

## 计算机科学学院专业拓展课

### Specialized Non-restrictive Elective Courses of School of Computer Science

课程编码 Courses Code	课程名称 Courses Name	开课学期 Semester	学分 Cre.	讲授学时 Teaching Hrs.	实验/实践学时 Experiment/ Training Hrs.	周学时 Weekly Hrs.	考试方式 Evaluation
1243001	专业英语 Computer English	5	2	36	0	2	考查 Quiz
1243421	微机原理与接口技术 Microcomputer and Interface Technology	5	2.5	36	18	2	考查 Quiz
1243422	计算机图形学 Computer Graphics	5	1.5	18	18	2	考查 Quiz
1243432	高级数据结构 Advanced Data Structures	5	2	36	0	2	考查 Quiz
1243423	移动计算 Mobile Computing	6	1.5	18	18	2	考查 Quiz
1243424	数字图像处理技术 Digital Image Processing Technologies	6	1.5	18	18	2	考查 Quiz
1243425	Android 应用开发 Development of Android Application	6	1.5	18	18	2	考查 Quiz
1243433	操作系统（二） Operating Systems 2	6	2	36	0	2	考查 Quiz
1243434	高级程序设计 Advanced Programming	6	2	36	0	2	考查 Quiz
1243426	信息安全 Information Security	7	1.5	18	18	2	考查 Quiz
1243427	智能计算 Intelligent Computing	7	1.5	18	18	2	考查 Quiz
1243428	电子商务 Electronic Commerce	7	2	36	0	2	考查 Quiz
1243429	创新创业指导 Innovation and Entrepreneurship Guidance	8	1	18	0	2	考查 Quiz
1243430	计算机新技术 New Computer Technologies	8	1	18	0	2	考查 Quiz
1243431	网络安全 Network Security	8	2.5	36	18	2	考查 Quiz
说明 Notes	<p>1. 计算机科学学院专业拓展课程共 15 门。</p> <p>2. 计算机科学与技术专业（师范）学生应至少选修 4 学分；计算机科学与技术专业（创新实验班）学生应至少选修 6 学分；软件工程专业学生应至少选修 6 学分；信息管理与信息系统专业学生应至少选修 6 学分。</p> <p>1. There are 15 specialized non-restrictive elective courses of School of Computer Science in total.</p> <p>2. Undergraduates in Computer Science and Technology Specialty (Teaching-Training) should obtain at least 4 credits; Undergraduates in Computer Science and Technology specialty (experimental and innovative class) should obtain at least 6 credits; Undergraduates in Software Engineering Specialty should obtain at least 6 credits; Undergraduates in Information Management and Information System Specialty should obtain at least 6 credits.</p>						

## 课程简介(Brief Introduction of Main Courses)

### 1. 课程名称：专业英语

(1) 课程编码：1243001

(2) 课程简介：该课程主要介绍计算机与信息技术的英文基本概念、常用术语和信息技术资料。主要内容包括：信息技术概述；系统软件与应用软件；处理、存储以及输入输出等硬件系统；数据通信系统；计算机网络；因特网与网络服务；计算机安全。通过本课程的学习，学生能初步掌握计算机相关的英文专业术语，基本具备阅读计算机专业相关的简短英文资料的能力。

### 1. Course Name: Computer English

(1) Course Code: 1243001

(2) Brief Introduction of the Course: In this course, the basic English concepts, key terms, and IT articles are addressed. The main contents include an overview of IT, system software and application software, hardware system for processing, storing, and inputting and outputting, data communication system, computer network, Internet and its services, and computer security. After studying the course, the students are supposed to grasp the computer-related English words and terms, and have the ability of reading the brief English materials in computer areas.

### 2. 课程名称：微机原理与接口技术

(1) 课程编码：1243421

(2) 课程简介：该课程讲述微型计算机的实现技术。内容包括微型计算机原理、80X86 微处理器的结构、80X86 微处理器的指令系统、汇编语言程序设计、内存储器及其接口、输入输出、中断、可编程接口芯片及其应用、总线技术以及微机系统实用接口技术。

### 2. Course Name: Microcomputer and Interface Technology

(1) Course Code: 1243421

(2) Brief Introduction of the Course: The course introduces the implementation of microcomputer. It presents basic concepts such as the principles of microcomputer, the organizations and instruction system of 80X86 microprocessors, assembler language programming, memory and interfaces, input/output, interrupt programmable interface chips and their application, bussing technique and practical interface techniques of microcomputer systems.

### 3. 课程名称：计算机图形学

(1) 课程编码：1243422

(2) 课程简介：该课程属计算机生成、处理和显示图形的学科。通过本课程的学习，使学生了解计算机图形学的发展和应用，学习计算机图形信息处理的基本理论和方法，掌握基本图形程序设计方法，包括理解图形绘制的基本方法以及二维和三维图形几何变换程序设计方法。

### 3. Course Name: Computer Graphics

(1) Course Code: 1243422

(2) Brief Introduction of the Course: Computer Graphics is concerned with how computer builds, processes and shows graphics. Through the study of this course, student are supposed to know the development and application of computer graphics, study the basic theory and information processing method of computer graphics and master the basic graphic display programming design method which includes understanding the basic design of graphic plotting and programming design method based on 2D and 3D geometric transform.

### 4. 课程名称：高级数据结构

(1) 课程编码: 1243432

(2) 课程简介: 该课程帮助学生深入了解数据结构及其分类、数据结构与算法的密切关系; 提高对各种基本数据结构的操作能力, 能够根据实际问题要求来选择数据结构; 掌握基本查找表的概念、特征及其查找方法, 基本的内排序和外排序方法, 以及设计算法的步骤和算法分析方法; 掌握数据结构在排序和查找等常用算法中的应用; 扩展对文件组织方法和索引技术的了解。

#### **4. Course Name: Advanced Data Structures**

(1) Course Code: 1243432

(2) Brief Introduction of the Course: This course offers deep understanding of the close relationship between data structure and its classification as well as algorithm. It will improve various basic data structures operation ability, and relevant capability of selecting data structure according to the requirements of the practical problems. It enables students to grasp the basic concept of searching table, its characteristics, searching methods, and various steps of designing an algorithm and the methods of analyzing an algorithm. The course also introduces data structure application in sorting and searching algorithms, and extends related understanding of file organizing methods and indexing techniques.

#### **5. 课程名称: 移动计算**

(1) 课程编码: 1243423

(2) 课程简介: 该课程介绍移动设备如何进行通讯以及实现通讯的各种实现技术, 讲述移动计算的基本概念, 主要集中于无线通讯网络、移动信息管理和移动应用系统。在学习该课程之前最好能够掌握一些计算机网络和数据库方面的知识。

#### **5. Course Name: Mobile Computing**

(1) Course Code: 1243423

(2) Brief Introduction of the Course:

This course is offered for those who are interested in knowing how mobile devices can be used to communicate with another party and what the technologies are involved to realize such a system. The fundamental concepts of mobile computing are introduced. However, our main focus will be on wireless telecommunication networks, portable information management and mobile application system. Prerequisites: a little bit background of network and database will be helpful.

#### **6. 课程名称: 数字图像处理技术**

(1) 课程编码: 1243424

(2) 课程简介: 该课程研究利用计算机完成图像信息各种处理的基本理论和方法。主要教学内容有图像的获取和表示: 主要是把模拟图像信号转换为计算机所能接受的数字形式, 以及把数字图像显示和表现出来; 图像增强: 校正图像的某些参数从而改善图像质量; 图像复原: 消除图像中各种退化, 利用复原技术校正图像。

#### **6. Course Name: Digital image processing Technologies**

(1) Course Code: 1243424

(2) Brief Introduction of the Course: Computer image processing is about manipulating image information using computers. The main contents of the course are: image acquisition and presentation, image enhancement and image recovery.

#### **7. 课程名称: Android 应用开发**

(1) 课程编码: 1243425

(2) 课程简介: 该课程主要介绍 Android 上的应用开发, 内容涉及程序架构, UI 编程, 数据存取, 网络编程等众多知识点, 使学生从零基础开始逐步达到独立开发 Android 应用程序的能力, 在整个课程中将配以大量开发实例, 使学生通过充分地动手实践、全面掌握 Android 操作系统相关的技术点及这些技术的实现思想, 教给学生分析和解决问题的能力及技巧。

#### **7. Course Name: Development of Android Application**

(1) Course Code: 1243425

(2) Brief Introduction of the Course: This course mainly introduces the development of Android applications. The content covers procedural framework, UI programming, data access, network programming and other knowledge. It gradually helps students to achieve ability that develops Android applications independently. In the course, a large number of development examples will be used, which makes students comprehensively to grasp the technical points of the Android operating system and the development of these technologies through practice. Students' ability and skills of analyzing and solving problems will be improved.

## **8. 课程名称：操作系统（二）**

(1) 课程编码：1243433

(2) 课程简介：该课程旨在学习《操作系统（一）》的基础上加深学生对操作系统热点和核心的理解。本课程的覆盖内容包括操作系统的基本理论、最新进展和发展趋势，涉及话题包括进程管理、内存管理、处理器调度、I/O 和文件管理、分布式系统和安全等。本课程会选择特定的操作系统实例进行研究。学习本课程一方面能为将来从事操作系统研究的同学提供更广阔的技术背景和理论基础，同时可以使学生分析和解决问题的能力得以提高。

### **8. Course Name: Operating Systems 2**

(1) Course Code: 1243433

(2) Brief Introduction of the Course: The study of this course bases on the Operating System 1, with the purpose of strengthening students understanding of the core concept of operating system. The course covers the basic theory of operating system, latest progress and new development trend, and relevant topics, such as process management, memory management, processor scheduling, I/O and file management, distributed systems and safety and so on. This course will choose the specific operating system as the case study to practice. Through this course, it provides students who may further engage in operating system study in the future with more extensive technical background and theoretical basis on the one hand, and it also improves students' ability in terms of analyzing and solving problems.

## **9. 课程名称：高级程序设计**

(1) 课程编码：1243434

(2) 课程简介：该课程着眼于 C 语言语法的高级程序设计，更注重语法在程序设计中的应用意义；特别注重程序设计方法和技巧，包括最基本的累加、求最大最小等程序设计方法外，还包括常用的顺推法、倒推法、迭代法、穷举法、回溯法等程序设计方法，排序和查找等算法，以及巧用下标、状态变量使用等程序设计技巧。

### **9. Course Name: Advanced Programming**

(1) Course Code: 1243434

(2) Brief Introduction of the Course: This course teaches students the advanced program design based on C language algorithm, and especially attaches the importance to the application meaning of the algorithm during the program design. The content includes:1) some common program design methods such as the push method, inverse push method, iteration method, exhaustion method, backtracking method, etc. ;2) sorting and search algorithm; 3) some design tactics like skillful use of subscript and state variable. In addition to this, this course lays much more emphasis on the ways and techniques of program design including the basic accumulation, seeking the max-min value, etc.

## **10. 课程名称：信息安全**

(1) 课程编码：1243426

(2) 课程简介：该课程分为信息设备安全、数据安全、内容安全和行为安全几个方面。本课程帮助学生掌握对称密码、公钥密码、Hash 函数以及网络安全等内容，能够灵活运用各种技术保证信息的安全。

## **10. Course Name: Information Security**

(1) Course Code: 1243426

(2) Brief Introduction of the Course: Information security includes information equipment safety, data security, content security and behavioral security. This course help students master symmetric cryptography, public key cryptography, hash functions and network security etc., and can flexibly use various techniques to ensure the security of the information.

## **11. 课程名称：智能计算**

(1) 课程编码：1243427

(2) 课程简介：该课程系统介绍智能计算方法的一般原理（借鉴和模拟生命进化过程、社会活动和行为等）、主要类型（系统建模、空间搜索和系统模拟等）和算法性质与流程。简要介绍智能计算中的复杂适应系统（进化系统）、多主体系统、面向领域的智能系统等内容，详细介绍空间搜索的最新智能算法形式，包括进化算法（遗传算法等）、粒子群算法、蚁群算法、免疫算法、模拟退火算法、禁忌搜索算法、（合领域知识的）启发式算法、DNA 计算、量子计算等，并结合典型问题进行计算实验讨论。通过本课程的学习，使学生掌握智能计算方法的基本理论和技术，并了解在如何应用于解决管理与工程实践中的重要问题。

## **11. Course Name: Intelligent Computing**

(1) Course Code: 1243427

(2) Brief Introduction of the Course: This course systematically introduces the general principle of computational intelligence method (reference and simulate the process of the evolution of life, social activities and behavior, etc.), the main types (system modeling, the search space and system simulation, etc.) and algorithmic properties and processes. Besides brief introduction of Intelligent Computing in the adaptation system (Evolution), multi agent system, oriented in the field of intelligent system, the latest intelligent algorithms of space search are introduced in detail, including evolutionary algorithm (genetic algorithm, particle swarm optimization algorithm, ant colony algorithm, immune algorithm, simulation annealing algorithm, tabu search algorithm, (a combination of domain knowledge) heuristic algorithm, DNA computing, quantum computing, etc. Through the study of the course, students can grasp the basic theory and technology of intelligent computing method, and understand the important problems in how to solve the problems in management and engineering practice.

## **12. 课程名称：电子商务**

(1) 课程编码：1243428

(2) 课程简介：该课程分为基础、技术、管理、应用四大部分。基础部分介绍电子商务的基础理论；技术部分重点介绍技术支撑平台、支付策略与技术、安全技术；管理部分介绍电子商务与法律、税收、网络企业管理；应用部分侧重于介绍电子商务与国际贸易、网络应用心理学、电子商务案例分析。

## **12. Course Name: Electronic Commerce**

(1) Course Code: 1243428

(2) Brief Introduction of the Course: The course discusses the foundations and key aspects of E-commerce which focus on the latest developments in the E-commerce industry. Practical case studies offer a useful reference for dealing with various issues in E-commerce such as latest applications, management techniques, or psychological methods.

## **13. 课程名称：创新创业指导**

(1) 课程编码：1243429

(2) 课程简介：该课程使学生掌握开展创业活动所需要的基本知识，认知创业的基本内涵和创业活动的特殊性，辩证地认识和分析创业者、创业机会、创业资源、创业计划和创业项目。使学生具备必要的创业能力，掌握创业资源整合与创业计划撰写的方法，熟悉新企业的开办流程与管理，提高创办和管理企业的综合素质和能力。使学生树立

科学的创业，主动适应国家经济社会发展和人的全面发展需求，正确理解创业与职业生涯发展的关系，自觉遵循创业规律，积极投身创业实践。

**13. Course Name: Innovation and entrepreneurship guidance**

(1) Course Code: 1243429

(2) Brief Introduction of the Course: To enable students to master the basic knowledge needed to carry out entrepreneurial activities, the particularity of entrepreneurial cognition and the basic connotation of entrepreneurial activity and dialectical understanding and analysis of venture, entrepreneurial opportunity, entrepreneurial resources, business plans and business projects. To enable students to have the necessary entrepreneurial ability, grasp the entrepreneurial resources integration and business plan writing method, familiar with the new business start-up process and management, improve its and enterprise management comprehensive quality and ability. Enable students to establish a scientific business, take the initiative to adapt to the development needs of national economic and social development and people, correctly understand the relationship between entrepreneurship and career development, conscientiously abide by business rules, actively join the business practices.

**14. 课程名称：计算机新技术**

(1) 课程编码：1243430

(2) 课程简介：该课程使学生了解计算机领域的一些前沿课题。课程以专题讲座的形式进行教学，每个专题涉及当前一个时期内比较一种新的理论、技术。

**14. Course Name: New Computer Technologies**

(1) Course Code: 1243430

(2) Brief Introduction of the Course: This course help students know something about the frontier topics in computer science and technology. It is in the form of lectures, and every lecture is on a new theory, or technology.

**15. 课程名称：网络安全**

(1) 课程编码：1243431

(2) 课程简介：该课程帮助学生对计算机系统与网络安全有一个全景的把握，并能深入理解和运用计算机系统与网络安全防御的技能，增强计算机系统与网络的安全防范能力。主要内容包括：密码学基础，网络基础（TCP/IP），恶意软件概念及防范，安全技术（防火墙，入侵检测，VPN 等），网络应用安全（网络扫描，网络监听，WEB 安全等），数据备份等。

**15. Course Name: Network Security**

(1) Course Code: 1243431

(2) Brief Introduction of the Course: This course help students have a panoramic view of the grasp of computer systems and network security, in-depth understanding, application of computer systems, networks security and defense skills, to enhance security capabilities of computer systems and networks. The main contents include the basis of cryptography, networking fundamentals(TCP/IP), the concept of malicious software and prevention technology, security technology(Firewall, IDS, VPN etc.), network application security(network Scanning, Network Sniffer, Web security), data backups, etc..