3. Relational data standardization theory, paradigm, function dependent and mode decomposition
4. Database Design;
5. Database recovery technology;
6. Database concurrent control;
7. Database security;

Recommend teaching or main reference books: (including editor, teaching material name, press, publication date)

1. DB2 Universal Database Administration Workshop for Windows, IBM Certified Course Material (Course Code CF231)
2. Relational Database Design, IBM Certified Course Material (Course Code CF18)

3. DB2 Family Fundamentals, IBM Certified Course Material (Course Code CF03)
4. DB2 SQL Workshop, IBM Certified Course Material (Course Code CF12)
5. DB2 Universal Database Programming Fundamentals, IBM Certified Course Material (Course Code CF10)
6. Principle of database system tutorial. Compiled by WANG Shan, CHEN Hong. Tsinghua university press. In July 1998
7. An introduction to database system (third edition). SA Shixuan, WANG Shanhu. Higher education press. 2003.2

Course Number: 0007444
Course Title: Operating System
Credit: 4 **Total Credit Hours:** 64
Students: Software engineering undergraduate
Prerequisites: Computer Principle and Assembler Language, C Language Programming, Data Structure
Evaluation Method: Written Examination
Course Description:
Through the studying of this course, It can enable students to master and use the operating system when making resource management and scheduling of computer hardware and software commonly used concepts, methods, strategies, algorithms, and means to master the basic concepts of operating systems, the basic structure and operating environment, depth within the operating system, to understand and grasp the basic principles of operating systems, design methods and implementation techniques. Through the introduction of UNIX, to understand the general architecture of the operating system, to understand the development trend of the relevant direction (such as window systems, network operating systems, distributed systems, system security, etc.). Specific knowledge, including the concept of processes and threads, process mutual exclusion and synchronization, the process of communication, the operating system to solve the process deadlock, memory management, virtual memory implementation, management and implementation of file system, device management and I / O technology , files stored in external memory.
Recommended Textbooks/References:
1. TANG Xiaodan, etc., The Computer Operating System, Xidian University Press, 2011.8
2. CHEN Songnian, Operating System Tutorial, The Second Edition, Electronic Industry Press
3. Galvin and Gagne, Operating System Concepts – 6th Edition, Silberschatz, Jan 14, 2005

Course Number: 0000207
Course Title: Computer Networks
Number of Credits: 3
Number of Credit Hours: 48
Students: Undergraduate students in Software Engineering
Prerequisites: Computer Architecture, Operating Systems
Evaluation Method: Attendance + Projects + Final Exam

Course Introduction:

"Computer Networks" is a required course for undergraduate students in Software Engineering and introduces to the students the basic concepts, theories and methods of data communication. By taking this course, students are expected to learn the basic concepts, principles and communication technologies among which network architecture, communication protocols, local area networks and wide area networks are the main subjects of coverage. Focus of the course will be on fundamental knowledge and practical skills as well as on state-of-the-art technologies and latest development and products. After successfully completing this course, students should have a thorough understanding of the basic principles of computer networking, data communication protocols and standards, and advanced technologies to prepare the students for future study and research as well as technology development in areas related to computer communication,

Text Books and Reference Materials:

1. Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, 5th Ed., China Machines Press, 2011.

Course Number: 0003338

Course Title: Java Programming

Credit: 3 **Total Credit Hours:** 3 weeks

Students: second year

Prerequisites: Object Orientated Programming

Evaluation Method: Exam and Laboratory

Course Description: This course starts by reviewing the evolution of programming Languages and Object Oriented Programming concepts. It will then emphasize the outstanding Java features relate the basic OO concepts to related Java constructs. It will then systematically cover some core Java programming and Java framework characteristics:

1. Java Primitive types
2. Abstraction and classes, Different types of classes, abstract, interface, class members, methods, fields
3. Objects in Java and garbage collection
4. Inheritance in Java, constructors, this and super keywords
5. Namespaces, overriding, overloading and polymorphism
6. Java Containment, Arrays and Collection classes
7. Exceptions in Java
8. Java Input/Output and streams
9. Java Database Access (JDBC)
10. Java UI development and Swing Library

Recommended Textbooks/References:

1. Thinking in Java by Bruce Eckel

Course Number: 0004575

Course Title: Introduction to Software Engineering (Chinese/English)

Credit: 2 **Total Credit Hours:** 32

Students: Software engineering undergraduates
Prerequisites: Discrete mathematics
Evaluation Method: Exam
Course Description:
"Introduction to Software Engineering" is professional foundation course of software engineering. This course takes the first level discipline of software engineering as references, and builds up the course framework base on this. This course takes currently popular unified development process, object-oriented technology and Unified Modeling Language as the core of the course, and takes "software modeling and analysis", "software design", "software verification and validation", "software evolution", "software process", "software quality" and "software management" as main learning points. By using closely integrated software development, advanced technology, best practices and case studies, thoroughly explain the software engineering requirements analysis, software design, software testing and software development and management, to enable students to master in the understanding and practice on the basis of current software engineering methods, techniques and tools.
Recommended Textbooks/References:
1. Ian Sommerville. Software Engineering 8th: 2010
2. Stephen R. Schach. Object-Oriented and Classical Software Engineering. McGraw-Hill Science/Engineering/Math.2012
3. Edited by YIN Renkun, ZHENG Renjie, MA Suxia, BAI Xiaoying. Practical Software Engineering 3rd edition. Tsinghua University Press

Course Number: 0004586
Course Title: Software Architecture（Chinese/English）
Credit: 3 **Total Credit Hours: 48**
Students: Undergraduate Students for Software Engineering
Prerequisites: Fundamental Programming Techniques, Programming in C/C++/Java , Object-Oriented Design & Programming
Evaluation Method: Paper-based Exam & Course Project
Course Description:
"Software Architecture" aims to cultivate and promote the capabilities of software system design/program design, as well as capabilities of implementing complex & complicated software engineering design. The course focus on training of software engineering students for abilities on methodology of recognizing the real-world with ideas of software engineering, expression mechanism of real-world, abstract, information-hidden approaches. More specifically, the course emphasizes the cultivation of engineering design abilities, including the abilities of modular, abstraction, information hidden, logic-inference, formalized expression.
The course provides the students with fundamental concepts of software architecture; With the understanding of basic concepts of software architecture, the course enable the student to apply OOA & OOD (Object-Oriented Analysis & Design) approach to implement the design procedure and methods of software architecture. In the next, within the main-stream developing environment and platform, the student could transfer the expression of software architecture into programming coding.
With the learning of this course, the students could carry out the methodology and design

approach of using software architecture style and related elements (components, connectors, input/output module, boundary module, constraints etc.) to express the real-world. The students should be able to implement the software design approach of system-level modeling, business modeling, component-level modeling, and data/information-level modeling; Furthermore, the students should able to understand and carry out a few classic and popular software architecture styles and application, as well as software architecture's formal representation.

The course enable the students to transfer the requirement specification into software architecture, and promote the design abilities of software engineering.

The Chinese/English courses aims to enhance the building of Chinese/English course curriculum in software engineering, meet the demand of international, world-class, engineering, innovative talents with global vision, cross-culture exchange, world-class competition.

Recommended Textbooks/References:

Textbook

1. Mary Shaw,David Garlan, Software Architecture Perspectives On An Emerging Discipline(Chinese Version), LIU Zheng-Jiang, JANG Peng and JING Fu-Sheng(Translators),Tsinghua University Press,March, 2007.
2. Mary Shaw and David Garlan, Software Architecture Perspectives On An Emerging Discipline （Photocopy Version）, Science Press, 2004. □

Reference Books

1. ZHANG You-Sheng,Software Architecture (In Chinese),Tsinghua University Press,2006,11
2. Len Bass,Paul Clements and Rick Kazman, Software Architecture in Practice ,SHUN Xuetao etc. (Translators) ,Tsinghua University Press,Feb., 2003
3. Visual C ++ .NET Techniques, George Shepherd, David Kruglinski, Machinery Industry Press 2003.

Course Number: 0004581

Course Title: Software Quality Control

Credit: 2 **Total Credit Hours:** 32

Students: Software Engineering, Software Engineering (Software Systems), specializing in Digital Media Technology, the third grade students

Prerequisites: Software Engineering

Evaluation Method: Exam

Course Description:

Software quality assurance is an important part in the process of software development, playing an important role in product quality control. Currently, quality control is urgent need of software enterprise, which will give big impact on international competitiveness of China's software enterprises. Learning this course requires students understand basic concepts of software quality control, catch the basic principles and methods of modern software project control, and knowledge of software maturity model. Combining theory and practical instances, it will make students understand the necessity and methodology of applying quality control on software project, and finally learn how to construct software quality control system.

Recommended Textbooks/References:

1. Successful Project Management by Jack Geduo et al. Beijing: Machinary Publishing 1999.
2. Computer Maturity Model: Guide to Software Improvement by Software Research Institute

of Carnegie Mellon. Electronic Publishing 2001
3. Software Peocessing Quality and Control by LI Jian. Qinghua University Publishing 2006

Course Number: 0004577
Course Title: Software Test
Credit: 2 **Total Credit Hours:** 32
Students: The third grade students of Software Engineering
Prerequisites: Software engineering
Evaluation Method: Exam
Course Description:
Software Test is a core course of Software engineering with high requirement of practical ability and Engineering practice, belongs to the professional course. It occupies an important position and core role in software engineering undergraduate professional cultivation system.
The aim of this course is to develop high quality, professional test talent, let the student to have a complete understanding and overall grasp of software quality. The content is systemic, practical and normative, that makes the students master the basic concepts of software test., grasp the testing method of whole software life cycle, master software quality measurement and evaluation method, grasp the general flow of software testing, common technology and major method. As well as the knowledge of how to set up test environment, design test cases, and writing test documentation, use test tools, so that to equip students with the basic capabilities of the testing techniques and test management, and able to independently undertake the implementation of the test items.
Recommended Textbooks/References:
1. CAI Jianping. Software testing of University Beijing: Tsinghua University press. 2009 .09
2. CAI Jianping .Software testing experiment guidance. Beijing: Tsinghua University press. 2009 .11
3. Ron Patton. Software testing. Beijing : China Machine Press.2002.07

Course Number: 0007455
Course Title: Development of Mobile Application
Credit: 2 **Total Credit Hours:** 32
Students: Software Engineering major undergraduates
Prerequisites: Computer software, Operating system
Evaluation Method: 60% Class Laboratory + 40% final term programs, final term programs are evaluated by program presentation and defense
Course Description:
Development of mobile application is a free elective for software engineering major and a practical course for undergraduates and graduates in software engineering and computer major. This course enables students to master the basic skills of development, deepen the understanding of the basic theory of wireless network and embedded equipment and gives students a solid foundation to get involved in this active field. The teaching of this course is based on Android, a

mainstream mobile platform operating system, so that the students can soon master the basic properties, procedures and methods of developing mobile software. Through the teaching program and case-based studies, the course enhances students' ability in developing mobile software and solving problems, and encourages innovation. The students are required to master the basics of Android system, program designing, development of user interface, data storage, network and communication, graph and multi-media, and Google API.

Recommended Textbooks/References:

1. Pro Android 2,Sayed Y. Hashimi, Satya Komatinen,Dave MacLean,t ranslated by Yang Yue, Posts and Telecom Press,2010
2. Professional. Android.2.Application.Development (Second version) , Reto Meier,translated by Wang Chao, Qinghua University Press, 2010
3. Beginning.Android.2, Mark L.Murphy, translated by WU Minghui, LI Xuefei, Posts and Telecom Press, 2010
4. Hello, Android: Introducing Google's Mobile Development Platform: third version Ed Burnette, translated by TIAN Junjing, ZHANG Bo, HUANG Xiangqing, Posts and Telecom Press 2010

Course Number: 0006571

Course Title: Web Middleware Technologies

Credit: 3 **Total Credit Hours: 48**

Students: Undergraduate Students for Software Engineering

Prerequisites: Fundamental Programming Techniques, Programming in Java, Object-Oriented Design & Programming, Software Architecture

Evaluation Method: Paper-based Exam & Course Project

Course Description:

J2EE (Java 2 Enterprise Edition) Middleware Techniques are the most popular and widely-used software architecture framework and specification for developing distributed enterprise-level systems/applications. Web Middleware Technologies provide the standard and specification of distributed software application patterns with the characteristics of multi-tiers, componentized, middleware containers and communication mechanism, based on Java development language.

The course covers the basic concepts, patterns, core frameworks, methodologies, and techniques essential to successfully developing software within J2EE development environment. The course's emphasis is about the concepts of J2EE's middleware (Web Containers, EJB Containers), methodologies of J2EE design & strategies, as well as Servlet, JSP, EJB, JDBC, JMS, JNDI techniques. From the perspective of engineering implementation, the course offer the students capabilities training and cultivating of all-life cycle of software system/application development, with design, developing, coding, compiling, deploying approach.

Recommended Textbooks/References:

Textbook:

1. HAO Yu-long, JIANG Hua, Programming in J2EE Techniques(In Chinese),Tsinghua University Press & Beijing Transportation University Press, May,2005.
2. Paul J. Perrone, Venkata S. R. R. Chaganti, Tom Schwenk（Authors）, LIU Wenhong, LUO YouPing （Translators）,J2EE Developer's Handbooks(In Chinese),Electronic Industry Press, 2004

3. Paul J. Perrone, Venkata S. R. R. Chaganti, Tom Schwenk,J2EE Developer's Handbook, Sams Publiser, 2003

Reference Books:

1. Deepak Alur, John Crupi, Dan Malks（Authors, LIU Tian-Bai, XIONG Jie （Translators）, J2EE Core Patterns, Machinery Industry Press,2005
2. Berry (Authors),QIU Zhong-Fan(Translator),J2EE Design Patterns Applied, Electronic Industry Press,2003
3. Eric Jendrock, Jennifer Ball, Debbie Carson, Ian Evans, Scott Fordin, Kim Haase, The Java™ EE 5 Tutorial, Third Edition: For Sun Java System Application Server Platform Edition, Addison Wesley Professional,2006

Course Number: 0007833

Course Title: Principles of Compiling

Credit: 3 **Total Credit Hours:** 48

Students: The third grade students of Software Engineering

Prerequisites: Advanced Programming Language, Data structures

Evaluation Method: Exam

Course Description:

Principles of Compiling is one of basic courses of Software Engineering. This course teaches students theories and technologies about programming languages and language processing software, and thus develops students' abilities to analyze systems and to design software by computer language processing techniques.

Concepts and methods of grammatical analysis, grammar guided translation which is based on attribute grammars and compiler automatically generating technology will be highlighted. By this the course emphasizes gradually designing and implementing compilation system based on theories of formal languages. Eventually students would be familiar with compiler construction principles that are based on formal language theories and implementation principles of advanced languages, fully grasp computer language processing techniques such as lexical analysis, syntax analysis and grammar guided translation etc, understand implementations of various components in advanced languages and master varieties of general analysis methods and translation technologies in computer language processing system and the uses of automatically generating systems.

Recommended Textbooks/References:

1. Principles of Compiler by JIANG Zongli. Beijing: Academic Publishing 2010.02
2. Principles of Compiler of programming language by CHEN Hongwang ect. national defence industrial press 2001.08
3. Compiler construction : principles and practice by Kenneth C Louden 2004.02

Course Number: 0003677

Course Title: Introduction to Information Security (Chinese/English)

Credits: 2 **Total Credit Hours:** 32

Students: Undergraduate students in Software Engineering and those in Software Engineering

(Embedded Software and Systems Specialty)
Prerequisites: Computer Networks, Operating Systems
Evaluation Method: Attendance + Projects + Final Exam
Course Introduction:
"Introduction to Information Security" is a technical course for undergraduate students in the major field of Software Engineering and introduces to the students the basic concepts and principles as well as technical skills in information security and privacy so as to prepare the students for future study and research in related areas of information technology. In addition to learning technical knowledge through attending classroom lectures, students are required to complete two course projects to help them in mastering the knowledge and the skills. This course has been approved by the Education of Ministry of China as a National Model Course for Chinese/English Teaching. Consequently, most of the course materials will be in English with some Chinese reference books and articles. Classroom teaching will also be conducted in English to enhance the students' skills in using English as a tool for learning technical knowledge as well as for conducting communication.
The content of this course includes: overview of information security, security models and policies, cryptography and key management, identification and authentication, access control mechanisms, information flow analysis, assurance models and methods, auditing, system security evaluation and network security.
Test Books and References Materials:
1. Matt Bishop, Computer Security: Art and Science, Tsinghua University Press, 2004.
2. HE Jingsha et al., Introduction to Information Security, China Machine Press, 2012.

Course Number: 0007461
Course Title: Software Requirement Engineering and UML
Credit: 2 **Total Credit Hours:** 32
Students: Software engineering undergraduates
Prerequisites: Introduction to software engineering
Evaluation Method: exams
Course Description:
Software requirements engineering and UML is a professional software engineering courses. This course is the source of an important position in the software development process. Requirement is an important basis for project solutions and project planning, who will be engaged in software development phase of the work are required to have knowledge of the system requirements engineering, which is essential for the success or failure of software projects; student learning through the process, should reach the following objectives:
(1) In-depth understanding of the definition of requirement, the importance of requirement, requirement in the entire software process, and relationships with other processes, and requirement-related factors; (2) master the requirements elicitation, requirements analysis and demand management understanding of industry best practices, understand and be able to use the correct and proper process, be able to requirement process combination of process and project definition process; (3) the preparation of master requirements specification and requirements review and confirmation.
Recommended Textbooks/References:

1. Suzanne Robertson. Mastering the Requirements Process (2nd Edition) . Addison-Wesley Professional. 2003

Course Number: 0003781
Course Title: Software Project Management
Credit: 2 **Total Credit Hours:** 32
Students: Undergraduate students major in Software Engineering
Prerequisites: Software engineering, Mathematics, Fundamentals of Management
Evaluation Method: Written Exam
Course Description:
The fundamental goal of software project management is to make software projects under the control of the managers and delivered to users at a predetermined cost, schedule and quality. We can sum up the general principles and methods that can guide future development from existing successful or failed cases by researching software project management. This course, which is an important part of the combination of technology and management of software engineering personnel training, is limitedly elective for undergraduates majored in Software Engineering. The main goal of the course is to teach software project management theory and methods. Students should understand the basic knowledge of software project management and acquire a certain software project management practice capacity by learning through this course. We focus on requiring students to master making plans for software projects and be able to apply the learned knowledge to solve real problems.
Recommended Textbooks/References:
1. HAN Wanjiang, JIANG Lixin. Software project management case tutorial (second Edition). China Machine Press,2009

Course Number: 0007462
Course Title: Multimedia Technology
Credit: 2 **Total Credit Hours:** 32
Students: The third grade students of Software engineering or Software engineering for Embedded Software and System
Prerequisites: Object-Oriented Programming and Design, Data Structures and Algorithms, Computer Network, Principles of computer composition
Evaluation Method: Exam
Course Description:
Nowadays with the development of computer industry, Multimedia technology and its applications become a new field of it. Multimedia technology is a technology applying computer for processing sounds, text, images and video and other multi-media.
The purpose of this course is to make students learn more about multimedia knowledge and its development trend and, moreover, more systematic study and grasp various applications of multimedia technology in both hardware and software, so as possess the ability to use common multimedia peripherals and design and develop multimedia material.
The task of the course is to explain the function ,type and its application of multimedia peripherals

combining the examples by multimedia; to use corresponding multimedia editing tools design multimedia material; integration of material, and development of multimedia applications; in addition, compressing/decompressing basic techniques of multimedia material for further study.

Through the course, students can understand the development trend of multimedia computer, master the basic theory of multimedia computer knowledge, familiar with the field of multimedia computer applications, so that students can possess basic capabilities of multimedia design and development of computer hardware and software system.

Recommended Textbooks/References:

1. LI Weicai. Basics of Multimedia Programming. TSINGHUA UNIVERSITY PRESS,2009.9
2. LIN Fuzong Basics of Multimedia Programming(vision 3).TSINGHUA UNIVERSITY PRESS,2009.1
3. LI ZeNian, Mark S. Drew. Fundamentals of multimedia. Beijing : China Machine Press, 2007

Course Number: 0007469

Course Title: Electronic service engineering and Application

Credits: 2 **Total Credit Hours:** 32

Students:: The computer kind professional undergraduate students

Prerequisite: Introduction to Software Engineering, Software Architecture

Evaluation Method: (open book, the comparative economics, written examination + experiment, in writing papers, completed the design of experiments, etc) complete analysis report

Course Description:

Electronic service engineering and Application is a software engineering direction for the professional elective course. This course mainly from the face of the system architecture of service, introduced the basic concept of service, on the basis of understanding the electronic service project status and development trend, relate SaaS, SOA, cloud computing and networking, system technology and things related domain knowledge. This course covers with two aspects: engineering application of e-government and e-commerce. The course includes the general structure, the corresponding technical framework, the development, and the key technology, solutions, etc.

This course uses classroom lectures, a combination of classroom discussions and after-school design. Require students to study the theoretical knowledge of combining with practice, improve the students to understand and use of the electronic service.

Recommend teaching or main reference books: (including editor, teaching material name, press, publication date)

1. “The national information security engineering technology research center”. The electronic government affairs overall design and technical realization, electronic industry press, 2003
2. WANG Yukai; ZHAO Guojun. “Electronic government affairs basis”. China’s soft electronic publishing house, 2002
3. ZHANG Yaoguo. “Electronic government affairs basis and application”. Beijing university press, 2002
4. EFRAIM TURBAN,JAE LEE,DAVID KING. “The electronic commerce--management perspective (copy edition)”. China high education press, 2001
5. (USA)GARY P.S CHNEIDER.” E-commerce”. CHENG Dong; HAN Tingting. The books

the fourth edition. Mechanical industry press, 2004
6. QIN Zheng; LIU Xiaoyan; WANG Lirong; HUANG Long; YANG Bo. Analysis of E-Commerce Cases. Xi'an Jiaotong University Press,2001
7. (USA)BRENDA KIENAN. Electronic business management practice. Health lotus science and technology. Tsinghua University Press,2002
8. ZHAO Lindu. E-commerce theory and practice. People's posts and telecommunications publishing house,2002
9. (USA)RYAN RUSSELL etc.. E-commerce site hackers prevention. Wisdom east studio. Mechanical industry press, 2002

Course Number: 0007155
Course Title: Cognition Practice
Credit: 1 **Total Credit Hours:** 30
Students: undergraduates of Software Engineering specialty
Prerequisites:
Evaluation Method:
The contents of the assessment: the practice is assessed through the paper.
The grading method:
Paper: the paper submitted after the practice should be more than 2000 words. It is 80% of the total score.
Attendance: it is 20% of the total score.
Course Description:
The course, though industry introduction, technical lecture and company visit, helps students to recognize the status and development of the related fields of software engineering and software industries, understand the status and development trend of the software industries, the content and function of software engineering, the curriculum of software engineering specialty, the function of all courses in practical work, the work environment and daily work content of typical software companies, initially establish the career planning of software industries. The course has three parts: the lecture part includes the overview about the software industry, the software industry segments and the emerging information technology, the demand and requirement for talent in software industry. The visit part includes visiting China Software International Company and other large software companies. The discussion part includes development prospects of software industry, personal career planning and individual learning plans.

Course Number: 0006384
Course Title: Programming Design Course Project
Credit: 2 **Total Credit Hours:** 60
Students: Freshman majored in Software Engineering
Prerequisites: Programming Fundamental
Evaluation Method: Project
Course Description:
This course is a fundamental course intended for freshman who majored in software engineering,

the purpose of this course is to train students' programming and problem solving skills in C by more than 30 all kinds of problems and projects.

Recommended Textbooks/References:

1. SU Xiaohong etc., C Programming – A Practical Approach for University,Publishing House of Electronic Industry ,2004
2. Brian W.Kernighan, Dennis M.Ritchie, THE C Programming Language (Second Edition),TsingHua University Press,1996

Course Number: 0007445

Course Title: Object-Oriented Programming Course Design

Credit: 3 **Total Credit Hours:** 90

Students: Freshman majored in Software Engineering, Digital Media

Prerequisites: Object-Oriented Programming Design

Evaluation Method:

1. Assessment content

The practical link is assessed through demonstrations and papers review. It is required that each student should accomplish two small-scale projects, stocks data inspecting system and instant messaging system, and submit a corresponding practical paper after the practice.

2. Achievement evaluation

The stocks data inspecting system is demonstrated by the student, and is given a score after review, which is about 30% of the total score.

The instant messaging system is demonstrated by the student, and is given a score after review, which is about 30% of the total score.

The practical paper containing more than 1000 words is given a score after review, which is about 20% of the total score.

The attendance is given a score, which is about 20% of the total score.

Course Description:

Based on lots of case analysis, this practical link is mainly focus on the project development of stocks data inspecting system and instant messaging system. It requires that each student should complete the tasks on system design and program coding on his/her own work, after mastering the basic knowledge and skills of project development. This practical link is comprised of three parts as follows:

The C++ programming includes: memory management; efficient operations on arrays and strings; objects' creation, destroy, copy, assignment, parameter passing and return; basic data structures; and basic sorting and search algorithms.

The VC++ programming includes: MFC classes and object hierarchical structures; MFC SDI application frameworks; MFC dialog programming frameworks; message passing mechanisms; GDI drawing; files I/O; multithread; and network programming.

The project practice includes independently programming of stocks data inspecting system and LAN instant messaging system.

Recommended Textbooks/References:

1. TAN Haoqiang C++ program design. Beijing: Tsinghua University Press. 2004.
2. LI Zheng, YUAN Dong, ZHANG Fengrui C++ program design 3rd. Beijing: Tsinghua University Press. 2003.

3. YAO Xinyan. Further study on C/C++. Posts and Telecommunications Press. 1999.

Course Number: 0009048
Course Title: Data Structures and Algorithms Course Design
Credit: 2 **Total Credit Hours:** 60
Students: Software Engineering Undergraduate
Prerequisites: Data Structures and Algorithms
Evaluation Method: Final Score = Design Report（30%）+Design Effect（40%）+ Acceptance of Defense（30%）
Course Description:
Data Structure Course Design require students can apply in specific applications and achieve a variety of different operations of a variety of data, based on a variety of data structures and their sequential and linked storage. Based on the selected issues, require students to analyze design ideas, select the data structure, establish the algorithm process, program and debug to get the results. Familiar with the process of software development and initially learn the basic tasks and skills of each stage of the software development process; foster students' capabilities of algorithm design and algorithm analysis; improve the competence in independent analysis and solving problems by using learned theoretical knowledge and methods; train software development by using component system point of view and software development general specifications; cultivate the scientific methods and style of work and spirit of cooperation which software workers should have.
Recommended Textbooks/References:
1. YIN Renkun, Data Structure (Object-oriented Methods and C++ Language Description)(2nd Edition), Tsinghua University Press, June 2007
2. WANG Hongmei, HU MingData Structure (C++ Edition) Learning and experimental guidance, Tsinghua University Press
3. Mark Allen Weiss, translated by ZHANG Huaiyong etc.Data Structures and Algorithm Analysis in C++ (3rd Edition), Posts & Telecom Press
4. Anany Levitin, translated by PAN YanIntroduction to the Design and Analysis of Algorithms（2nd Edition）, Tsinghua University Press

Course Number: 0007760
Course Title: .Net software Development (self-Learning)
Credit: 1.5 **Total Credit Hours:** 45
Students: undergraduates of Software Engineering specialty
Prerequisites: Object-oriented Programming Design, Operating System, Data Structure
Evaluation Method: practice and reply
Course Description:
The course, with the main line of a small .NET project, supported by a large number of case studies, requires students to understand the knowledge and skills of the project, and then independently complete the design and programming work. This session requires students to achieve the following effects:

(1) Skillfully grasp the C# object-oriented programming techniques, (2) grasp WinForm desktop application programming techniques under the environment of Visual C#, (3) grasp debugging and troubleshooting techniques of C# program and accumulate more than 2000 lines of code.

The course has two parts. The theoretical part includes the basic syntax of C#, the overview of .NET framework, and the basic programming skills of WinForm. The practice part includes independently completing small WinForm Explorer software.

Recommended Textbooks/References:

1. Christian Nagel Bill Evjen Jay Glynn, C# Advanced Programming, Tsinghua University Press, 2010.
2. QIAN Xiao, LI Huijian, LI Jizhe, C# Winform Practical Development Tutorials, Water Resources and Hydropower Press, 2010.

Course Number: 0007448

Course Title: Java Course Design

Credit: 3 **Total Credit Hours:** 90

Students: Software engineering undergraduate

Prerequisites: Java Programs Design

Evaluation Method:

1. Assessment content

The practical link is assessed through demonstrations and papers review. It is required that each student should accomplish the design of multimedia instant messaging system during the practice, and submit a corresponding practical paper after the practice.

2. Achievement evaluation

The multimedia instant messaging system is demonstrated by the student, and is given a score after review, which is about 60% of the total score.

The practical paper containing more than 1000 words is given a score after review, which is about 20% of the total score.

The attendance is given a score, which is about 20% of the total score.

Course Description:

Based on lots of case analysis, this practical link is mainly focus on multimedia instant messaging systems. It requires that each student should work in pairs, and complete the tasks on requirement analysis, system design, and program coding and testing after mastering the basic knowledge and skills of project development. Through pairs work, each student should learn a certain cooperation, communication and document writing skills, and the final codes should be more than 4000 lines.

The Java programming includes I/O operations, Swing, network programming, multithread programming, and international/local programming.

The project practice requires the implementation of multimedia instant messaging systems and its corresponding documents. The functions should contain files transfer and video transmission, and other optional functions such as audio/video synchronous transmission, video encoding and decoding and so on.

Course Number: 0007449

Course Title: Networking programming I
Credit: 2 **Total Credit Hours:** 48
Students: Software Engineering major undergraduates
Prerequisites: Computer Network, Operating System
Evaluation Method: 50% close written examination + 40% laboratory + 10% class performance
Course Description:
This course is a practical course for software engineering major. The course mainly includes the algorithm of sequence or concurrent realization of applications so that the students can understand the design, construction and optimization of network application software. This course mainly introduces the design, development and optimization of network application software based on Linux operating system and socket API. These are the foundation of development of various network servers. Through this course the students can understand the client/server computing mode, comprehend the application program interface to foundation protocol software, master the basic algorithm of realizing the client and server software, and construct the distributed applications based TCP/IP protocol stack. The course requires the students to master the basic algorithm of server design, and be able to realize the concurrent server with multi-process, multi-thread, or single process multiple I/O.
Recommended Textbooks/References:
1. Douglas E. Comer David L. Stevens, Internetworking with TCP/IP volume 3: client-server programming and applications Linux/POSIX sockets version, Posts and Telecom Press,2002
2. Unix Network Programming, Volume 1: The Sockets Networking API (3rd Edition),w. richard stevens;bill fenner;andrew m. rudoff, Posts and Telecom Press, 2010
3. UNIX Network Programming, Volume 2: Interprocess Communications (2nd Edition),w. , richard stevens, Posts and Telecom Press,2010-07-01
4. Linux Socket Programming be example,translated by ZHAN Jungu, YU Wei, Xidian University Press,2002-1-1

Course Number: 0007452
Course Title: Integrated Development Course Design
Credit: 2 **Total Credit Hours:** two weeks
Students: undergraduates of Software Engineering specialty
Prerequisites: Software Engineering
Evaluation Method:
1. The contents of the assessment: the practice is assessed through reviewing and the paper. During the practice, the students must complete the multimedia instant communication project and then submit a practical paper.
2. The grading method:
Collaborative office system: the system, demonstrating by the student, is 60% of the total score.
Paper: the technical paper submitted after the practice should be more than 1000 words. It is 20% of the total score.
Attendance: it is 20% of the total score.
Course Description:
The course, with the main line of a small and medium-sized project, supported by a large number of case studies, requires students to complete the collaborative office system through the two

twinning fashion on the basis of understanding the knowledge and skills of the project. It includes the requirement analysis, designing, coding and testing. The requirement analysis phase includes addressing the project requirements, analyzing the requirements, documentation, reviewing the requirements and other related work. The designing phase includes designing prototype and database, reviewing the prototype designation. The related work includes thorough B/S structural project development process, Java EE development framework, the modeling, development management and maintenance of database, the designation, development and deployment of web site. The length of the code should be more than 3000 lines. The practice includes modeling database, analyzing the station organization and structure, the technical seminars about commonly used Java EE components, professionalism and professional habits of software engineers.

Recommended Textbooks/References:

1. Ian Sommerville, Software Engineering 8th, Mechanical Industry Press.
2. Stephen R. Schach, Object-Oriented Classical Software Engineering 8th, Mechanical Industry Press.
3. YIN Renkun, ZHENG Renjie, MA Suxia, MA Xiaoying, Practical Software Engineering 3rd, Tsinghua University Press.

Course Code: 0007761

Course Name: XML Application Programming（Self-learning）

Credit: 2 **Class hours:** 48

Students: Software engineering for the third grade students

Prerequisite: Introductory programming

Examination form: written examination

Course introduction: （250-300words）

With the rapid development of global information, computer technology and communication technology mutual fusion penetration, produce the XML standard, and solve the network environment of the data and the problem of communication between computer information. XML also become increasingly powerful e-commerce operations basis. Society is also pressing need a lot of master XML, etc of computer network system planning, design, construction and operation maintenance technicians, Open this course is to meet the social demand for computer network talents, to strengthen the students' practical ability.

The course is practice elective course,The main purpose is to develop the information technology application type of students' practice ability. Through the course of study, Students understand and grasp the basic XML syntax and related programming knowledge, including DTD, CSS, XSL, XPath etc. And can write simple XML document and solve the problem of the preliminary engineering application.

Recommend teaching or main reference books:

1. FAN LiFeng, the XML practical course, people's post and press, 2009.4
2. WANG ZhenJiang MA Hong. The XML basis and practical teaching ", Tsinghua University Press, 2011.10
3. (USA)Mitch Amiano ,Conrad D'Cruz,The XML case analysis course, Tsinghua University Press, 2007.11

Course Number: 0004578
Course Title: Software Test Course Design
Credit:2 **Total Credit Hours:**60
Students: The third grade students of Software Engineering
Prerequisites: Software Engineering
Evaluation Method: Experiment Report and PPT of Presentation
Course Description:
The content of this course contains open source software test tools as the main means testing, aiding by mainstream commercial tool, and carrying out the code analysis, unit test, system test, software quality evaluation and test management experiment. The course ask each students to write a summary report of required testing tasks test by test tools , and to do multimedia presentation in the class.
Through the practice of the course and examination, students will grasp methods and skills of application of software test, develop students' ability of finishing the actual task by various test tools, teamwork, communication skills, report writing and writing skills, as well as multimedia production and oral**.**
Recommended Textbooks/References:
1. CAI Jianping. Software testing of University. Beijing: Tsinghua University press. 2009 .09
2. CAI Jianping .Software testing experiment guidance. Beijing: Tsinghua University press. 2009 .11
3. Ron Patton. Software testing. Beijing : China Machine Press.2002.07

Course Number: 0007453
Course Title: Software Engineering Integrated Practice
Credit: 3 **Total Credit Hours:** 90
Students: The third grade students of Software Engineering
Prerequisites: Requirements Engineering and UML, Software Project Management, Software Process Quality Control, Software Testing
Evaluation Method:
1. Assessment content
The practical link is assessed after the reviews of the four stages in team works, including requirement analysis, prototype design, system design, and final submission. It is required that each student must submit a practical paper after the development.
2. Achievement evaluation
- Team score is the sum of the review scores on requirement analysis, prototype design, system design, and final submission.
- Individual score is given by the team leader of each group.
- The paper score is about 20% of the total score, after submitting a paper with more than 2000 words.
- Attendance is given a score, which is about 20% of the total score.
- Total score = team score*0.4 + individual score*0.2 + paper score*0.2+ attendance score*0.2.

Course Description:
This practical link is mainly focus on the development of a middle-scale project, and requires that

the simulation of a whole life cycle on logistics distribution system software is completed under the standards and requirements of software engineering in a six-member team work, including project establishment, team building, requirement analysis, prototype design, system design, software developing, testing, submitting, and archiving. Each student should master RUP and MSF software process, project management methods over a small-scale team, and establishments of project plans, know the roles and labor division in a complete project team, and develop a good team communication and cooperation capability. Requirement analysis includes requirement extraction and refining, case design, requirement document, requirement evaluation, etc. Software design includes user operation stream design, user operation UI design, prototype design evaluation, traffic modeling, object-oriented analysis and design, database design, system architecture design, etc.

Recommended Textbooks/References:

1. Ian Sommerville. Software Engineering 8th: Mechanical Industry Press. 2010.
2. Stephen R. Schach. Software Engineering: Object-Orientied and Traditional Methods. Mechanical Industry Press. 2012.
3. YIN Renkun, ZHENG Renjie, MA Suxia, BAI Xiaoying Practical Software Engineering 3rd. Tsinghua University Press.

Course Number: 0007454

Course Title: Enterprise Practical Training

Credit: 1 **Total Credit Hours:** 150

Students: Software Engineering the fourth grade students

Prerequisites:

Evaluation Method:

1. Assessment content

The practical link is assessed after the reviews of the two stages in team works, including system development and final submission.

2. Achievement evaluation

- Team score is the sum of the review scores on system development and final submission.
- Individual score is given by the team leader of each group.
- Attendance is given a score, which is about 20% of the total score.
- Total score = team score*0.5 + individual score*0.3 + attendance score*0.2.

Course Description:

This practical link is mainly focus on the development of large-or-middle-scale project, and requires that the whole process of a project is completed, including requirement analysis, prototype design, system design, software developing, testing, submitting, and archiving. Each student should deftly use the methods and tools of software engineering to develop an actual project, and master the architecture design of a complicated large-or-middle-scale project. In the project development, each student should study and apply some high and new technology, and develop a good occupational quality and habit according to the enterprise standard. This practical link is comprised of two parts as follows. The first part is high and new technology including SSH architecture, EJB, and Android application development; and the other part is project practice in a six-member team work, including the simulation of a whole life cycle on logistics-distribution/service-preparation system software, and the completion of tasks on system

design, software developing, testing, and submitting stages.

Course Number: 0006456
Course Title: Enterprise Practical Training
Credit: 1 **Total Credit Hours:** 150
Students: Software Engineering the fourth grade students
Prerequisites:
Evaluation Method:
Graduation design (Thesis) of the scores according to percentile (excellent (100-90), good (89-80), medium (79-70), (69-60), pass failed), take the "structure" of performance comprehensive evaluation. "Structure" by teacher ratings, marking the score, the respondent group score composition, the three part of the ratio of 2:3:5.
Results: reply by the respondent group evaluation, comprehensive validation by the defence committee.
Course Description:
Graduation design is a training program of a necessary teaching link, is to achieve the training objective of undergraduate education important component. Graduation design is to train students to link theory with practice, comprehensive use of the knowledge, improve the independent analysis, the ability to solve problems by a professional and technical and scientific research basic training; through graduation design allows each student under the guidance of teachers, independently completed a tas, is a comprehensive application the professional school (basic) knowledge of the exercise, independent completion of certain technical work; to foster and improve students' ability to work independently, the software project system analysis, design, development, testing, maintenance and other work capacity.

Course Number: 0007757
Course Title: Multimedia Technology Course Design
Credit: 2 **Total Credit Hours:** 60
Students: undergraduates of Software Engineering
Prerequisites: Object-Oriented Programming and Design, Data Structures and Algorithms, Computer Network, Principles of computer composition
Evaluation Method: Experiment Report and PPT of Presentation
Course Description:
The course requests students to learn the common use of multimedia software, acquisition and processing of audio and video data, format conversion of image processing and image file, 2D and 3D animation, the use of multimedia writing tools, applications of interactive multimedia software of hypertext and hypermedia, development of web page with Flash and multimedia network communication; To be able to use Visual C++ to read and show digital image file, and simple design of multimedia program. Through experiments students can better grasp the course contents of the multimedia technology, be able to do presentation of multimedia in the classroom.
Through the practice of the course and examination, students will grasp methods and skills of application of multimedia technology, develop students' ability of multimedia applications design

by various multimedia technology, teamwork, communication skills, report writing and writing skills, as well as multimedia production and oral**.**

Recommended Textbooks/References:

1. LI Weicai. Basics of Multimedia Programming. TSINGHUA UNIVERSITY PRESS,2009.9
2. LIN Fuzong. Basics of Multimedia Programming(vision 3).TSINGHUA UNIVERSITY PRESS,2009.1
3. LI Zenian, Mark S. Drew. Fundamentals of multimedia. Beijing : China Machine Press, 2007

Course Number: 0007758

Course Title: Network Engineering and Management Course Design

Credit: 2 **Total Credit Hours:** 48

Students: Software Engineering Major Undergraduates

Prerequisites: computer network, operating system

Evaluation Method: 50% written examination (close) + 40% laboratory + 10% class performance

Course Description:

This course is a practical course for software engineering major. Based on the knowledge taught in courses about network architecture, the course includes a large amount of laboratory work about the installation of network equipments such as router, switch and firewall, thereby deepening students' understanding of the working mechanism of TCP/IP and OSI model and enhancing students' perceptual knowledge and practical experience of network. The course is laboratory-oriented, aiming to foster the students' practical skills and ability in applying theoretical knowledge to application. Through this course the students can learn the usage of main-stream network equipments and cultivate a sense of team work. The course curriculum includes the making of network cable, routing protocols installation, DNS setting-up, access control list setting-up, VLAN installation and related setting-ups of routers and switch.

Recommended Textbooks/References:

1. Cisco networking academy program, Cisco Systems Company, Posts and Telecom Press, 2004,7
2. Cisco networking academy program CCNA.1, Wendell Odom,Thomas Knott, translated by Cisco networking academy, Posts and Telecom Press, 2008, 2

Course Number: 0006565

Course Title: Introduction to Computer Science

Credit: 2 **Total Credit Hours**: 32

Students: First-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: None

Evaluation Method: Report + lectures + written test

Course Description:

This is the first professional computer course for the students to learn. It is designed to enable the students to have a comprehensive understanding of the expertise, the latest developments and applications in the field of computer. The main contents include computer basics, computer

architecture, operating system, network computing, program design and algorithm analysis, information systems, databases, software engineering, multimedia, intelligent systems, information security as well as IT-related social humanistic knowledge. It aims to enable students to understand the background, definition, content and meaning of the computer science and technical methodology; master the basic content of the main fields of computer science as well as the curriculum provision, the core concepts of computing disciplines, mathematical methods, systematic and scientific methods, social and career problems, etc. to provide methods for correct understanding of computer courses and lay a foundation for future learning of computer courses. Through the course learning, the students will have a basic idea of the main knowledge and professional courses they are going to learn in the future to establish a basic knowledge framework for the follow-up courses and lay a foundation for the mastering of professional knowledge and scientific research.

Recommended textbook or main references:

1. "Introduction to Computer Application" WANG Quanmin, China Railway Publishing House 2011
2. "Introduction to Computer Science" (second edition), 【USA】Firouz Mosharraf, translated by Liu Yi etc, China Machine Press, 2009
3. "Overview of Computer Science" (10th Edition), 【USA】J. Glenn Brookshear, translated by Liu Yi, etc; Post & Telecom Press, 2009
4. " Introduction to Computer Science" (Third Edition), WANG Yulong, etc, Publishing House of Electronics Industry, 2009
5. "Introduction to Computer Science -- Thoughts and Methods", DONG Rongsheng, Higher Education Press, 2007

Course Number: 0007078

Course Title: Freshmen Seminar Course

Credit: 1 **Total Credit Hours**: 16

Students: First-year undergraduates majoring in Software Engineering (embedded software and systems)

Prerequisite: None

Evaluation Method: General assessment

Course Description:

The main purpose is to enable the freshmen to understand the professional course and adapt themselves to college study. As for professional knowledge, a few seminars will be held to enable the students to understand the course of embedded system and its future development, develop the innovation consciousness and ability of the students and make them love the professional course and willing to dedicate for it. Through discussing the cutting-edge scientific research and technology in the field of embedded system, paying attention to the philosophy and interestingness, the course aims to mobilize the freshmen's curiosity and interest for study. Meanwhile, it guides the freshmen to understand the future development of the course and learn new study methods to adapt to the university study and helps the freshmen to set their learning goals.

Course Number: 0009054

Course Title: High Language Programming III

Credit: 4 **Total Credit Hours:** 64

Students: First-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: None

Evaluation Method: Final score is composed of the score of written test, computer exam and project work based on a certain proportion

Course Description:

This is a public basic required course for undergraduates majoring in computer science and technology, information security and Internet of Things Engineering. It is the first and a major high-level language programming course for the students to have a systematic study and a required basic course for follow-up course learning. It is designed to enable the students to understand and master the basic concepts, basic methods and skills of high-level language programming, enable the students to provide solutions to simple problems with C language and initially establish the calculation mode of thinking of the students. The teacher should enable the students to understand the methods for structured programming, train the students to master the basic skills for program writing and debugging, standardize coding habits and stimulate students' interest in learning programming. The course emphasizes the development of comprehensive ability of the students.

Recommended textbooks or main references: (including the name of editor in chief, textbooks, publishing house and publication date)

1. LIAO Husheng, YE Naiwen and Zhou Jun, Case Tutorial of C Language Programming (2nd Edition), Post & Telecom Press, September 2010
2. LI Wenxin, etc, Programming Guidance and Online Practice, Tsinghua University Press, July 2007
3. (US) Brian W.Kernighan, Dennis M.Ritchie, C Programming Language (English) (2nd Edition) China Machine Press, August 2006
4. P.J. Deitel and H.M.Deitel, University Tutorial for C Programming Tutorial (5th Edition) (English), Publishing, House of Electronics Industry, May 2010

Course Number: 0003173

Course Title: Discrete Mathematics II

Credit: 3 **Total Credit Hours:** 48

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Linear algebra

Evaluation Method: Exam

Course Description:

As a compulsory important professional basic course for the students from science and engineering colleges and universities majoring in software engineering, discrete mathematics is a mathematics course focusing on the study of discrete structure, and is closely linked to theoretical computer science and applied technology. The integration, analysis, summarizing and interpretation methods used in discrete mathematics are widely applied in computer science and

technology and are necessary theoretical preparation for subsequent courses such as data structures, operating systems and compiler theory. The course is mainly composed of three parts, namely collections and relationships, graph theory and mathematical logic. The knowledge required to be mastered include: the basic concept of collection, representation of binary relations, the concepts of equivalence relations, compatibility relations and partial order relationship, the definitions of various graphs, the properties and applications of Dijkstra algorithm, Euler diagrams, Hamilton Figure, bipartite graph, planar graph, non-oriented tree, spanning tree and oriented tree, signifying method of proposition, the rules of reasoning theory, the reasoning process and predicate calculus reasoning.

Recommended textbook or main references:

1. SHAO Xuecai, YE Xiuming, Discrete Mathematics (2nd Edition), Publishing House of Electronics Industry, 2009
2. QU Wanling, GENG Suyun, ZHANG Li' ang, Discrete Mathematics, Higher Education Press, 2011
3. Bernard Kolman, Robert C.Busby, Discrete mathematical structures (6th Edition) (photocopy), Higher Education Press, 2010
4. (US) Kenneth h.rosen, translated by YUAN Chongyi, QU Wanling and ZHANG Guiyun, Discrete Mathematics and Its Applications (6th edition of the original book), China Machine Press, 2011
5. QU Wanling, GENG Suyun, ZHANG Li' ang, Discrete Mathematics Problem Solving and Learning Guidance (second edition), Tsinghua University Press, 2008

Course Number: 0009063

Course Title: Circuit and Electronic Technology

Credit: 4 **Total Credit Hours**: 64

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Advanced Mathematics, College Physics

Evaluation Method: Exam

Course Description:

This course is a basic technical course for the basic e-technology education of the students not majoring in electronics from engineering colleges. Through the course learning, the students are expected to master the basic theory and analysis methods of circuit analysis and electronic technology, understand the application and development of electronic technology and preliminarily understand electronic circuit analysis and design methods. It is of great significance to developing the spirit of innovation, ability of thinking and the ability to analyze and solve practical problems to lay a foundation for learning subsequent courses and doing subject-related engineering technical work.

This course is divided into two basic modules: the "circuit basis" and "technical basis for analog electronics". On the basis of clarifying physical concepts and basic theory, the former part mainly introduces the basic concepts of circuit analysis, basic theorems and analysis and calculation methods; the latter part focuses on introducing the basic circuit composition, performance characteristics and basic analysis methods based on the introduction of the common characteristics of electronic devices.

Recommended textbook or main references:

1. LIU Shuying, etc, Circuit and electronics (third edition), Publishing House of Electronics Industry, 2008
2. QIU Guanyuan, LUO Xianjue, Circuit (5th edition), Higher Education Press, 2006
3. HUA Chengying, "Basic Analog Electronics" (fourth edition), Higher Education Press, 2006

Course Number: 0002358

Course Title: Digital Logic I

Credit: 3 **Total Credit Hours**: 48

Students: Students majoring in software engineering, second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite : Circuit and Electronic Technology

Evaluation Method: Exam

Course Description:

This is a basic required course of the undergraduates majoring in software engineering. It is closely related to the classical theory of digital electronic technology and the development of new technologies and has a strong practical applicability. The learning of this course can lay a solid foundation for the students to learn the professional knowledge of digital logic circuit in the future. Through the course learning, the students are expected to master the basic theories and concepts of digital logic circuits, the combinational logic circuits and sequential logic circuit analysis methods and design methods, and develop the capability to combine theories with the practical problems. Combined with practical application, this course introduces the basics and development tools of programmable logic devices and is designed to strengthen the application of programmable logic devices and supporting EDA software in supporting experiments.

The purpose of this course: Guide students to establish the basic concepts of digital logic circuits, learn the basic analysis and design methods and understand the characteristics and use of programmable logic devices to lay a foundation for future professional course learning.

Recommended textbook or main references:

Textbook

1. "Fundamentals of Digital Electronics" (first edition), editor in chief: JIANG Jie, Beijing University of Technology Press, 2009

References

1. "Fundamentals of Digital Electronics" (fifth edition), editor in chief: Yan Shi, Higher Education Press, 2006
2. "Fundamentals of Digital Electronics (digital part)" (fourth edition), editor in chief: KANG Hua, Higher Education Press2000
3. "Digital Logic Applications and Design", by John M. Yarbrough, Pearson Education, 2002
4. "Fundamentals of Digital Logic with VHDL Design", by Stephen Brown, Zvonko Vranesic, McGraw-Hill Education, 2002

Course Number: 0007749

Course Title: Computer Networks I

Credit: 2 **Total Credit Hours:** 32

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Introduction to Computer Science, Advanced Programming Language

Evaluation Method: Exam

Course Description:

This is a basic course for the students majoring in embedded system. The purpose is to enable the students to understand basic computer network knowledge and grasp the basic concepts and working principle of computer network and network application programming methods. Main task: Through the course learning, the students are expected to have a clear, comprehensive and systematic understanding of the computer network on the whole based on their computer knowledge, have a clear idea of the main types of computer network and the common network protocol, learn the most basic methods for computer network operations and day-to-day management and maintenance, initially grasp the structure of network protocol represented by TCP / IP protocol, initially develop the programming capacity on TCP / IP protocol and LAN and learn the latest development of new network technology to lay a foundation for the use, design and development of network applications.

Recommended textbook or main references:

1. (Netherland）Andrew S. Tanenbaum and (US) David J. Wetherall, Computer Networks, 5th Ed., China Machine Press, 2011

Course Code: 0009026

Chinese Name: Principle of Operating System II

English Name: Principle of Operating System II

Credit: 3 **Total Credit Hours:** 48

Targets: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite courses: Computer theory, assembly language, data structures and algorithms

Examination forms: Written examination

Course Description:

This is an important professional course for the students majoring in software engineering. It is designed to enable the students to fully understand the basic principles, concepts and a variety of management techniques of the operating system and train the ability of the students to analyze and design system software. Specific knowledge includes: The concepts, history and dual mode of operating system, system calls, process, process status, process control block, IPC, process scheduling, scheduling algorithms, critical resources and critical sections, synchronization hardware solutions, semaphores, classic IPC logic, process communication, deadlock, relocation, contiguous memory allocation, the paging storage management, segmented memory management, virtual memory, demand paging storage management, page allocation and replacement, request segmented storage management, file and file system, logical structure, access control method, the directory structure, the directory implementation, external memory allocation, the I/O control method, buffer, device independence, spooling, device driver, the disk structure and scheduling.

Recommended textbook or main references: (including the name of editor in chief, textbooks, publishing house and publication date)

1. Abraham Silberschatz, Peter Bear Galvin and Greg Gagne, translated by ZHENG Kougen, “The Concept of Operating System: Java Implementation” (7th edition)” (translated version), Higher Education Press, 2010
2. Written by Tanenbaum.A.S, translated by CHEN Xiangqun and MA Hongbing, “Modern Operating Systems”(3rd edition of the original book), China Machine Press, 2009
3. FEI Xianglin, LUO Bin, SUN Zhongxiu, “Operating system tutorial” (4th edition), Higher Education Press, 2008
4. Written by William Stallings, translated by CHEN Xiangqun and CHEN Yu, “Operating System: the Essence and Design Principles”, (sixth edition of the original book), China Machine Press, 2010.

Course Number: 0002549
Course Title: Database Systems Principles
Credit: 2 **Total Credit Hours:** 32
Students: Third-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: Data Structures and Algorithms
Evaluation Method: Exam
Course Description:
As an important branch of embedded system software development, Database Technology mainly studies how to store, use and manage data and has strong theoretical and practical applicability. With the development of computer technology, database applications have extended from traditional data processing and information management to computer-aided design, computer control, artificial intelligence, office information systems and other fields.
The purpose of this course is to enable students to grasp the basic concepts of database system, master database system design and development methods, understand the principles and techniques of database technology and know the direction of development of database technology.
The database principle mainly introduces the following knowledge:
1. The data model, database system structure and the composition of database system;
2. Relational model, relational data structures and the formal definition, the integrity of relationship, relational algebra and relational calculus;
3. Relational data normalization theory, paradigm, functional dependencies and mode decomposition
4. Database design;
5. Database recovery techniques;
6. Database concurrency control;
7. Database security.

Recommended textbook or main references:
1. “Database System Tutorial”, 2nd Edition, SHI Bole, DING Baokang, etc; Higher Education Press; 2003
2. “The Basic Fundamental of Database System”, WANG Shan, CHEN Hong, Tsinghua University Press, July 1998
3. An Introduction to Database System (3rd edition), SA Shixuan, WANG Shanhu, Higher Education Press, February 2003

Course Number: **0006651**
Course Title: **Principle of Embedded System Design**
Credit: 2.5 **Total Credit Hours:** 40
Students: Third-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: Operating System, Principles of Computer Composition, C Language Programming
Evaluation Method: Exam
Course Description:
This course mainly introduces embedded system hardware / software co-design principles and methods. Through the study of this course, students are expected to understand the basic concepts, working principle and design methods of complex embedded systems, and understand the bottom-up and top-down design process of embedded systems. Through curriculum design, at the same time, students will accumulate more experience in design while independently designing a typical embedded system. In such a way, it will improve students' practical ability.
Recommended textbook or main references:

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design ", Princeton University, 2005.
2. Wayne Wolf, "Embedded Computer System Design Principle", China Machine Press, January 2002

Note: The following are the basic elective courses for software engineering (embedded software and systems)
Course Number: **0006569**
Course Title: **IC Analysis and Design**
Credit: 3 **Total Credit Hours**: 48
Students: Second-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: Fundamentals of Circuit Analysis, Digital Circuitry, Analog Circuitry
Evaluation Method: General assessment
Course Description:
This is a basic elective course and is designed to develop the engineering design capability of the students.
Students are expected to understand that the design of integrated circuits is a complex system design that should follow the top-down and bottom-up principles and strengthen the ideology of following "design flow" to lay a foundation for FPGA design. Knowledge: Students are expected to master the principles of integrated circuits (IC), fundamentals of IC technology, IC devices, basic unit circuits of digital IC and IC design methods. They should also know how to use the design tools of general integrated circuits. Capabilities: While mastering the knowledge, students should know how to conduct and complete IC design, how to analyze the problems in the process of design and how to correct relevant mistakes.
Recommended textbook or main references:

1. "Digital Integrated Circuits: A Design Perspective", second edition, Tsinghua University Press, February 2006

2. “VLSI Handbook”, Tsinghua University Press, November 2002
3. “Design of Analog CMOS Integrated Circuits”, Xi’an Jiaotong University Press, February 2003
4. “Digital ASIC Design and Verification”, Publishing House of Electronics Industry, October 2004

Course Number: 0006701
Course Title: Computer Architecture
Credit: 2.5 **Total Credit Hours:** 40
Students: Third-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: Principles of Computer Composition
Evaluation Method: Written examination
Course Description:
This course is designed to enable the students to master the basic concepts of computer system architecture, learn to conduct comprehensive surveys, analysis and design of computer system architecture from the perspective of a high-rise building using the application algorithms, hardware and software; teach the students to analyze, evaluate and design a computer application system from the perspective of cost performance; enable the students to master the main design ideas and skills of the contemporary RISC technology and understand the advanced technology and design ideas for today’s computer system architecture, including parallelism, scalability and programmability. Specific knowledge include the basic concept of computer system structure, Amdahl’s law, CPI and MIPS performance index calculating; data representation, encoding method of instruction system, Huffman extension encoding thinking, RISC processor; multi-body cross-memory, Cache address image, conversion and replacement policy, the basic concept of virtual memory, memory protection; the basic concept of pipeline, pipeline performance indicator calculation, nonlinear pipeline scheduling method, vector water processor; parallel processor structure, the structure of the multiprocessor, multi-level interconnect network technology, etc.
Recommended textbook or main references: (including the name of editor in chief, textbooks, publishing house and publication date)
1. FANG Juan, Computer Architecture, Beijing, Tsinghua University Press, 2011
2. ZHENG Weimin, TANG Zhizhong, Computer Architecture (2nd edition), Beijing, Tsinghua University Press, 1998
3. David A. Patterson, John L. Hennessy, Computer Architecture: A Quantitative Approach, Morgan Kaufmann, 2011

Course Number: 0007753
Course Title: Digital Signal Processing
Credit: 2.5 **Total Credit Hours**: 40
Students: Third-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: Advanced Mathematics, Discrete Mathematics

Evaluation Method: General assessment

Course Description:

This is a professional foundation course for senior undergraduate students majoring in software engineering (embedded system). Through the study of this course, students are expected to understand and master the basic concepts and analysis methods of digital signal processing and master the analysis and design methods of digital signal processing, providing a theoretical basis for the study of DSP design techniques, digital image processing, multimedia technology, etc.

Recommended textbook or main references:

Textbook:

1. CHENG Peiqing, Digital Signal Processing (third edition), Tsinghua University Press. February 2007
2. Main references:
3. WANG Shiyi, Digital Signal Processing (revised edition), Beijing Institute of Technology Press, June 2011
4. Oppenheim, Discrete-time Signal Processing (third edition) (English), Publishing House of Electronics Industry, January 2011

Course Number: 0002996

Course Title: Principles of Compiling I

Credit: 3.5 **Total Credit Hours**: 56

Students: Third-year undergraduates majoring in Software Engineering (embedded software and systems)

Prerequisite: Advanced Programming Language, Data Structures and Algorithm

Evaluation Method: General assessment

Course Description:

"The principles and techniques of compiler writing are so pervasive that the ideas found in this book will be used many times in the career of a computer scientist." said by Alfred V.Aho, the famous computer scientist. Compiler is the basis of modern electronic digital computer running, it relates to a more appropriate and abstract data transformation (both abstract and practical).It is the perfect embodiment of the automatic computing.

Basic concepts, theories for compiler are taught in this course, in addition, the typical ideas and methods of basic problem-solving will be more deeply explored, This course enables students to raise the level of computer problem solving comprehensively, and experience the fun of achieving the automatic computing. The knowledge includes the grammar description of language, lexical analysis(scanning), syntax analysis(paring),semantic analysis, intermediate code generation and so on. The main methods are: top-down, bottom-up, stepwise refinement, recursive solving, goal-driven, problem analysis, the abstraction and formal description of the problem, algorithms design and implementation, system building, modeling and other methods.

Recommended Textbooks/References:

1. JIANG Zongli, JIANG Shouxu. Principles of Compiling. Higher Education Press,January 2010
2. Alfred Aho, Ravi Sethi, Jeffrey D. UllmanCompilers: Principles, Techniques, and Tools,The People's Posts and Telecommunications Press.February 2002
3. LV Yingzhi.etc. Principles of Compiling. Tsinghua University Press, February 2005

4. JIANG Zongli, JIANG Shouxu. Theory of Formal Languages and Automata (second Edition). Tsinghua University Press,July 2007,third printing in October 2011

Course Number: 0006652

Course Title: Embedded Microprocessor Architecture and Application

Credit: 2 **Total Credit Hours**: 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Principles of Embedded System Design

Evaluation Method: General assessment

Course Description:

As a professional course, embedded microprocessor architecture and application is an important part of the embedded software and system design. The students are expected to understand how to select the microprocessor and learn the structure of the ARM microprocessor with the purpose of application, including ARM external interface, ARM-based embedded system software development (assembly and C programming), ARM applications, etc. The course is designed to introduce embedded microprocessor architecture – the core of embedded hardware with ARM as an example, enable the students to have a comprehensive understanding of the ARM embedded microprocessor and the development methods and an in-depth understanding of how to develop the systems with ARM embedded microprocessor as the core. Finally, the course compares kernel microblaze of the current microprocessors of FPGA with ARM to make the students understand the structure of microblaze and expand their knowledge.

Recommended textbook or main references:

1. DU Chunlei, ARM Architecture and Programming,Tsinghua University Press;
2. Raj Kamal, Embedded Systems Architechture Programming and Design, Tsinghua University Press

Course Number: 0007754

Course Title: Interface Technique of Microcomputer

Credit: 2 **Total Credit Hours**: 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Analog Circuit and Digital Circuit, Principles of Computer Composition, Assembly Language Programming

Evaluation Method: General assessment

Course Description:

It is designed to, on the one hand, help students understand the principles of MPU software and hardware and the composition and interface of single-chip microcomputer system and, on the other hand, support the cultivation of professional technical personnel with independent analysis, study and design capacity for data collection, information processing and automatic control hardware and assembly language software development. Course Contents: The development of microprocessors and microcomputers, representation and transformation of number binary

counting system, the structure and operation timing of microprocessor, instruction set and assembly language programming, memory interface, I/O interfaces, analog quantity input and control interface, interrupt timer and serial communications, multi-machine communication methods and the realization, microcomputer application system development, etc.

Recommended textbook or main references:

1. Editor in chief: Wang Ting, Principles and Interface Technique of MPU, Chemical Industry Press

Course Number: 0006819

Course Title: DSP Design Technology

Credit: 2 **Total Credit Hours:** 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Digital Signal Processing, Circuits and Electronics, Digital Logic, EDA Design Techniques

Evaluation Method: General assessment

Course Description:

This is a professional course for senior undergraduate students majoring in software engineering (embedded system). Through the study of this course, students are expected to understand and master the basic theories of digital signal processing, master DSP algorithms and system processes on Xilinx-based FPGA platform, main design methods and typical DSP algorithms and get familiar with DSP system development process with FPGA so that they'll be able to basically develop DSP products with FPGA to solve practical problems.

Recommended textbook or main references:

1. John G. Proakis, Dimitris K Manolakis, Digital Signal Processing: Principles, Algorithms and Applications (solutions manual)
2. WU Dongmei, ZHANG Yujie, DSP Principles and Application (Teaching material of practical planning for application type undergraduate E-communication in the 21st Century)

Course Number: 0006238

Course Title: Embedded Operating System

Credit: 2 **Total Credit Hours**: 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: C Language Programming, Data Structure, Operating System

Evaluation Method: General assessment

Course Description:

As an elective course for students majoring in embedded system, "Embedded Operating System" is a theoretical and practical course. The main purpose of this course is to enable students to gain a deeper understanding of the internal organization of embedded operating system and grasp and apply embedded operating system design methods. Through the study of this course, students are expected to master the basic concepts of embedded systems, including process, tasks,

synchronization mechanisms, etc, learn the characteristics, composition, generation and transplantation of embedded operating system, be able to write a tiny operating system kernel; understand the current mainstream operating systems Linux, WinCE and Mobile for embedded systems, and learn how to select and construct operating systems for specific embedded systems to lay a good foundation for future development and use of embedded systems and real-time system design.

Recommended textbook or main references:

1. YAN Hairong, Principles and Application of Embedded Operating System, Publishing House of Electronics Industry, 2012

Course Number: 0007030

Course Title: Embedded Software Development Technology

Credit: 2 **Total Credit Hours**: 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Introduction to Software Engineering, Introduction to Embedded System

Evaluation Method: General assessment

Course Description:

As a specialized course of software engineering (embedded system), this course will describe the overall architecture of embedded systems, the relationship between embedded software and hardware, and the development process and key technologies of embedded software. On the basis of mastering the basic concept of object-oriented programming, through learning object-oriented software development process model, students will mainly learn object-oriented technology-based embedded system analysis methods and modeling technology. Combined with specific cases and course experiments, students are expected to understand embedded system software design and development technologies and master the technologies for reliable design of embedded software and embedded operating system transplantation.

Recommended textbook or main references:

1. Object-oriented Embedded System Development, by ZHU Chengguo, Beihang University Press, September 2007

Course Number: 0002377

Course Title: Software Architecture

Credit: 2 **Total Credit Hours**: 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Introduction to Software Engineering, Programming Language

Evaluation Method: General assessment

Course Description:

Software architecture is an important area for research and practice of software engineering. This course mainly introduces the basic principles, methods and practices of software architecture. Through the study of this course, students are expected to master the main concepts, basic

principles and methods of software architecture, master software architecture modeling methods and describing methods, master software architecture styles and be able to correctly conduct system architecture-based software development. At the same time, through course experiments, students will accumulate experience in designing software architecture.

Recommended textbook or main references:

1. "Software Architecture" (2nd Edition), by ZHANG Yousheng, etc, Tsinghua University Press, January 2010

Course Number: 0009028

Course Title: Human Computer Interaction(HCI)

Credit: 2 **Total Credit Hours:** 32

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Computer Graphics

Evaluation Method: General assessment

Course Description:

It is an important part of computer user interface design. As a professional course, it is closely related to cognitive science, ergonomics, psychology, etc. Human-computer interaction research covers a wide range of areas, including the theories and methods of modeling, design, evaluation, etc., and the applied research and development in the Web, mobile computing, virtual reality and other fields. As a typical interdisciplinary, integrated curriculum, human-computer interaction is the product of the combination of computer science and cognitive psychology. It is designed to enable students to master some knowledge of human-computer interaction and conduct simple interaction design.

Recommended textbook or main references:

1. "Fundamentals of Human-computer Interaction", Editor in chief: MENG Xiangxu, Tsinghua University Press, 2010, 2nd Edition

Course Number: 0003483

Chinese Name: Introduction to Artificial Intelligence I

Course Title: Introduction to Artificial Intelligence

Credit:2.5 **Total Credit Hours**: 40

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Data structures, discrete mathematics and advanced programming language

Evaluation Method: General assessment

Course Description:

As an elective course of embedded software and systems majors, this course is an introductory course in the field of artificial intelligence and mainly introduces the basic theory, methods and techniques of artificial intelligence. Through the course learning, the students are expected to master the basic ideas and methods of artificial intelligence and learn the basic analysis and design methods to lay a good foundation for the learning of more advanced courses, further research in

the field of artificial intelligence and software practices in the future.

There are obvious difference between artificial intelligence and other software programs. The difference is mainly manifested in the distinctive characteristics of artificial intelligence: stress ing heuristic method in thinking and uncertainty in algorithms. Meanwhile, artificial intelligence is a pioneering area with an endless stream of new ideas and new technology, therefore, its training of students is special and it encourages innovation and is irreplaceable.

Recommended textbook or main references:

1. "Introduction to Artificial Intelligence Technology" (third edition), LIAN Shiyou, Xi'an University of Electronic Science and Technology Publishing House, 2007

Course Number:0007751

Course Title: Cutting-edge Technologies of Internet of Things

Credit:2 **Total Credit Hours**:32

Students: Four-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite:Computer networks and programming

Evaluation Method: General assessment

Course Description:

This is a free elective on cutting-edge technology of embedded software and system majors. "Internet of Things" is called the third wave of the world's information industry following computer and the Internet. This course mainly introduces the concept, historical origins for the rise, relevant technology and its common applications, application and business models of the Internet of Things. Meanwhile, it describes the relationship between the Internet of Things and cloud computing, SaaS, SOA and other hot technologies and industries. Through the study of this course, students are expected to have a comprehensive and systematic understanding of the concept, technology and industry coverage of the Internet of Things.

Recommended textbook or main references:

1. "Internet of Things: Technology, Application, Standards and Business Model" (2nd Edition), by ZHOU Hongbo, Publishing House of Electronics Industry, July 2011

Course Number: 0007752

Course Title: Short-range Wireless Communication Technology

Credit: 2 **Total Credit Hours**:32

Students: Four-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Programming Approach (C), Assembly Principle, Principle and Interface of Microcomputer; Human-computer Interaction (HCI)

Evaluation Method: General assessment

Course Description:

This is a free elective on techniques of embedded software and system majors. The short-range wireless communication technology is an important part of embedded software and system design. As a professional course, this course is closely related to such disciplines as electronic engineering, computer applications and human-computer interaction. It mainly talks about several hot issues on

short-range wireless communication technology and mobile self-organizing network: Wi-Fi, Bluetooth, ZigBee technology, mobile Ad hoc network technology and the corresponding NS2 simulation technology. Short-range wireless communication technology is a typical interdisciplinary, integrated curriculum and is the product of the combination of embedded systems and electronic communications. This course is designed to enable students to master some knowledge of wireless communications and design simple embedded networking systems.

Recommended textbook or main references:

1. "Short-range Wireless Communication and Networking Technology", Editor in chief: Sun Yi, Xi'an Electronic Science & Technology University Press, 2008, 2nd Edition

Course Number: 0008301

Course Title: Programming Design Course Project

Credit: 2 **Total Credit Hours:** 60

Students: First-year undergraduates majoring in software engineering (embedded software and systems)

Evaluation Method: Final grade is composed of three parts: C language code; curriculum design practice report and teacher interview

Course Description:

This course is designed to develop the ability of students to write C language program to solve practical problems with what they learn from high-level language programming courses. It focuses on training students to develop rigorous attitude toward work and aims to enable the students to master the structured programming method and develop good programming habits. Through the course learning, the students are expected to understand the basic development process of programming and master the basic skills for writing and debugging C language programs. The course puts emphasis on the development of the comprehensive capacity of the students and mainly strives to train the innovation spirit of the students from experimental class to fully exploit the innovation potential of the students.

The main task of this course is to guide the students to analyze, design, write, debug and test C language program and write practice report in accordance with the topic requirements of curriculum design.

Recommended textbook or main references

1. LIAO Husheng, YE Naiwen and ZHOU Jun, Case Tutorial of C Language Programming (2nd Edition), Post & Telecom Press, September 2010
2. LI Wenxin, etc, Programming Guide and Online Practice, Tsinghua University Press, July 2007
3. (US) Brian W.Kernighan,Dennis M.Ritchie, C Programming Language (English) (2nd edition), China Machine Press, August 2006
4. P.J.Deitel,H.M.Deitel, University Tutorial (5th edition) (English), Publishing House of Electronics Industry, May 2010

Course Number: 0007155

Course Title: Practice of Embedded system Engineering

Credit: 1 **Total Credit Hours:** 30

Students: First-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: None

Evaluation Method:

1. Assessment content: Conduct assessment on thesis
2. Grading method:

Report: At the end of the practice, submit a report of more than a 2000 words, 80% of the total score

Course Description:

In the forms of introduction of the industry, technical lectures and visits to businesses, this course helps the students to establish a basic understanding of the situation and development of software engineering-related fields and software industry. It is designed to enable the students to understand the current situation and development trends of the industry and the work environment and the day-to-day work content of typical enterprises and initially establish their career planning for embedded software and systems industry.

Recommended textbook or main references:

None

Course Number: 0007748

Course Title: Object-Oriented C++ Programming Design

Credit: 1 **Total Credit Method:** 30

Students: First-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: None

Evaluation Method:

1. Assessment content: review and papers. In the practice link, the students are required to complete two small projects: the stock data inspection system and real-time communication system. After the practice, the students are expected to submit a paper on the practice.
2. Grading methods:
   - Stock data inspection system: Assessment of students demo, 30% of the total score
   - Instant messaging system: Assessment of students demo, 30% of the total score
   - Papers: Submit a technical paper of more than 1000 words by the end of practice, 20% of the total score
   - Attendance: 20% of the total score

Course Description:

This is the students' self-learning course and the teacher is only responsible for the arrangement of project organizations, discussions and questions answering.

Taking the stock data inspection system and real-time communication system as the main line, supplemented by a large number of cases, this course is designed to enable the students independently complete the design and programming work on the basis of understanding the knowledge and skills required for the project. This course consists of three parts:

C + + programming: Memory management; efficient operation of the array and string; object creation, destruction, copying, assignment, parameter passing as a returned value; basic data structures; basic sorting and searching algorithms.

Visual C + + programming: MFC and object hierarchy; MFC SDI application framework; MFC Dialog program framework; messaging mechanism; GDI drawing; File I / O; multithreading; network programming.

Project combat: Independent completion of programming for the stock data inspection system; independent completion of programming for the micro instant messaging system on LAN.

Recommended textbook or main references:

1. TAN Haoqiang, C++ Programming Design, Beijing, Tsinghua University Press, 2004
2. ZHENG Li, DONG Yuan, ZHANG Ruifeng, C++ Language Programming Design (3rd edition), Beijing, Tsinghua University Press, 2003
3. YAO Xinyan, C / C + + Deep Exploration, Post & Telecom Press, 1999.

Course Number: 0008302

Course Title: The Experiments of Digital Logic

Credit: 0.5 **Total Credit Hours**: 12

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Digital Logic, Circuit and Electronic Technology

Evaluation Method: Operation test

Course Description:

As an independent experimental course, it is arranged in the same semester with the corresponding theoretical course "digital logic".

The contents of this course include three parts: The first part talks about the knowledge of electronic technology experiments, the second introduces how to use electronic instruments and the third part includes basic experiments on digital electronic technology. The basic experimental knowledge includes experimental safety, the specification of experiments, knowledge of electronic components and experience in experiments. The use of electronic instruments includes the use of experimental boxes, multimeters, DC power supply, oscilloscopes and signal source. Digital logic experiments include basic unit experiments, the use of instruments, combinatorial logic circuit experiments and sequential logic circuit experiments. Some experiments are conducted on the EDA platform.

The purpose of this course: Through knowledge learning and experimental operations, the students are expected to improve the hands-on skills, foster a scientific style and obtain experience in electronic technology experiments.

Recommended textbook or main references:

1. Instructions of "The Circuit and Electronic Technology Experiment", August, 2012

Course Number: 0009064

Course Title: The Circuit and Electronic Technology Experiment

Credit: 2 **Total Credit Hours**: 48

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Circuit and Electronic Technology

Evaluation Method: Operation test

Course Description:

As an independent experimental course, it is arranged in the same semester with the corresponding theoretical course "Circuit and Electronic Technology".

This experimental course consists of two parts. The first part is about basic circuit analysis experiments. The second part includes basic experiments on analog electronics technology. The main contents include: the knowledge of the safe use of electricity, the use of electrical instrumentation, measurement of circuit parameters, experiments on classic circuit analysis, the use of electronic instruments, circuit board soldering and classic electronic technology experiments. Some experiments are conducted on theg EDA platform.

The purpose of this course: To verify the theoretical knowledge, learn experimental knowledge, train operating capacity, foster a scientific style and accumulate practical experience.

Recommended textbook or main references:

1. Instructions of "The Circuit and Electronic Technology Experiment", August, 2012

Course Number: 0006566

Course Title: Assembly Language Programming

Credit: 1 **Total Credit Hours**: 24

Students: Second-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Principles of Computer Organization

Evaluation Method: Exam

Course Description:

Assembler language is a basic programming language, which can be known well through coding and testing program. The course of Assembler language firstly make people understand the trait, grammar, meaning of Assembler language by The basic theory teaching and then, through experiment teaching, students will do some basic coding of every normal assembler structure, including branched program, cyclic program, subsystem and DOS function calls based on grasping essential conceptions, like functions, forms and addressing mode. Finally the stage of comprehensive program coding enable students to know deeply and clearly and finish difficult program design by Assembler language, so that it will lay the well foundation for the future learning.

Recommended textbook or main references:

1. YI Xiaolin, ZHU WenJun, LU Pengcheng. Principles of Computer Organization and Assembly language
2. SHEN Meiming, WEN Dongchan. IBM-PC Assembly language Programming.
3. BU Yanping, ZHOU Wei. Assembly language Programming Tutorial

Course Number: 0006243

Course Title: EDA Design and Tools

Credit: 2 **Total Credit Hours**: 48

Students: Third-year undergraduates majoring in software engineering (embedded software and

systems)

Prerequisite: Electronic circuitry, analog circuitry, digital circuitry

Evaluation Method: General assessment

Course Description:

As an important tool for electronic circuit design, Electronic design automation (EDA) is widely used in the field of analog and digital circuitry. This course mainly introduces EDA-based digital circuit design technology and the knowledge about circuit schematic design in the EDA software Cadence environment as well as PCB (Printed Circuit Board) and high-speed PCB design. Through combining theory and practice, this course is designed to enable the students to understand the basic concepts of EDA technology, master VHDL programming skills and the main factors affecting modern circuit board design as well as the process and methods for the use of EDA design software. Meanwhile, through curriculum design, students can use the EDA design software to design a PCB, including the process from components library to the schematic diagram, to accumulate experience in PCB design and improve understanding of the discipline and practical ability.

Recommended textbook or main references:

1. PAN Song, EDA Technology Practical Tutorial – VHDL Edition, Science Press, June 2010
2. Mark I.Montrose, translated by LV Yinghua, etc, Electromagnetic Compatibility PCB Design, China Machine Press, January 2008
3. ZHOU Runjing, Cadence Concept-HDL & Allegro Schematic and Circuit Board Design, January 2012

Course Number: 0006654

Course Title: Course Project of Embedded System Design

Credit: 0.5 **Total Credit Hours**: 12

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Principle of Embedded System Design

Evaluation Method: General assessment

Course Description:

Following the opening of the course of Principle of Embedded System Design, this experimental course mainly provides an opportunity for the students to conduct a medium-scale experiment on embedded system design. The international advanced Xilinx FPGA development platforms, tools and software will be provided for the students to develop a Huffman encoding and decoding SoC and conduct a complete process of developing an embedded system. The students can test and verify the concepts, principles and design methods of embedded systems in an actual case to develop the embedded system research and development capabilities.

Recommended textbook or main references:

1. Xilinx FPGA Software Design Tools and User Manual

Course Number: 0006280

Course Title: Database Management and Design

Credit: 2 **Total Credit Hours**: 48

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Principles of Database I

Evaluation Method: General assessment

Course Description:

This course is designed to help students deeply understand the basic concepts of the database system, master database design theory and methods and understand the Principles of Database Systems through the practice, develop the ability of the students to develop and implement database application systems and to analyze and solve problems.

The main task of this course is to enable the students to use SQL Server 2005 to design and establish the database system, learn the technology for the establishment, use and management of SQL Server 2005 database system.

Recommended textbook or main references:

1. LIU Yongjun, "SQL Server 2005 Database Application Tutorials", Tsinghua University Press, September 2009
2. WEI Lin, the second edition of the "SQL Server 2008 Database Application Development Tutorial", Tsinghua University Press, June 2011
3. QIU Lihua, etc, "SQL Server 2008 Database Application Tutorials", second edition, Post & Telecom Press, August 2012

Course Number: 0007747

Course Title: FPGA-based Digital Circuit Design (Primary Course, Foreign Teacher)

Credit: 1 **Total Credit Hours**: 30

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Principles of Embedded System Design

Evaluation Method: General assessment

Course Description:

This course mainly introduces FPGA hardware design principles. Students will learn how to conduct FPGA-based hardware programming and will have a systematic understanding of the logic structure of FPGA, master FPGA circuit design processes and methods, learn FPGA-based IP development methodology and complete hardware system design.

Recommended textbook or main references:

1. Clint Cole, "Real Digital,A Hands-on Approach to Digital Design", Xi'an Electronic Science & Technology University Press, 2009

Course Number: 0006656

Course Title: SoC Embedded Operating System Design Practice (Primary Course, Foreign Teacher)

Credit: 1 **Total Credit Hours**: 30

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: C Language Programming Data Structure, Operating System

Evaluation Method: General assessment

Course Description:

It is an extended curriculum of "Embedded Operating System". Through practices, students will learn applications of Linux Operating System, another mainstream embedded operating system, and learn SoC design and operating system transplantation in an FPGA environment to enhance their Linux Operating System cutting capacity and the ability to develop FPGA software.

Recommended textbook or main references:

1. Xilinx training materials

Course Number: 0007746

Course Title: Innovation Project Practice

Credit: 2 **Total Credit Hours**: 60

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: Embedded microprocessors, embedded operating system

Evaluation Method: General assessment

Course Description:

This is a practical training and project-driven curriculum. Through the learning of curriculum, the students are expected to enhance their practical ability innovation ability and project capabilities and obtain the knowledge on innovation and projects, ARM board knowledge or FGPA board knowledge for projects, project-related embedded system knowledge, etc. The capabilities they'll have after the course learning include teamwork ability, project capabilities, the ability to integrate knowledge and conduct innovations, as well as the ability to study independently. The quality to be trained includes: the quality of innovation, project quality and the quality of specific application-oriented embedded system engineer

Course Number: 0006817

Course Title: DSP Design and Implementation (Primary Course, Foreign Teacher)

Credit: 1 **Total Credit Hours**: 30

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: C Language Programming, Data Structure, Operating System

Evaluation Method: General assessment

Course Description:

It is an extended course of "DSP Design Techniques". Through practices, students will understand DSP design and realization in the FPGA environment and enhance their ability to understand and use DSP design technology.

This is a professional course designed for higher undergraduate students majoring in Software Engineering (Experimental Class for Embedded System).

By learning of this course, the students are expected to master the basic principles of digital signal processing, the design flow of DSP algorithms and systems based on Xilinx FPGA platform and master the main design methods of typical DSP algorithms on FPGA so as to have the basic ability

of DSP product design on FPGA.

Recommended textbook or main references:

1. Xilinx training materials

Course Number: **0006818**

Course Title: **Embedded System Hardware and Software Design (Primary Course, Foreign Teacher)**

Credit: 1 **Total Credit Hours**: 30

Students: Third-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: C Language Programming, Data Structure, Operating System

Evaluation Method: General assessment

Course Description:

This is an advanced integrated practice curriculum for the study of embedded system design. Through concentrated quarter course learning, students are expected to enhance their embedded system software and hardware design capabilities. This course introduces hardware and software from the viewpoint of unifying software and hardware so that students will learn how to select software and hardware and complete the complex design in accordance with the needs of design. The practical courses take Virtex or Spantan2E development board as the hardware platform, hardware design takes Mricoblaze or ARM as hardware foundation, and software takes Linux as the core, focusing on the development of C language for operating system. It also talks about the use of BeeCube.

Recommended textbook or main references:

1. Xilinx training materials

Course Number: **0007454**

Course Title: **Professional Practice**

Credit: 8 **Total Credit Hours**: 240

Students: (Four-year undergraduates majoring in software engineering (embedded software and systems)

Prerequisite: All required courses

Evaluation Method: Submit internship report

Course Description:

This course is designed to enable the students to better combine theory with practice, improve the comprehensive ability of students, develop professional quality and lower the blindness of graduation employment. It is a required course before the senior project.

Through the learning of this course, the students are expected to understand the technology used by enterprises in the actual R&D process as well as the development process and norms, deepen their understanding of embedded systems development technology and embedded systems engineering; learn the new technologies, new ideas and new management practices used by enterprises in the actual development to expand their knowledge, improve their practical skills and make good technical and psychological preparations for future careers; accept the guidance and

supervision of the internship mentor, learn employees' spirit of teamwork, dedication and professionalism, develop their own sense of responsibility and prudent attitude towards work and strive to become excellent embedded software and systems engineers with good virtues and strong ability. Through the internship, the students will have an in-depth understanding of this industry and choose the topics for their senior projects in accordance with the work internships content.

Course Number: 0006456
Course Title: Senior Project
Credit: 16 **Total Credit Hours:** 480
Students: Four-year undergraduates majoring in software engineering (embedded software and systems)
Prerequisite: None
Evaluation Method: Paper defense
Course Description:
Senior Project is the most important part of link of the four-year study of the students majoring in software engineering (embedded software and systems) and is the final assessment of the students' four-year learning outcomes.
In the stage of senior project for the undergraduates majoring in software engineering (embedded software and systems), the teacher gives the topic and guidance, and the students are expected to complete the proposed project and write the papers. The actual results will be displayed as the students' graduation designs, covering both theoretical results and the actual work. The combination of the two is a basis for the appraisal of the senior project. It checks the students' theoretical knowledge, but also their practical ability.

Course Number: 0007156
Course Title: Fundamentals of Chromatics
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The first grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
It is a compulsory course of disciplinary fundamentals offered in the first term of the program. It is a basic course for animation, new media design and new programs combining science and art. It is also a must for art designer and technicians.
It expects students to grasp basic principles and laws of chromatics and apply theories, methods and laws of the major color coordination into design. It help student within a short time to know the essentials of chromatics to conduct color analysis, extraction and restructuring so as to achieve a balanced visual effect and to apply the laws to manipulate the color ambiance in a spatial environment.
Recommended Textbooks/References:
1. Fundamentals of Color Design(Se Cai Sheji Jichu), SU Hua, Tsinghua University Press.
2. Design Colors (Sheji Secai), Chen Hong, MI Qi, China Waterpower Press

Course Number: 0006664
Course Title: Basic Theory on Game Design
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The third grade students
Prerequisites: none
Evaluation Method: Phased assignment and open-book examination.
Course Description:
It is fundamental compulsory course for digital media technology majors. It covers the history of game industry, the attributes of games, the emotion design in game, entertaining elements, game design and theoretical knowledge in game software technology. It is designed to develop students' ability in game design and game development in digital media field; to familiarize students with the principles in video game design and the basic methods in video game design and development; to proceed from practice so as to prepare students fro future careers while giving equal emphasis on the fundamental and procedures of game development.
Recommended Textbooks/References:
1. Basic Theory on Game Design, edited by RONG Xinke, Beijing Kehai Electronic Press, 2003, 6

Course Number: 0007441
Course Title: Fundamentals of layout
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The first grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
From the easy to the difficult and complicated structured lesson to enable students to understand the various aspects of the layout design. From the establishment of coherent, add the changes, emphasizing the focus on design techniques and color design and taught to the students experience and knowledge. To systematize the contents of the instructions to the students the basic principles of the layout to lay a solid foundation for the design entry. Close to the practical content of this course, students to follow specific principles and practical examples, can significantly enhance the students' design capabilities; also enable students to understand that any design is not done at random, but there is an established principle, only mastered these principles, be able to make good design work.
Recommended Textbooks/References:
1. Ida Chiyoda Naito Gao, "the principle of the layout", CITIC Press, the September 2011

Course Number: 0006844
Course Title: Fundamentals in Web Page Design
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The second grade students
Prerequisites: Fundamental of Layout design

Evaluation Method: General Assessment

Course Description:

It is a compulsory for digital media technology majors. It develops students' capability to design, establish and maintain webpage. It covers "DreamWeaver Interface and Operation", "HTML4.04/CSS', "JvaScript Core", "Introduction of HTML5/CSS3". The teacher will assign mini-projects to students, as required by the curriculum. In this process, students will find problems which then will be addressed collectively with the help from the teacher. It course do not arrange practice as each class will go with a mini-project, accounting for 1/3 of the total credit hours.

Recommended Textbooks/References:

1. Fundamentals in Webpage Design: HTML, CSS and JavaScript, SHI Xiaoya, SU Ping, Beijing Jiaotong University Press, 2006

Course Number: 0007440

Course Title: UI design

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for The third grade students

Prerequisites: None

Evaluation Method: General Assessment

Course Description:

This course introduces students to the field of human-computer interface design, and the researching on it, and should be detailed to the students about the interface design ideas of cognitive science-based, and consider the characteristics of the human mind, pointed out the shortcomings in the current interface design at the same time, introduce new products development of ideas. This course is set in computer science, ergonomics, psychology multiple disciplines in one important lessons about the human-computer interaction design. This course explains how to make the web, computers and new equipment more easy to learn and easy. Depth exploration of the human brain works, emphasizing the computer as a tool for people's mental capacity on the characteristics, man-machine interface should be designed according to human capabilities and shortcomings. This course is the current practical experience of using the idea of cognitive science and the future of interface design with detailed description of the design ideas should be established on a scientific basis.

Recommended Textbooks/References:

1. Jef Raskin, the human interface: an interactive system design, Machinery Industry Press, January 2011

Course Number: 0000978

Course Title: Computer Graphics Ⅰ

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for the second grade students

Prerequisites: Linear Algebra

Evaluation Method: Examination

Course Description:

It covers the basic principles, theories and methods in computer graphics, and utilizes the most used graphics library-OpenGL to develop 3D graphics applications. It teaches the basic principles in computer graphics and graphic system, the mechanism and attributes of major graphic devices, the basics of computer graphic standards; graphics transformation, including, projection transformation, geometrical transformation, transformation from window to viewport, realization of graphic transformation by OpenGL; basic theory and algorithm for realistic graphics, including illumination model, local illumination model, refracting model, texture mapping, hidden surface removal, global illumination model, real-time realistic graphic technology, realization of illumination and texture mapping by OpenGL.

Recommended Textbooks/References:

1. Computer Graphics by Steve Cunningham, translated by SHI Jiaoying, China Machine Press, 2009

Course Number: 0007743

Course Title: Computer System Platform

Credit: 3 **Total Credit Hours:** 48

Students: Digital media technology undergraduates for the second grade students

Prerequisites: None

Evaluation Method: Examination

Course Description:

The curriculum of computer system platform is a digital media technology professional's basic required courses. This course is to meet the needs of the digital media technology professional students the basic knowledge of the computer system. The course covers the core content of professional courses such as computer composition principle, operating system, computer network, etc, but knowledge of computer systems was appropriate tailored based on digital media students needs and training objectives. So that students can gain a profound understanding of the appearance and behavior of the computer system. Through this course, students can learn about how the computer system to coordinate the work ,understand the behavior of the computer, and to lay the necessary professional basis for the design and realization of efficient multimedia applications, but also be able to more effectively use a variety of computer software for digital media tools .

Recommended Textbooks/References:

1. The computer system platform, ZHANG Li, LI Xiaoming, Tsinghua University Press, 2009
2. (Dutch) Andrew s.tanenbaum, (United States) the David j.wetherall (forward), computer network (English version 5), Machinery Industry Press, 2011
3. JIANG Jing , XU Zhiwei, the principle of operating system • technology and programming, Machinery Industry Press, 2004
4. James f. Kurose, Keith w the Ross, computer networks: a top-down approach (4th edition English copy version), Higher Education Press, 2010

Course Number: 0006853

Course Title: Virtual Reality Technology
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure, Computer graphics, Game development using OpenGL
Evaluation Method: Project Design
Course Description:
It is a compulsory and core course for the digital media technology majors. It teaches the principles and theories of virtual reality technology with hands-on experience on the part of students. It helps students to grasp the development of virtual reality, to apply various technologies to develop and produce virtual reality and to learn the components and modules in virtual reality so as to develop an app of VR.
Recommended Textbooks/References:
None

Course Number: 0007438
Course Title: Law of Animation Movement
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the second grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
Photography enhanced people's understanding of movement by objects. The previously incomprehensive movement could be captured by high-speed photography, therefore an important tool for animators to learn the law of movement.
Animation could resort to various media to tell stories. It not only could simulate real movement, most importantly, it could exaggerate the expression while in keeping with the law of movement. Animators' time-tested laws of movements should be passed down to us. Those laws, derived from reality, get move vivid and funny than it is in a reality.
The course will proceed from the teaching conditions to arrange the teachings. It expects students to manipulate an animation software to do stop-motion animation. As a paperless software, it is recommended to adopt Flash to complete assignments or students proceeding from their personal preference to adopt copy board drawing or other ways. Choice of the tools for realization should be left to the discretion of the students.
Recommended Textbooks/References:
1. Key Frame, LI Jie, China Machine Press, first published in August, 2004
2. Timing for Animation, Whitaker, John Halas, Chinese Film Press, Second Edition 10/2005
3. The Animators' Survival Kit, Richard Williams, China Youth Publish Group, First Edition 01/2006

Course Number: 0007439

Course Title: Animation Design using Flash
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The second grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming Fundamentals (C language), Object-oriented programming (C++)
Evaluation Method: Project design
Course Description:
Through this course, Students will master the basic usage of flash, to complete flash video production and animation design. To lay a good foundation for basic skills in digital media, animation, web design, special effects, and game design courses. Through flash software operation demonstration, it explain the basic method of operation. It arranges classroom practice and after-school experiment each chapter to consolidate the knowledge. Students through the course of study can complete the simple animation design and production, and to lay the foundation for further study of the flash interactive design and application development. Grouping Homework produce flash animated short. It require 2-3 students are divided into a group, complete the role of design and drawing, script design and animation in three stages.
Recommended Textbooks/References:
1. Adobe Incorporated (Author), CHEN Zongbin (Translator), Adobe Flash CS5 Chinese version of the classic tutorial, Posts and Telecom Press, 1st edition (December 1, 2010)

Course Number: 0007456
Course Title: Game plan
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for The third grade students
Prerequisites: Basic Theory on Game Design
Evaluation Method: General Assessment
Course Description:
This course is to train students on the game software design basis. Students will be able to fully understand why the planning of the game as a successful film script as challenging, and after learning the game-planning theory, the lecturer will present five different game categories, students were grouped into three person team to think up creative, discussion, planning, and completed the first draft of the planning document. After each group is completed, the group will demonstrates planning and creativity in turn, and listening to the lecturer commented, and each group were given the score. This course allows students to understand the career on game plan need professional knowledge and work.
Recommended Textbooks/References:
1. Game Design Workshop, 2nd edition, Tracy Fullerton, Elsevier Inc.,2008

Course Number: 0007457
Course Title: Fundamentals of Digital Sound
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students

Prerequisites: None
Evaluation Method: General Assessment
Course Description:
This course belongs to the Basic and elective, mainly to solve the problems of students in the design and application of digital sound, on the course, the students will grasp the basic principles and methods of digital sound design, learn to use the digital audio workstation and the corresponding software to create a simple sound. Through this course, students will learn what is a digital sound design, the characteristics and laws of the digital sound, sound knowledge of the import and processing, MIDI music production, etc.. Since this course is a combination of theory and practice course, each class lectures and experiments, each half the time, the teachers have completed teaching immediately organize students to practice on the computer.
Recommended Textbooks/References:
1. Xiongying, computer music workstation, Cubase / Nuendo crash course, Tsinghua University Press, March 1, 2010

Course Number: 0007832
Course Title: Human-Machine interface development technology
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure, Computer graphics, Database.
Evaluation Method: Project design
Course Description:
It is a elective and core course of disciplinary fundamentals. It teaches the principles, theories and methods of human-machine interface technology. It offers insights into the development and operation of all-ready applied technologies. It helps students to understand voice-recognition, touch screen, sense motion and the interface programming of various sensors, WIFI, Bluetooth so as to create own human-machine interface technology with their own design.
Recommended Textbooks/References:
None

Course Number: 0009027
Course Title: Digital image processing
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics
Evaluation Method: Examination
Course Description:
It covers fundamentals of digital image which includes image sampling, quantification and introduction of the necessary mathematics, gray-scale transformation and spatial filtering including gray-scale transformation function, histogram processing, fundamental of spatial

filtering, smoothing filter, sharpening filtering, frequency-domain filter, image restoration and reconstruction, colored-image processing including colored model, false color processing, full-color image processing, color transformation, smoothing and sharpening, colored-image fragmentation. denoising, compression, image compression which covers the fundamentals of compression and basic methods for image-compression, morphological image processing which covers corrosion, expansion, opening and closing, hit or miss, basic morphological algorithms, gray-scaling morphology, image segmentation: threshold method, regional segmentation, watershed segmentation, image representation and description, introduction on objection recognition. This course will teach students the fundamental theories, principles and methods for digital image processing and prepare students to operate with OpenCV to develop apps for digital image processing.

Recommended Textbooks/References:

1. Digital Image Processing (3rd Edition) by Rafael C. Gonzalez etl., translated by RUAN Qiuqi, Publishing House of Electronics Industry, 2012

Course Number: 0007460

Course Title: IOS Apps Design

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for the third grade students

Prerequisites: Fundamentals of programming (C language)

Evaluation Method: General Assessment

Course Description:

It is the optional course for digital media technology majors, which develops students' design concept and the proper coding habits and it offers insights and hands-on experience in the planning, design, development and launch processes which are needed in independent design of IPhone App and valued by the labor market. It covers "the fundamentals of object-oriented programming introduction", " Objective-C programming", "object-oriented Programming" etc.. It concentrates on the basic theories and teaches students Objective-C object-oriented programming and basic design modes which prepares the students to develop IPhone Apps.

Recommended Textbooks/References:

1. IOS Software Development Disclosing: IPhone&ipad Enterprise App and Game Development (IOS Ruanjian Kaifa Jiemi: Iphone&ipad Qiye Yingyonghe Youxi Kaifa), Yubbin, Publishing House of Electronics Industry

Course Number: 0006836

Course Title: Introduction to Motion Capture and Application of Motionbuilder

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for The third grade students

Prerequisites: None

Evaluation Method: Phased assignments and projects

Course Description:

It is a restricted electives for digital media technology majors. It teaches the operation of Autodesk

Motionbuilder used for 3D character animation design and motion capture. The course will teach students how to operate Motionbuilder to edit animation for 3D characters, including skeleton rigging, key-frame set up, nonlinear animation editing and exporting of the animation data. It teaches students how to do data tracking on real human motion by motion capture equipments. It develops students ability to coordinate motion capture devices with Motionbuilder and the capacity to apply character animation data into the production of 3D game animation.

Recommended Textbooks/References:

1. Motionbuilder official techniques documents, Autodest company

Course Number: 0007463

Course Title: Game Development with OpenGL

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for The third grade students

Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C++), Object-oriented programming, Discrete mathematics, Algorithm and data structure, Computer graphics, Database

Evaluation Method: Project design

Course Description:

It is a restricted elective and core course for the majors. It teaches the fundamentals, principles and hands-on experience of game development with OpenGL. It develops students' capacity to do rendering, special effects rendering with OpenGL, to master render script and to produce render script so as to develop an app with preliminary functions using OpenGL.

Recommended Textbooks/References:

1. OpenGL SuperBible, Richard S. Wright, Jr. Benjamin Lipchak, Nicolas Haemel, translated by ZHANG Qi, FU Fei, Post and Telecom Press, 01/09/2010

Course Number: 0007464

Course Title: Game Development Using C#

Credit: 2 **Total Credit Hours:** 32

Students: Digital media technology undergraduates for the third grade students

Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure.

Evaluation Method: Project design

Course Description:

It is a restricted elective and core course for the majors. It teaches the programming by C sharp language, Microsoft platform game design by C sharp language for windows, Xbox and windows phone, the development technology of dot net platform. Students will be able to use .net gadgeteer and netduino to do embedded game development and gain a better understanding about the applications of Microsoft C# and Net.

Recommended Textbooks/References:

1. Beginning Visual C# 2010, Watson K. and Nagel C., translated by HUANG Jing Tsinghua University Press, 01/12/2010

Course Number: 0007465
Course Title: Geometry Processing
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure, Computer graphics, Game Development with OpenGL
Evaluation Method: project design
Course Description:
It is a restricted elective and core course for the majors. It teaches the basic algorithm, theories and applications of geometry processing. It develops students' ability to develop programs to realize various geometry processing with C# language. It enhances students' capacity in programming and the application of linear algebra and advanced mathematics into geometry processing.
Recommended Textbooks/References:
1. OpenGL SuperBible, Richard S. Wright, Jr. Benjamin Lipchak, Nicolas Haemel, translated by ZHANG Qi, FU Fei, Post and Telecom Press, 01/09/2010

Course Number: 0007466
Course Title: Digital Photography and Camera
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the second grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
Photography is a must for digital media technology majors. It teaches on the basis of theory introduction the principles of photography and how to complete simple video or picture assignment with photographic equipment.
It inspires students to creatively and independently solve problems. It illustrates theories and definition with concrete examples, combining theory with practice. Each class proceeds with open-class discussion on the basis of a collection of a wealth of materials. It clarifies the definitions with vivid and famous animations to inspire in case students feel bored so as to enhance their appreciation of art.
Recommended Textbooks/References:
1. New York Institute of Photography, New York Film Academy, China Photography Press. First Edition 8/2009.

Course Number: 0007468
Course Title: Analysis of Game Engine
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure,

Computer graphics, Game development with OpenGL
Evaluation Method: Project design
Course Description:
It is a compulsory course of disciplinary fundamentals. It teaches students with interest in game design and with background of art and programming to learn the methods and skills of engines, taking OGRE as an example. It develops students' capacity to develop 3D games and virtual roaming which is needed in a 3D production team and game production company.
Recommended Textbooks/References:
None

Course Number: 0006846
Course Title: Screen Play
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
This course will have students have a general understanding of the basic theory and techniques of the conventional movie dramas. Preliminary master design, ideas, and to complete the process of a screenplay. The basis of the conventional movie dramas theory, graduate of the script and play, story and plot, elements of drama and drama structure, themes and emotions, characters and action " details and props, "the classic play of the narrative line and plot line," Space People "theories of the discussion of contrast contemplating changes.
Recommended Textbooks/References:
None

Course Number: 0006851
Course Title: The New Technology of Game Development
Credit: 2 **Total Credit Hours:** 32
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure, Computer graphics, Game development with OpenGL
Evaluation Method: Project design
Course Description:
It is an elective and core course for the majors. It teaches the latest game development technology, the trend of industry and fresh practices in game development. It helps students to stand at the forefront of the industry by introducing the latest technologies.
Recommended Textbooks/References:
None

Course Number: 0007155
Course Title: Cognitive Practice
Credit: 1 **Total Credit Hours:** 30
Students: Digital media technology undergraduates for The first grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
The main content of Cognitive Practice is to organize students to visit, study three to four digital media business or company in Beijing. The students will in-depth understand the classification in digital media technology professional in the actual industry (such as visual effects design, game design and development, etc.), as well as digital media technologies in specific engineering and design development process. The students will learn the forefront of the digital media technology and the digital media industry development prospects in the context of the cultural and creative industries in Beijing. Lay a foundation of interest and professional practice cognitive foundation for subsequent learning expertise. After the practice, students will combine their experience to complete the report.
Recommended Textbooks/References:
None

Course Number: 0007447
Course Title: Fundamental of 3D art
Credit: 3.5 **Total Credit Hours:** 105
Students: Digital media technology undergraduates for the second grade students
Prerequisites: None
Evaluation Method: Phased Assignments and Projects
Course Description:
It is a compulsory course for practice. Student will learn how to use the 3dsmax through practice and understand the process of 3D art design and production. Through project design and production, students will be familiar with the design concept and production procedures and elements in 3D art design, including modeling, material, textures, lighting, animation and rendering. It helps lay a solid foundation for more complex, more specialized 3D game art design and production. It prepares the students to do game design and development and virtual reality design and production. It consists of 5 parts, namely basic still life scene design and production, advanced still life scene design and production, basic modeling of polygon, intermediate modeling of polygon.
Recommended Textbooks/References:
1. Chief Editor: WANG QI, Autodest 3ds Max standard training textbook 1, Post &Telecom Press

Course Number: 0007157
Course Title: Fundamental of Game Art (sketch)
Credit: 2 **Total Credit Hours:** 60

Students: Digital media technology undergraduates for the first grade students
Prerequisites: None
Evaluation Method: General Assessment
Course Description:
Sketch is a fundamental course of game art design and molding. It teaches the basic techniques and methods of drawing game characters, animals, buildings, environment and scene in an imaginary and creative design and to discuss with designer and clients on game designing and development. It is a cornerstone course for game art designers.
Recommended Textbooks/References:
None

Course Number: 0007446
Course Title: Game Development using Flash
Credit: 2 **Total Credit Hours:** 60
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++)
Evaluation Method: Project design
Course Description:
By this course , students will master the method of making flash games, complete flash game design and production and learning flash game development language foundation and a variety of algorithms to complete the game design and innovation. This course will enable students to have basic AS3.0 programming and game development capabilities. By the step-by-step explanation of the game design steps, problems and solutions encountered in the skills of game design, game design process, and step by step lead students into areas of the Flash game design.
Recommended Textbooks/References:
1. Rex van der Spuy (Author), LI Xin (translator), CHEN Teng (translator), Bin (Translator), Flash Game Programming Fundamentals tutorial, Posts and Telecom Press, 1st edition (July 2011day)

Course Number: 0007744
Course Title: Foundations of Java Program Design
Credit: 3 **Total Credit Hours:** 90
Students: Digital media technology undergraduates for The third grade students
Prerequisites: Programming fundamentals (C language), Object-oriented programming (C++)
Evaluation Method: Phased Assignments and Projects
Course Description:
Java language as a object-oriented programming language that is more popular on the Internet, has the characteristics that has nothing to do with the operating system. The code can be run on different operating systems such as Windows, UNIX, Linux and MacOS. It is a powerful tool for the modern variety of network programming. The task of this course is to equip students with the ability to network programming and of applications of Java applets using Java in web design, after

students is familiar with Java programming tools, and object-oriented programming method. Through the course, the students will closer understand the basic concepts of object-oriented and the usage of the basic idea of object-oriented programming. The course will lay the foundation for further network programming.

Recommended Textbooks/References:

1. FU Zhuxi, XU Jiankui, Java Programming (2nd Edition), Tsinghua University Press, 2010.5

Course Number: 0006232

Course Title: Virtual Reality Practice

Credit: 2 **Total Credit Hours:** 60

Students: Digital media technology undergraduates for the third grade students

Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++), Discrete mathematics, Algorithm and data structure, Computer graphics, Game development using OpenGL

Evaluation Method: Project design

Course Description:

It is a compulsory course for practice. It requires students to grasp the principles, concepts, methods of VR development, to operate a rendering engine to do scene production for VR, to get the ropes of the basic components of VR development, to be able to set up a specific VR scene, to operate related engines, including Unity, Unreal and OGRE to conduct VR development. The project recommended include 3D VR museum, 3D VR community, 3D VR digital city and 3D VR building, etc..

Recommended Textbooks/References:

None

Course Number: 0007450

Course Title: Introduction to Game Development

Credit: 2 **Total Credit Hours:** 60

Students: Digital media technology undergraduates for the second grade students

Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++)

Evaluation Method: Project design

Course Description:

It is a compulsory course of practice. It expects students to know the classifications of games and concepts, including 3D game, webpage game, FLASH Game, Mobilephone Game, Sense Motion Games and to know their respective development technologies, which include javascript, android, Iphone, windows phone, game engine, sense motion devices. It offers a preliminary overview of game production.

Recommended Textbooks/References:

None

Course Number: 0007451
Course Title: Game Development Practice
Credit: 2 **Total Credit Hours:** 60
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++)
Evaluation Method: Project design
Course Description:
It is a compulsory course for practice. It teaches basic principles, concepts and methods of 3D game development. It expects students to produce and adapt with a game engine, to know the components of 3d games and to alter each components. It requires students to learn the development platform and language of 3D game and the operation of game engine including, Unity and Unreal so as to produce games.
Recommended Textbooks/References:
None

Course Number: 0007454
Course Title: Professional Practice
Credit: 7 **Total Credit Hours:** 210
Students: Digital media technology undergraduates for the fourth grade students
Prerequisites: Required courses
Evaluation Method: General Assessment
Course Description:
Professional Practice is an important part of training of digital media technology, undergraduate students in engineering practice ability. In the last semester of the senior year of college, the high level of professional and technical personnel come to college, using the school's laboratory equipment and other teaching resources (digital game design and development studio, digital video and animation design studio, digital multimedia communication technology studio, etc.),based on the elective learning route for students in the first three years and interest characteristics, to train students internship capacity. During the Professional Practice in accordance with the real business environment, the implementation of the ability of students in engineering practice will be done. Among these, some of the excellent students will be sent to the actual enterprises to attachment internship in the enterprise, to follow up the enterprise-specific work items.
Recommended Textbooks/References:
None

Course Number: 0006456
Course Title: Senior Project
Credit: 16 **Total Credit Hours:** 480
Students: Digital media technology undergraduates for the fourth grade students
Prerequisites: Required courses

Evaluation Method: Thesis oral defense

Course Description:

Senior Project design (thesis), is the most important part of the undergraduate students' four years of learning, the inspection of the final assessment of the students' learning outcomes. The teachers guiding the way to take the students' own proposition. Engineering design and development problems encountered by the students in the workplace attachment phase will be solved under the guidance of the teacher. All that is Reflected in papers. At the same time, the actual results of problem solving will be displayed as students graduate design work.

Recommended Textbooks/References:

None

Course Number: 0007470

Course Title: The original painting design

Credit: 1 **Total Credit Hours:** 30

Students: Digital media technology undergraduates for the first grade students

Prerequisites: None

Evaluation Method: General Assessment

Course Description:

The original painting design based on games, animation art design requirements and the actual operation. Students will have accumulation of hands-on experience of the most cutting-edge for the future development. Careful analysis in each case of the entire course will be a variety of techniques and methods as well as a variety of operating errors, have made detailed explanations. The original painting design is a basic course, this course emphasis is not on the operation of the software technology, it is on the art cultivation increased.

Recommended Textbooks/References:

None

Course Number: 0006872

Course Title: 3D Game Art and Design

Credit: 3 **Total Credit Hours:** 90

Students: Digital media technology undergraduates for the third grade students

Prerequisites: Fundamental of 3D Art

Evaluation Method: Phased assignments and projects

Course Description:

It is an elective course for practice. It prepares interested students who aspire to work in 3D game art design industry or to be an independent 3D game producer to learn basic tools, including 3dsmax, Zbrush, Motionbuilder and a comprehensive use of Photoshop. Enlightened by concrete examples, students will get holistic insights into the design philosophy and process of 3D game art design and production. They will understand the requirements by computer real-time rendering for design and production of 3D art subject matter. Via hands-on design and production experience, students will get to know the design principles and process of production in a project of 3D game and virtual reality of different and the elements involved, including, polygon modeling, shader,

textures, lighting, animation and real-time rendering. It is consisted of six parts, namely, advanced design and production of the inorganic, 3D environment design and production, refined 3D character design and production, 3D scene design in games, 3D character design in game and 3D game character animation editing.

Recommended Textbooks/References:

None

Course Number: 0007471

Course Title: Application of Game Engine

Credit: 3 **Total Credit Hours:** 90

Students: Digital media technology undergraduates for the third grade students

Prerequisites: Linear algebra, Advanced mathematics, Programming fundamentals (C language), Object-oriented programming (C++)

Evaluation Method: Project design

Course Description:

It proceeds from OGRE to teach students the methods and skills of operating a game engine. By practice and learning, students will be able to get the know-how of 3D game development, and virtual roaming needed in a 3D game production team and a game company. Students are expected to complete 3D game production and virtual reality project.

Recommended Textbooks/References:

None

Course Number: 0007472

Course Title: Artistic Anatomy and Digital Sculpture

Credit: 2 **Total Credit Hours:** 60

Students: digital media technology undergraduates for The third grade students

Prerequisites: Fundamental of Game Art (sketch)

Evaluation Method: General Assessment

Course Description:

For each artistic object, artists and designers will be toiled to observe and research.

Human body is the most important subject matter. It is important to know anatomy, the structure, organ-distribution and motion, therefore they could readily be adopted in future design and programming.

Artistic anatomy differs from medical one in that it requires student to notice the organs that affect the contour of a human body and the requirement is not as strict as that for painting majors. It stresses the structure of human body, the location and affiliation of major muscles and bones, the traction of bones by muscles and muscle, bone and fat impacts on human body by different postures.

It is supplemented by 3D sculpture software and practice aid.

Recommended Textbooks/References:

1. Strength Training Anatomy, Fredreic Delavier, ShanDong Science and Technology Press, First Edition

Course Number: 0007745
Course Title: Computer Graphics Ⅱ
Credit: 1 **Total Credit Hours:** 30
Students: Digital media technology undergraduates for The second grade students
Prerequisites: Linear algebra
Evaluation Method: Examination
Course Description:
It is a furthered study based on computer graphics 1. It proceeds from the introduction of advanced processing theory of graphics, ranging from modeling, rendering, collision detection technology, interpolation and spline modeling, dynamics and animation which includes the classification of animation, OpenGL animation realization, to non-polygon graphics, including, light projection, ray tracing, volume rendering, OpenGL-backed per pixel operation. Through practice, this course will teach students how to apply graphics into app development, the basics of advanced computer graphics and programming. The subjects covered in practice are: rendering and rendering pipeline which consists of pipeline, rasterization, OpenGL rendering pipeline, programmable shader and programming, GPU introduction and GPU special effects development.
Recommended Textbooks/References:
1. Computer Graphics by Steve Cunningham, translated by SHI Jiaoying, China Machine Press, 2009

Course Number: 0007473
Course Title: IOS Apps Design Practice
Credit: 2 **Total Credit Hours:** 60
Students: Digital media technology undergraduates for the third grade students
Prerequisites: IOS Apps Design
Evaluation Method: General Assessment
Course Description:
It is an optional course for digital media majors and a practice of IOS App Design course. It develops students design concept for 3G smart phone software and proper way of coding. It offers insights and hands-on experience in the process of planning, designing, development and launch necessary for independent IPhone App Design, a capability which is valued by the labor market. It covers “iPhone and iTunes App Store”, “OS-X Operating System”, “X-code Development Environment”, “Structure and Working Mechanism of iPhone App”, “iPhone OS API Analysis”, “App Quality Optimization”, “UI Design and Interface Builder Development and Application”, “Instruments” etc..
Recommended Textbooks/References:
1. IOS Software Development Disclosing, YU Bin, Beijing: Tsinghua University Press, 2011

Course Number: 0007474
Course Title: Android Mobile Apps Design
Credit: 2 **Total Credit Hours:** 60
Students: Digital media technology undergraduates for the third grade students
Prerequisites: Java Program Design

Evaluation Method: Project design

Course Description:

On the basis of Java Program Design, it combines theories with enterprise projects and prepares students the complete set of know-how to develop apps for Android smart phones. It covers “Android basics”, “core components”, “database technology”, “multimedia technology”, “2D/3D technology”, “game programming”, “background service”, “telephone service”, “SMS and MMS”, “sensor technology”, “network programming”, “internet technology”, “GPS and location service”, “Google Map service” etc.. Classic business case to be introduced are: “Mind Machine Android Version”, “Plants Vs. Zombies Android Version”, “GLMS logistic system”, “GPS subsystem”, “GWAP-2 operation system”, “automatic ordering subsystem”, “Palm Cinema”, “GBC-generic Weibo client”, “MyCity Positioning and Navigation Service System”, “P2P game platform”, “MessageMate-3G SMS management system”, etc..

Recommended Textbooks/References:

1. Android Game Programming from Scratch, LI Huaming, Tsinghua University press, 2011
2. Android 2.0 Game Development Bible(Android 2.0 youxi kaifa baodian), WU Yafeng, SU Yaguang, Post &Telecom Press.