



北京工业大学

BELING UNIVERSITY OF TECHNOLOGY

100 Ping Le Yuan • Chaoyang District • Beijing 100124 • P.R.China

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电工技术 I		
课程英文名称 <b>Course Title</b>	Electrotechnics I		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程是高等学校本科非电类专业的一门技术基础课程。通过本课程的学习,可获得必要的电工技术基本理论、基本知识和基本技能,为今后学习电子技术等专业课程和从事与本专业有关的工作打下一定的基础。本课程内容包括电路分析、磁路分析、变压器原理与特性、电动机原理及其继电接触控制、电工测量基础和安全用电常识。其中电路分析部分包括电阻、电容、电感、电压源、电流源和受控源等基本元件特性、基尔霍夫电压和电流定律、叠加定理和戴维南定理、直流电路分析包括等效变换、支路电流法和结点电压法、一阶动态电路的暂态分析、交流电路相量分析、三相电路及非正弦周期电路分析;磁路分析包括直流磁路和交流磁路分析及电磁铁原理。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a basic course for undergraduate students major in non-electronic and non-electrical. The students are expected to grasp the basic concepts, theories, methods, and the basic techniques of electrotechnics, which would lay a foundation for further studying and related work of students. The main topics include: circuit analysis, magnetic circuit analysis, transformer principles and features, three-phase electric motors, contactor control of electric motors, and basic knowledge of electrical measurement and how to safely use electricity. And the circuit analysis include: basic circuit elements; Kirchhoff's law; superposition theorem; Thevenin's and Norton's theorems; resistive circuit analysis; transient analysis of first-and second-order circuit; AC circuit analysis (phasor method, impedance computing, etc.); harmonic analysis; three-phase circuit; non-sinusoidal periodic circuit analysis; magnetic path analysis.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电工技术 II		
课程英文名称 <b>Course Title</b>	Electrotechnics II		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程是高等学校本科非电类专业的一门技术基础课程。通过本课程的学习,可获得必要的电工技术基本理论、基本知识和基本技能,为今后学习电子技术等专业课程和从事与本专业有关的工作打下一定的基础。本课程包括理论课和实验,理论内容有:电路分析、电工测量基础和安全用电常识。其中电路分析部分包括电阻、电容、电感、电压源、电流源和受控源等基本元件特性、基尔霍夫电压和电流定律、叠加定理和戴维南定理、直流电路分析包括等效变换、支路电流法和结点电压法、一阶动态电路的暂态分析、交流电路相量分析、三相电路及非正弦周期电路分析。实验包括三个硬件实验和一个 Multisim 软件仿真实验。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a basic course for the undergraduate students major in non-electronic and non-electrical. The students are expected to get the basic concepts, theories, methods, and the basic techniques of electrotechnics. This course consists of lectures and experiments. The basic topics include: circuit analysis, basic knowledge of electrical measurement and how to use electricity safely. The circuit analysis include: basic circuit elements; Kirchhoff's law; superposition theorem; Thevenin's and Norton's theorems; resistive circuit analysis; transient analysis of first- and second-order circuit; AC circuit analysis (phasor method, impedance computing, etc.); harmonic analysis; three-phase circuit; non-sinusoidal periodic circuit analysis. The experiments include three hardware experiments and one EDA experiment with Multisim.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子技术 IV		
课程英文名称 <b>Course Title</b>	Electronic Technology IV		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程是为非电专业本科生开设的学科基础课。目的是使同学获得电子技术的基本理论、基本知识和基本技能，了解电子技术的应用和发展情况，为学习后续课程以及从事与本专业有关的工程技术工作打下一定基础。具体知识包括模拟电路基础和数字电路基础。模拟电路基础包括：二极管、三极管。共射极阻容耦合放大电路、共集电极放大电路和多级放大器。差动放大电路。集成运算放大器：基本分析方法和简单电路的设计方法。反馈及负反馈对放大电路性能的影响。集成电压比较器。整流、滤波电路。串联稳压电路的结构及集成稳压器的应用。振荡器。数字电路基础：会用逻辑代数或卡诺图进行逻辑电路的分析和化简，基本门电路，TTL 门电路的内部结构原理及端口电路的特点，组合逻辑电路的分析方法和设计方法，编码器、译码器、显示器，R-S、J-K、D 触发器的工作原理、逻辑功能及应用方法，寄存器、计数器的工作原理、分析方法，集成计数器的分析、设计和应用方法，集成计数器的结构。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is the subject basic course for the undergraduate of non-electric major. The students are expected to get the basic theories, concepts, methods, and the basic techniques of electronic technology, and understand the application and development of electronic technology, and for students to lay the foundation for the future studying and the related work. The basic topics include: the analog electronics and the digital electronics. The analog electronics include: diode, transistor, common emitter resistance capacity coupled amplifier, common collector amplifier and Multi-stage amplifier circuit, differential amplifier circuit, the basic analysis method and the design of simple circuits for integrated operational amplifier, the concepts of feedback and the effects of the negative feedback on the performance of the amplifier, integrated voltage comparator, oscillator, the rectifier, filter circuit and series regulator circuit of DC Power Supply. Digital electronics include: the methods of analysis and simplification of logic circuits with Logical algebra or Karnaugh map, the basic gate circuits, the internal structure and the characteristics of TTL gate circuit, the methods of analysis and synthesis for combinational logic circuit, encoder, decoder, monitor, the working principle of logic functions and applications of R-S, J-K and D triggers, register, counter, the analysis and design of integrated counter.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电路与电子技术		
课程英文名称 <b>Course Title</b>	Circuit and Electronic Technology		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>本课程是对高等工科院校非电类专业学生进行电子技术基础教育的技术基础课。通过本课程的学习,使学生掌握电路分析与电子技术方面的基本理论和基本分析方法,了解电子技术的应用和发展概况,初步掌握电子电路的分析、设计方法。在培养学生电路及电子设计的创新精神、思维能力、分析和解决实际问题能力等方面具有重要意义,为学习后续课程以及从事与本专业有关的工程技术等工作奠定一定的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a basic Electronic Technology course for the student of the department of computer science. The students are expected to grasp the basic principle and analysis methods of circuit and electronic technology, through which the ability of analysis of circuit is improved. Application of Electronic Technology, development profile, electronic circuit analysis, and design methods will be studied in this course, which can improve the ability of circuits and electronics design and solve practical problems, the spirit of innovative, and the skills of thinking and analyze. This course will base for the study of the computer science technology. (The basic design principles and applications of the basic arithmetic circuit, the signal generator circuit, the signal processing circuit and DC voltage regulator circuit will be studied in the experiment of this course).</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信网络基础		
课程英文名称 <b>Course Title</b>	Fundamentals of Communication Networks		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是通信、电子信息类专业学科基础必修课。通过这门课程的学习,使学生获得通信网络方面的基本理论、基本知识和基本技能,培养学生具有分析和应用通信网络的基本能力,为学生从事通信、电子相关的工作岗位打下坚实的基础。通信网络在传统的电话交换网、分组交换网、计算机通信网的基础上得到了飞速发展,出现了多种新型的网络和技术,例如,宽带综合业务网(B-ISDN)、Internet、千兆以太网、第三代移动通信系统(IMT-2000)及其长期演进等。目前正在向下一代Internet、全光网络、第四代移动通信等方向发展。尽管这些网络在形式上千差万别,但它们的基本原理是相同的。本课程的教学任务是系统深入地讨论这些网络的共性原理。</p>			
课程英文简介 <b>Course Description</b>			
<p>Fundamentals of communication networks are the required course for electronic information-majors students. Communication networked systems are at the core of a wide range of human activity, including health, business, science, engineering and social interaction. Communication networks are extremely complex systems consisting of many components whose operation depends on many processes. To understand networks it is essential that students be exposed to the big picture of networks that allows them to see how the various parts of the network fit into one whole. This course attempts to provide a balanced view of all important elements of communication networking. The course describes many of the most popular analytical techniques for design and analysis of communication networks, with an emphasis on performance issues such as delay, blocking, and multiple address techniques. Specific contents include the basic and intermediate theory of queuing systems, the fundamental concepts of communication network architecture, and data link control protocols.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电工电子基础训练 II		
课程英文名称 <b>Course Title</b>	The basic practical training of Electrical and Electronic II		
总学时 <b>Total Credit Hours</b>	30	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>本课程通过理论学习和动手实践,使学生初步接触电工及电子基础知识,了解和掌握基础的电工电子操作技能,其中包括安全用电、电工基础实训、常用电子元器件的识别与测量;熟悉电子焊接工艺基本知识、原理和实际操作;了解电子产品制作工艺流程,掌握印制电路板制作工艺及生产流程,能设计、焊接、调试出一定难度的电子电路、最终装焊一台正规的电子产品。使学生了解并初步掌握当今世界先进的电工电子基础,培养学生具有一定的综合实践能力,培养学生的工程意识和认真、自信精神,为对学生后续课程打下良好的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through the study of theory and hands-on practice, this course aims to give students a basic understanding of electrical and electronic knowledge and master the basic skills involved in the safety use of electricity, electrical basis training, the identification and measurement of commonly used electronic components, familiar with electronic welding process basic knowledge of principles and practical understanding of the electronic production process, to master the printed circuit board production process and production processes, to design, welding, electronic circuit debugging some difficulty, the final assembly and welding of a formal electronic products. Let students to understand and master the world's most advanced electrical and electronic foundation preliminary, make students have a comprehensive practical ability to cultivate students' awareness of engineering and careful, self-confident spirit, and lay a good foundation for students' follow-up courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子工艺实习		
课程英文名称 <b>Course Title</b>	Electronic Technical Practice		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程通过理论学习和动手实践,使学生初步接触电子产品生产实际,了解和掌握一般电子工艺知识和技能,其中包括常用电子元器件的识别与测量;常用仪器、仪表的使用,熟悉电子焊接工艺基本知识和原理;较熟练掌握锡焊得操作,了解电子产品制作工艺流程,掌握印制电路板制作工艺及生产流程,掌握印制电路的计算机辅助设计方法,并能设计、焊接、调试出一定难度的电子电路。最终装焊一台正规的电子产品。随着电子技术突飞猛进的发展,也随着电子工程应用技术方面的飞速进步,增加了表面安装技术(SMT)实习,让学生接触手工贴片技术,再流焊接工艺并亲手制作一个表面贴装工艺的实习产品,使学生了解并初步掌握当今世界先进的电子工艺技术,培养学生具有一定的综合实践能力</p>			
课程英文简介 <b>Course Description</b>			
<p>In this course students would contact with the electrical and electronic knowledge, and master the basic skills of electronics process technology. It is including the identification and measurement of the safety use of electricity, electrical basis training, commonly used in electronic components; familiar with electronic welding process basic knowledge of principles and practical; understanding of the electronic production process, mastering the printed circuit board production process and production processes, and design, welding, electronic circuit debugging some difficulty, the final assembly and welding of a formal electronic products. Let students to understand and master the world's most advanced electrical and electronic foundation preliminary, and make students have a comprehensive practical ability to cultivate students' awareness of engineering and careful, self-confident spirit, and lay a good foundation for students' follow-up courses.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	模拟电子技术		
课程英文名称 <b>Course Title</b>	Analog Electronics Technique II		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>通过本课程的学习,要求学生掌握电子器件的基本性能,掌握基本放大电路、模拟集成电路、反馈放大电路的基本理论和基本分析方法,为专业深造打下良好的模拟电子技术基础。(由模拟集成电路所组成的基本运算电路、信号产生电路、信号处理电路和直流稳压电路的基本设计原理和基本应用技术在实验环节进行),</p>			
课程英文简介 <b>Course Description</b>			
<p>The students are expected to master basic performances of electronic devices, test methods, basic principles and basic analysis methods of the typical circuits which include the composition of the general electronic equipment, the high-performance analog integrated circuits, and the feedback amplification circuits through which the good foundation will be based for the analogy electronic science.</p> <p>(The basic design principles and basic applications of the basic arithmetic circuit, the signal generator circuit, the signal processing circuit and DC voltage regulator circuit will be studied in experiments of this course.)</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字电子技术		
课程英文名称 <b>Course Title</b>	Digital Electronic Technology		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>本课程是应用物理专业本科生的基础必修课，具有较强的实践性。通过本课程的教学，使学生掌握数字电子技术领域的基本概念、基本方法和基本技能；培养学生在该领域的分析、设计、综合与创新能力；掌握 Multisim 仿真软件的应用技术；了解可编程逻辑器件的基本原理与应用；了解用硬件描述语言设计硬件的思路和基本方法，为后续专业课程的学习打下良好基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a foundation course for undergraduate students majored in Electronic Engineering, Communication Engineering, Electronic Science &amp; Technology, Automation, and Biological Engineering. It is closely related to practical applications. The student who has finished the course should be able to grasp the basic concepts, methodologies and skills in the field of digital electronic technology. The objectives of this course are to cultivate the students' abilities of analysis, design, synthesis and innovation in this field, to grasp Multiuse simulation software and its application technique, to understand the fundamental theory and applications of programmable logic devices, and get to know the idea and basic method of hardware design implemented by hardware description languages, and finally to lay good foundation for the subsequent professional courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	无线通信原理		
课程英文名称 <b>Course Title</b>	Wireless communications		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过对无线通信一般原理的讲解、分析与技术的讨论向学生传授有关知识，培养学生的分析、设计能力。要求掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体内容有：常用的无线通信系统，各自的优势与互补。无线传播特性形成的信道基本特性、分析方法及建模方法。无线链路增强技术，如信道编码技术、交织器、调制技术在无线信道下的性能分析和配置、三者结合的编码调制技术原理、结合无线信道变化特性的自适应编码调制等技术原理和性能优势；利用信道独立特性的分集原理及发送接收技术；高性能传输技术，如多天系统（MIMO）的性能分析及空时码、预编码和复用技术，正交频分复用调制（OFDM）技术原理及问题等；扩频通信（CDMA）原理等内容。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through explanation, analysis and discussion of the principle of the wireless communications to students develop the students' abilities of analyzing and designing. The students are required to grasp the basic concepts, theories, methods and techniques. The contents include the common wireless communication systems, their respective advantages and complements with each other, the basic characteristics, and analysis and modeling methods of the channel, based on wireless propagation characteristics. The wireless link enhanced technologies, such as channel coding technology, interleave, modulation and their performance analysis and configuration in the wireless channel, combination of the three methods base on coding modulation principle, the principle and performance advantages of the adaptive coding modulation based on wireless channel changes, the diversity principle and the sending-receiving technology base on the independent characteristics of the channel. high-performance transmission technology, such as the performance analysis of MIMO, space-time code, recoding and multiplexing technology, the technology principle and the problems of OFDM, the principles of CDMA and so on.</p>			





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课程名称 <b>Course Title</b>	电路分析基础 II		
课程英文名称 <b>Course Title</b>	Circuit Analysis Fundamentals II		
总学时 <b>Total Credit Hours</b>	80	总学分 <b>Credit</b>	5
课程中文简介 <b>Course Description</b>			
<p>电路分析基础 II 是电工、电子、通信、自动控制与计算机等技术领域必备的基本理论知识，是高校电类专业必修的学科基础课。电路分析基础 II 课程理论严密、逻辑性强，有广阔的工程背景。通过本课程的学习，对培养学生严肃认真的科学作风和理论联系实际的工程观点，对培养学生的科学思维能力、分析计算能力、实验研究能力和科学归纳能力都有重要的作用。</p> <p>它主要研究电路分析理论的基本概念、基本定律、基本定理与基本方法及其在工程实践中的应用，并通过实验课来培养学生的操作与测试能力。</p> <p>通过本课程的学习，应使学生深刻理解和掌握电路理论的基本概念、基本定律、基本定理与基本分析方法，并学会在工程实践中的应用。通过本课程的学习，应为学生学习后续课程（模拟电子电路，数字电子电路，信号与系统，通信电路等）及专业课程，打下必要的基础，并为学生在今后的创业实践中提供必要的知识储备。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a compulsory basic course for undergraduate students majored in Electronic Engineering, Communication Engineering, Electronic Science and Technology, Automation, Control Engineering, and Biological Engineering. The students are expected to grasp the basic concepts, laws and theorems, methods, and techniques of circuit theory. And through the experiments in this course, the ability of operation, testing and scientific experiments would be trained. This course would lay the necessary foundation for students to study follow-up courses, such as, Analog Electronic technology, Digital Electronic technology, Signal and Systems, High-frequency Electronic Circuits, etc., and some professional courses. It will also lay foundation for students to practice "sustainable development" in their work.</p> <p>The main topics have: basic circuit elements; Kirchhoff's law; superposition theorem; Thevenin's and Norton's theorems; resistive circuits analysis included equivalent transform, loop and nodal analysis method; transient analysis of first-order and second-order dynamic circuits; AC steady-state analysis included phasor method, impedance computing, harmonic and frequency analysis; three-phase circuit and non-sinusoidal periodic circuit analysis; two-port networks analysis and non-linear resistive circuit analysis.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机软件基础		
课程英文名称 <b>Course Title</b>	Fundamentals of Computer Software		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>随着计算机应用领域的扩大和深入,非计算机专业的工程技术人员掌握必要的计算机软件技术基础知识是提高计算机应用水平、利用计算机技术解决本专业工作中的具体问题的的重要途径。计算机软件基础是电类非计算机类专业本科生的一门学科基础必修课,内容包括数据结构、软件工程和操作系统三门课程的基本内容。通过本课程学习,使学生了解和掌握程序设计中常用的数据结构及相应算法;掌握操作系统的基本概念和基本功能,了解计算机系统软、硬件资源如何控制管理,如何合理组织计算机系统的工作流程;了解如何以软件工程的观点开发应用软件的基本理论和方法,了解软件开发环境和常用工具。加强程序设计能力的训练,培养学生 在计算机软件领域中分析问题和解决问题的能力,为今后开发应用软件打下必要的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>With the expansion of computer applications and development, technical personnel of non-computer major are required to know the necessary computer software technology to improve the level of computer application, to use computer technology to solve specific issues in the professional work. This course, Fundamentals of Computer Software, is a compulsory course for undergraduate students, who are in electrical related and non-computer major. This course includes three basic topics: data structures, software engineering and operating system. After learning this course, the students will understand and master the basic data structures and corresponding algorithm in programming. The students will master basic concepts and functions of the operating system. In addition, the students will understand how the software and hardware resources control management and organize the workflow of the computer system. The students will also learn the idea of development the software application in a view of software engineering, with familiar the development environment and tools. To strengthen the students' programming capacity to analyze problems and problem-solving skills in the computer software field, this course will lay the necessary foundation for the future software development.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数据结构与算法		
课程英文名称 <b>Course Title</b>	Data Structures and Algorithms		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>用计算机解决任何问题都需要进行数据表示和数据处理，而数据表示和数据处理正是数据结构与算法要研究的内容。本课程是为电子信息工程专业本科生（实验班）开设的一门学科基础必修课。它是计算机程序设计的重要理论基础，所讨论的内容和技术方法，无论对进一步学习计算机领域的其它课程，还是对从事软件工程的开发，都有着不可替代的作用。本课程结合电子信息工程实验班本科生的具体情况，介绍数据结构和初步的算法分析两部分内容。通过本课程的学习，使学生能够理解和掌握各种数据结构（逻辑结构和物理结构）的基本概念以及有关算法，能够合理组织数据、有效存储和处理数据，正确设计算法以及对算法的分析和评价；培养学生基本的、良好的程序设计技能。</p>			
课程英文简介 <b>Course Description</b>			
<p>Solving any problems by computer needs data representation and data processing. These two parts are the basic contents of the course Data Structures and Algorithms. It is a basic required course for Electronic Information Engineering undergraduates (Experimental class). It is the theoretical basis of the computer program design. The content and the technical methods discussed in this course are foundation both on the further study of the related courses and the development of the software engineering. This course introduces data structure and the preliminary algorithm analysis. Through the study of this course, firstly, students can understand and master the basic concept and some related algorithms of data structure (including logical structure and physical structure). Secondly, students can organize data reasonably, storage and process data effectively. Thirdly, students can design and evaluate the algorithms correctly. This course will lay the necessary foundation for the future software development.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	模拟电子技术		
课程英文名称 <b>Course Title</b>	Analog Electronic Techniqy		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程讲述电子器件、模拟电子电路、模拟集成电路、反馈放大电路的基本组成原理、基本分析方法和基本应用技术。通过本课程的学习，要求学生掌握电子器件的基本性能，掌握基本放大电路、模拟集成电路、反馈放大电路的基本理论和基本分析方法，为专业深造打下良好的模拟电子技术基础。（由模拟集成电路所组成的基本运算电路、信号产生电路、信号处理电路和直流稳压电路的基本设计原理和基本应用技术实验环节进行）</p>			
课程英文简介 <b>Course Description</b>			
<p>This content of this mainly includes the knowledge of the basic principle, the basic analysis methods and the basic application technology about the electronic devices, the analog electronics circuit, the analog integrated circuits, and the feedback amplification circuit. The students are expected to master the basic performance of electronic devices and test methods and the basic principle and basic analytical method of the typical circuits which includes the composition of the general electronic equipment, the high-performance analog integrated circuits, the feedback amplification circuits, through which the good foundation will be based for the analogy elections electronic science.(The basic design principles and basic applications of the basic arithmetic circuit , the signal generator circuit , the signal processing circuit and DC voltage regulator circuit will be studied in the experiment of this course )</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字电子技术		
课程英文名称 <b>Course Title</b>	Digital Electronic Technology		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>本课程是电子信息、通信工程、电子科学与技术、自动化等专业的学科基础课，具有较强的实践性。通过本课程的教学，使学生掌握数字电子技术领域的基本概念、基本方法和基本技能；培养学生在该领域的分析、设计、综合与创新能力；掌握 Multisim 仿真软件的应用技术；了解可编程逻辑器件的基本原理与应用；了解用硬件描述语言设计硬件的思路和基本方法，为后续专业课程的学习打下良好基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a foundation course for undergraduate students majored in Electronic Engineering, Communication Engineering, Electronic Science &amp; Technology, Automation, and Biological Engineering. It is closely related to practical applications. The student who has finished the course should be able to grasp the basic concepts, methodologies and skills in the field of digital electronic technology. The objectives of this course are to cultivate the students' abilities of analysis, design, synthesis and innovation in this field, to grasp Multisim simulation software and its application technique, to understand the fundamental theory and applications of programmable logic devices, and get to know the idea and basic method of hardware design implemented by hardware description languages, and finally to lay good foundation for the subsequent professional courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	微机原理与应用 I		
课程英文名称 <b>Course Title</b>	Computer Principles and Applications I		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>本课程是电类专业本科生的专业基础课,是本专业本科生学习和掌握计算机硬件知识以及汇编语言程序设计的入门课。主要通过对计算机系统的内部结构、工作原理等的讲授,以及对学生设计能力的训练,使学生从理论和实践上掌握计算机的基本原理、基本组成,微处理器的结构及工作原理,指令系统,汇编语言程序设计,存储器及其接口电路设计,计算机接口技术的概念、数据传输方式以及部分简单智能接口电路的设计及软件编程等。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a fundamental course for the undergraduates with electrical related majors. It is an introductory course for the undergraduates to learn and master the knowledge of computer hardware as well as assembler language design. The students will master the related knowledge of computer principles by means of learning the computer internal structure and working principles. The corresponding topics include the basic principles and components of computer, the structure and working principles of the microprocessor, the instruction set, the assembler language design, the memory and its interface circuit design, the concept of computer interface, data transmission, and some simple intelligent interface circuit design and software programming.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	单片机及接口技术		
课程英文名称 <b>Course Title</b>	Single-chip Microcomputer Principle and Interface Technique		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>本课程是自动化及相关专业本科生的学科基础必修课，是一门面向应用的、具有很强的实践性与综合性的课程。单片机知识在电类专业的课程体系中处于承上启下的地位，在测控系统和智能仪器仪表的实现中经常应用到单片机与接口技术，单片机与接口技术是电子信息类、自动化类专业学生应该很好掌握的一项专业技术。</p> <p>本课程主要介绍 MCS-51 单片机的硬件基本结构、内部各种功能部件的工作原理及编程控制、指令系统以及各种常用硬件接口的设计。通过本课程的学习，主要使学生能够理论联系实际，具备利用自己所学知识解决实际工程问题的能力。课程的最终目标是使学生学会一种方法：即以 80C51 为内核的单片机为学习、使用背景，针对不同的应用要求，选择最适宜的单片机并能够设计、安装、调试接口电路和应用程序。同时，为学习后续课程及在今后的实际工作打下必要的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Single-chip microcomputer (SCM) principles and interface technique is a disciplinary compulsory course for the students majoring in automatic control and other relational professions. It's a course focusing on application and has fine practice and synthetic performance. Single-chip microcomputer principle and interface technique is always used in the design of measuring and control systems. Single-chip microcomputer principle and interface technique is a professional skill for students majoring in electric information and automation to study well.</p> <p>This course introduces SCM hardware basic structure, the principle of all kinds of inside function units, instruction repertoire, and the design of different hardware interface used often. By studying this course, students have the skill to solve actual engineering problems using knowledge. The end-all of this course is to let students study a method that is using 80C51 as the background of studying and utilization, aiming at the different application requirement, students can select the most suitable SCM, design, install and debug interface circuits and application programs. Simultaneously, lay the foundation for learning other new courses and actual works.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电力电子技术		
课程英文名称 <b>Course Title</b>	Power Electronics		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>电力电子技术以电力电子器件和变流技术为讲授内容, 所授内容被广泛用于电力系统、电力拖动乃至各类电源产品。课程主要讲述电力电子器件的基本结构、工作原理、主要参数、应用特点; 器件应用中的驱动、保护等基本问题; 各类变换电路, 如 DC-DC, DC-AC, AC-AC, AC-DC 等变换电路的基本原理、电路特点、波形分析; 各种负载对电路工作的影响分析和初步设计、计算。通过本课程的学习使学生熟悉各种电力电子器件的特性和使用方法, 掌握各种变换电路的结构、工作原理和控制方法, 获得电力电子技术必要的基本理论、基本分析方法以及基本技能。</p>			
课程英文简介 <b>Course Description</b>			
<p>The Power Electronics studies the electric energy conversion and its control by use of different power electronic devices, circuit topologies and control methods. It is not only applied to the static power conversion device for electric energy transportation widely, but also to the speed regulation of all kinds of motors in industrial production, the output energy control of the power supplies and so on. The Power Electronics focus on the basic structure and principle of those power electronic devices, their main parameters, application features, as well as their driving circuits and protection methods will be explained in detail. Moreover some important basic converter circuits, such as DC to DC, DC to AC, AC to AC, AC to DC converters, including their principle and features, the current and voltage wave analysis, the load influence on circuit running, as well as the essential design and calculation of the converter circuits. After learning this subject the students should have an acquaintance with some important full-controlled power electronic devices and their features and applications, and be familiar with the structure and principle of the basic power converter circuits and their control methods. They should get the basic theories of power electronic technique, and gain mastery of the basic analysis methods and the skills.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	检测技术		
课程英文名称 <b>Course Title</b>	Automatic Measurement and Instrument		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>随着信息技术的飞速发展,信息的获取、处理已经成为信息领域的关键技术,同时检测技术是过程控制、运动控制等各类闭环测控/监控系统中必不可少的重要组成部分,涉及各个行业的自动化。因此,自动检测及仪表课程是培养自动化专业人才的重要专业基础课。</p> <p>本课程以信息为主线,围绕信息的获取、变换、处理、传输和显示等方面来学习检测技术,并与自动化仪表结合起来,使学生不仅能理解一个个独立的传感器原理,而且可以掌握由传感器及其他环节(仪表)构成的完整的检测系统。</p> <p>通过本课程的学习,学生将掌握检测系统的组成和性能指标、误差分析方法、各种传感器的转换原理及测量电路以及温度、压力、流量、物位等四大参数检测仪表的应用。</p>			
课程英文简介 <b>Course Description</b>			
<p>With the rapid development of information technology, information acquisition and processing has become the key technology in the field. At the same time detection technology is the essential component of process control, motion control and closed loop control of other types, and is involved in all sectors of automation. Therefore, automatic detection and instrument course is an important professional basic course in the major of automation.</p> <p>The main contents of the course include information acquisition, transformation, processing, transmission, display, and automatic instrumentation. The students can not only understand the principles of separate sensors, but also can be familiar with a complete detection system made from sensors and other components.</p> <p>Through this course, students will master the composition of the detection system and its performance index, the method of error analysis, the principles and measuring circuits of various sensors, and the application of four types of detection instruments.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	自动控制原理		
课程英文名称 <b>Course Title</b>	Automatic Control Theory		
总学时 <b>Total Credit Hours</b>	72	总学分 <b>Credit</b>	4.5
课程中文简介 <b>Course Description</b>			
<p>课程为信息控制类专业的学科基础必修课。本课程是按照社会现代化对自动化技术的需求,力求使学生掌握自动控制理论方面的基础知识、基础理论和基本方法而开设的。通过课程的学习,要求学生理解掌握反馈控制的基本思想,掌握自动控制系统的一般分析方法,在此基础上,能够进行并完成一般控制系统的校正设计,进而使学生掌握运用自动控制原理的理论与方法解决实际问题的本领,为自动化专业的后续课程学习打下良好的基础。具体知识包括:控制系统的数学模型,控制系统的时域、复域、频域分析方法,系统控制器及校正环节的设计,非线性系统以及离散控制系统分析。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is a basic required course of information and control discipline. The students are expected to understand the basic concepts, theories, methods of automatic control according to the society's demand for automation technology. They are expected to master the basic principles of feedback control and the analytical method of automatic control systems. On this basis, the students can carry out the compensation and design of control systems. And then, the students are expected to solve the practical problem using the principles of automatic control and to establish the foundations for follow-up courses. The basic topics include: the models of control systems, time-domain, complex-domain and frequency-domain analytical method of automatic control systems, the design of controller and compensator, nonlinear system and distributed control system.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电机原理及拖动基础		
课程英文名称 <b>Course Title</b>	Electric Machine Principle and Electric Drive		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程属于自动化学科本科生的专业基础课,通过本课程学习,可以使学生掌握工业应用中电机、变压器及电力拖动的基础理论,并具备必要的动手实践能力。主要教学内容包括:电力拖动系统动力学、负载特性;直流电机结构、工作原理、磁路、电枢反应、励磁方式、转矩及功率关系、机械特性;他励直流电动机的电动及制动运行;变压器结构、运行原理、相量图、等值电路、参数测定;交流电机磁路绕组电动势与磁动势;异步电动机结构及运行原理;三相异步电动机的启动、制动及调速方法;电励磁同步电机、永磁同步电机与无刷直流电机结构及控制方法;电动机的选择方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>Electric machine principle and electric drive are introduced in this course. The students are expected to understand the basic concepts, theories, methods, and techniques of electric machine and transformer and electric drive, which will improve their practical ability. The basic contents include: electric drive dynamics, load characteristic; DC motor structure, operation principle, magnetic circuit, armature reaction, excitation modes, torque and power relationship, mechanical characteristic; motoring and braking operation of separated excitation DC motor; transformer structure, operation principle, phasor diagram, equivalent circuit, parameter measurement; electromotive force and magnetic motive force of AC motor winding; operation principle of induction motor; starting, braking and speed regulation method of induction motor; electrically excited synchronous motor, permanent magnet synchronous motor, brushless DC motor; motor selection method.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	线性系统理论基础		
课程英文名称 <b>Course Title</b>	Elementary of Linear System Theory		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>线性系统理论基础是自动化专业学科基础课程,是继自动控制原理之后的又一门重要的控制系统核心课程。它以线性状态空间模型为基础,系统地阐述了控制系统的一些基本的分析方法和控制设计思想,是现代控制理论后续课程的基础。本课程力图使学生掌握现代控制理论的基本分析方法和一些基本控制设计思想的原理与算法,为进一步的控制理论课程学习和控制方法的实际应用打下良好基础。本课程以连续时间时不变线性系统作为研究对象,研究基于状态空间模型的系统分析与控制设计的思想与方法,具体知识包括:状态空间模型的建立及简化、系统分析(状态轨迹分析、系统的能控性与能观测性分析、基于李雅普诺夫的稳定性分析)、系统控制设计(极点配置、镇定、最优化)和状态观测器设计等。</p>			
课程英文简介 <b>Course Description</b>			
<p>Elementary Linear System Theory” is a basic course for the students majoring in automatic control, as well as another key course following the course “Principle of Automatic Control”. It is based on the linear state-space model, and expounds some basic analysis approaches and control design ideas of controlled systems. It is a base for studying further courses in control theory. The course takes continuous time time-invariant linear systems as the research object, and studies the approaches and ideas of system analysis and control design based on state-space model. The contents include the following knowledge: modeling and standardization of state-space model, system analysis (state trajectory analysis, controllability and operability, stability analysis based Yaupon function), and system control design (pole placement, stabilization, optimization) and state observer design.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电磁场与电磁波		
课程英文名称 <b>Course Title</b>	Electromagnetism Field and Electromagnetism Wave		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>本课程是工科电子信息工程和通信工程专业本科生必修的一门专业基础课。本课程在大学物理（电磁学）的基础上，着重阐述电磁场与电磁波的基本概念、原理、规律和基本分析方法，及其在工程实际中的应用。通过本课程的学习，使学生进一步认识并掌握电磁场与电磁波的物理本质、基本规律和基本分析方法，培养学生对电磁问题的分析与求解能力，并为学习相关的后续课程（如微波技术、通信电路原理、射频电路设计等课程）或深入研究电磁理论打下必要的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a basic course required for undergraduate students major in Electronic Information Engineering and Communication Engineering. Based on University Physics, principles, theories, disciplines, analytical methods and the engineering applications of electromagnetic field and electromagnetic wave are introduced in this course. The students are expected to understand the physical nature, the basic disciplines and the analytical methods of the electromagnetic field and electromagnetic wave, and have the techniques to solve the related problem, through which their analysis and problem-solving abilities in electromagnetism will improve. The foundation will be laid for the following courses such as Microwave Technology, Principles of Communication Circuit, and RF Circuit Design.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字信号处理 II		
课程英文名称 <b>Course Title</b>	Digital Signal Processing		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>数字信号处理课程是电子信息与通信工程专业、控制科学与工程专业等必修的专业基础课程。该课程以离散时间信号与系统作为对象,研究对信号进行各种处理和利用的技术。该课程主要内容包括:离散时间信号和系统分析的基本理论和方法、DFT 变换、FFT 变换、IIR 和 FIR 数字滤波器的实现结构以及设计方法等。</p> <p>数字信号处理是理论性和工程性都很强的学科,注重理论与工程应用的紧密结合。通过该课程的学习,使得学生能深入理解信号处理的内涵和实质。同时,为以后进一步学习和研究数字通信、模式识别、图像处理、随机数字信号处理、时频分析等必修专业课奠定良好的专业基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Digital signal processing (DSP) is a professional foundation mandatory course for the majors of electronic information and communication engineering, control science and engineering. The course is about the principles of discrete time signal and system and researches of basic signal processing theories, technologies and applications. The course topics mainly includes: basic theories and methods of discrete time signal and system analysis, DFT, FFT, structures and design of IIR and FIR digital filters, etc.</p> <p>DSP is a course with abundant which aims at the integration of theories and engineering applications. Through this course, students will gain a basic insight into the connotation and essence of signal processing. In the meantime, the course provides a good foundation for the further study of the courses like digital communication, pattern recognition, image processing, and random digital signal processing and time-frequency analysis.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	随机信号分析		
课程英文名称 <b>Course Title</b>	Introduction to Random Signal Analysis		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>随机信号分析课程是电子信息工程、通信工程、控制科学与工程等多个专业方向必修的一门专业基础课。要求学生通过本课程学习掌握随机信号分析和处理的基本概念、基本理论和基本分析方法。该课程主要内容包括：随机过程及其统计特性、随机过程的数字特征、随机过程的频谱特性、功率谱与相关函数的关系等。</p> <p>随机信号分析是理论性和工程性都很强的学科，注重理论与工程应用的紧密结合。通过该课程的学习，使得学生能深入理解随机信号处理的内涵和实质。同时，为学习后续课程通信系统原理的学习以及从事统计信号处理研究工作打下坚实基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Random signal analysis is a professional foundation mandatory course for undergraduates with majors of electronic and information engineering, communication engineering and automation. The course introduces to students the basic concepts of random signal analysis and processing, theories and analysis methods. The course topics mainly include: random processes and their statistical properties, the digital features and spectral properties of the random processes, the relationship between power spectrum and correlation function, etc.</p> <p>Random signal analysis is a course with abundant theoretical and practical values, which aims at the integration of theories and engineering applications. Through this course, students will gain a basic insight into the connotation and essence of random signal processing. Furthermore, the course provides a good foundation for the further study other courses like principles of communication system and the follow-up engagement in the statistical signal processing research.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信系统原理		
课程英文名称 <b>Course Title</b>	Principles of Communication Systems		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>主要讨论各种通信系统的基本原理和性能分析,在内容上兼顾模拟通信和数字通信,讲课着重基本概念,并结合实际应用,介绍通信系统中各种技术的特点,对必要的数学分析和推导力求严谨,考虑到本课程的难点是数学推导多而且复杂,因此重点应从系统角度出发,介绍通信系统的基本原理、系统构成、特点和应用,使学生掌握通信学科的有关基础理论知识,提高分析和设计通信系统的能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course focuses on the basic principles and performance analysis of different communication systems including analog communication and digital communication. Lectures take emphasis on the basic concepts and practical applications to introduce the characteristics of the various technologies. The difficulty of mathematical derivation is taken into account in this course. From the system point of view, this course introduces the basic principles of the communication systems, system structure, characteristics and applications, aiming to enable students to grasp the basis of communication theory and improve analysis and design capability of communication systems.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信系统原理		
课程英文名称 <b>Course Title</b>	Principles of Communication Systems		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程是为电子信息工程专业实验班本科生开设的一门专业必修课，主要向学生讲授通信系统的基本原理和组成，并对通信系统的性能进行分析。在内容上兼顾模拟通信和数字通信，讲课着重基本概念，对必要的数学分析和推导力求严谨，重点从系统角度出发，介绍各种通信系统的基本原理、系统构成、特点和应用，通过学习本课程，使学生掌握通信系统的有关基础理论知识，加强系统观念，提高分析和设计通信系统的能力，为今后从事有关通信方面的科研工作打下良好基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is one of compulsory courses for the undergraduate students major in Electronic and Information Engineering (Experimental class). The fundamentals and components of the communication systems are introduced and the performance analysis of the communication systems is demonstrated in the course as well both in analog communication and digital communication. It takes emphasis on the basic concepts and the practical essential mathematic analysis and derivation. It introduces the fundamentals, components, features and applications of different communication systems in a systematic way. Students will learn knowledge, experience and skill in analyzing and designing communication systems. It is a solid foundation for students to engage in research on communication.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信号与系统 I		
课程英文名称 <b>Course Title</b>	Signals and Systems I		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>信号与系统课程是电类专业的一门基础必修课。课程内容主要包括连续/离散时间信号的基本分析方法、连续/离散时间系统的时域分析、连续系统的频域分析、连续系统的复频域分析和离散系统的 <math>z</math> 域分析等。要求掌握连续/离散时间系统的零输入响应与零状态响应；连续/离散时间系统的冲激响应（单位样值响应）与阶跃响应；卷积（或卷积和）的性质及其计算方法；常用函数的傅立叶变换，拉普拉斯变换和拉氏逆变换的计算方法，<math>Z</math> 变换和逆 <math>Z</math> 变换的计算方法等。通过本课程教学，使学生初步掌握与应用信号与系统分析的基本概念、基本规律和基本分析计算方法，重视工程实践与应用，培养学生解决问题的能力，增强学生的创新能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>Signals and Systems I is a fundamental course for undergraduates of electrical related majors. The curriculum topics mainly include continuous/discrete time signal analysis methods, time domain analysis of continuous system and discrete system; the spectrum domain analysis of continuous system, complex frequency domain analysis of continuous system, and the <math>z</math> domain analysis of discrete system etc. The course will introduce the zero-state response, zero-input response of continuous system and discrete system, the unit impulse response and step response of continuous system and discrete system, convolution, convolution theorem and calculation method. And the course will demonstrate the Fourier transform, Laplace transform and inverse Laplace transform, <math>Z</math> transform and inverse <math>Z</math> transform. Through teaching of this course, the course is aiming to make students to grasp and application the basic concepts, basic principles and basic analysis method of signal and system analysis. With emphasis on engineering practice and application, the course will cultivate students' ability to solve problems and enhance the students' creative ability.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体器件原理IV		
课程英文名称 <b>Course Title</b>	Principles of Semiconductor Devices IV		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>通过对 PN 结、双极晶体管和场效应晶体管的学习及一些基本实验使学生掌握双极晶体管和场效应晶体管的基本原理、基本概念及基本应用的知识, 为分立半导体器件的设计、集成电路的研究奠定基础; 为学生今后自学、了解其它半导体器件和电路的知识打下良好的理论与实践基础。要求学生掌握有关方面的、基本理论、基本方法和基本技术。具体知识包括双极晶体管、金属—氧化物—半导体场效应晶体管、结型场效应晶体管和金属—半导体接触场效应晶体管的基本概念、基本结构、制造工艺; 直流特性 (输入输出特性、电流增益等); 频率特性、开关特性, 其中直流特性、频率特性是重点; 高频特性参数、大电流效应、短沟道效应、开关过程是难点。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction to the fundamental concepts and applications of PN junction, bipolar junction transistors and field effect transistors. The course will provides students with the foundation for the design of discrete semiconductor devices and research of integrated circuits, and pave the way for students to study other semiconductor devices and circuits by themselves. The topics include: basic concepts, structures and fabrication processes of bipolar junction transistors and different field effect transistors, DC characteristics (i.e. input-output characteristics, current gain, etc.); frequency characteristics, switching characteristics of BJT, MOSFET, JFET and MESFET. The focus is on the DC and frequency characteristics. The teaching difficulties are the parameters of high frequency characteristics, high current effect, short channel effect, and switching process.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体物理学 II		
课程英文名称 <b>Course Title</b>	Semiconductor Physics II		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	3.5
课程中文简介 <b>Course Description</b>			
<p>本课程是电子科学与技术本科专业基础课,主要了解和掌握基于半导体材料独特的物理特性,形成信息处理基本单元器件物理基础。课程引入能带论描述半导体晶体内电子和空穴载流子运动特征,学习 N 型、P 型和本征半导体中载流子浓度特征,掌握掺杂和温度因素对载流子浓度、迁移率和电阻率的调控作用原理,以及载流子的扩散运动、产生复合、漂移运动等特性,并由此发展而来的半导体 PN 结电流-电压特性理论,金属-氧化物-半导体 MOS 结构中栅压对半导体中载流子浓度的控制理论。通过该课程的学习,掌握半导体相关的物理知识、半导体中物理特性的能带论分析方法、半导体器件基础理论和应用,为后续的半导体器件物理、集成电路等相关主干课奠定扎实基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is a major fundamental course for the Electronic Science and Technology. It will discuss the unique properties of semiconductors and provide the theoretical foundation for information processing unit. The topics include: introduction of energy band theory; motion of carriers (i.e. electrons and holes); concentration of carriers in N type, P type and intrinsic semiconductors; effect of doping and temperature on carrier concentrations, mobility and bulk resistivity; carrier diffusion, generation, recombination, drifting and the developed I-V theory for PN junction; control mechanism of the concentration of surface carriers by gate voltage in a MOS structure. The students are expected to comprehend the physics of semiconductors, understand the fundamental theory and application of semiconductor devices, and establish foundation for the follow-up major courses, such as semiconductor device physics and integrated circuit.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电磁场理论		
课程英文名称 <b>Course Title</b>	Theory of electromagnetic field		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过本课程的学习,使学生掌握电磁场理论的基本知识及基本理论以及处理问题的基本方法,为后面的专业课(固体物理、半导体物理、半导体器件原理等)学习打下理论基础。通过系统讲解,理论的分析,典型问题的运算和解决,使学生在抽象、复杂理论的能力,运用数学工具解决物理问题的能力得到培养和提高。</p> <p>具体知识包括矢量分析与场论,电磁场基本实验定律—库伦力定律,安培力定律,法拉第电磁感应定律,位移电流假说,麦克斯韦方程组,静电场的基本规律,恒定电场的基本规律,恒定磁场的基本规律,静态场的基本解法,时变电磁场的基本规律,时谐电磁场及传播规律。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course will give the fundamental concepts and methods of electromagnetic field to lay theory foundation for the follow-up major courses (e.g. Semiconductor physics, Solid state physics, Theory of semiconductor devices, etc.). The purpose is for students to develop the ability to study the abstract and complex theories and to solve physical problems using mathematical methods. The topics include: vector analysis and field theory; basic experimental law of electromagnetic field, including Coulomb's Law, Ampere Law and Faraday Law of electromagnetic induction; displacement current hypothesis; Maxell's equations; basic law of electrostatic field, constant electric field, and constant magnetic field; basic solution of static field; basic theory of time-varying electromagnetic field; basic theory of time harmonic electromagnetic field</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	固体物理学		
课程英文名称 <b>Course Title</b>	Solid State Physics		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>固体物理是近代物理学的一个重要分支,是研究固体的结构及其组成粒子之间的相互作用与运动规律以阐明其性能与用途的学科。该课程是电子科学与技术专业的学科基础必修课。其目的是让学生掌握固体物理的基本规律、基本概念和处理固体物理学问题的特有方法,为后续“半导体物理学”等课程的学习奠定必要的理论基础。课程的基本任务是通过本课程的学习,使学生掌握理论与实际相结合的研究方法,抓住主要矛盾,通过建立科学的物理模型来处理各种实际问题。本课程的主要内容包括:晶体结构,晶体的结合,晶格振动,能带理论,晶体中电子在电场中的运动,金属自由电子论,晶体中的缺陷。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction to the structure of solids and interaction between the component particles, which are related with the material properties and applications. The purpose of the course is for students to comprehend the basic law, basic concepts and special methods in solid state physics. The students are expected to grasp the research methods combining theory and practice, and establish the physical model to solve practical problems. The topics include: crystal structure, lattice vibration, energy band theory, electrons motion in electric field, free charge theory, and crystal defects.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	集成电路分析与设计III		
课程英文名称 <b>Course Title</b>	Integrated circuit analysis and design III		
总学时 <b>Total Credit Hours</b>	64	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>该课程是微电子专业学生的必修课，是一门重要的专业课程。21 世纪是信息化世纪，随着高新技术的发展，各种通用、专用集成电路得到更加广泛的应用。因此，通过这门课程的学习，使学生能够深入了解和掌握反映 VLSI 发展的新技术、新器件、新电路，关注 VLSI 领域的新发展，并熟练掌握 IC 设计的基本方法和技术。</p> <p>本课程教学以 CMOS 工艺为主，从电路的单元特性和工作原理出发，学习研究中大规模及 VLSI 的设计特点，掌握版图设计过程和方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>Integrated circuit analysis and design III” is a compulsory course for undergraduate students major in Electronic Science and Technology. The purpose of the course is for students to gain insight of new technologies, new devices and new circuits of VLSI, understand the new development in the field of VLSI, and grasp the basic methods and techniques of IC design. The course focuses on the CMOS process, with the unit characteristic and working principle of the circuit as the starting point. The students are expected to comprehend the large-scale IC and VLSI design, and grasp the process and methods of layout design.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	量子力学III		
课程英文名称 <b>Course Title</b>	Quantum Mechanics III		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>量子力学是电子科学与技术专业的专业基础课,量子力学是后续课程固体物理、半导体物理的基础。本课程主要讲授量子力学的基本概念和基本原理。课程的主要内容包括:黑体辐射、光电效应、波尔氢原子光谱;德布罗意假设;波函数及其统计解释、测不准原理及态叠加原理;薛定谔方程,定态及定态薛定谔方程,一维无限深势阱,线性谐振子,势垒,氢原子;力学量算符,角动量和角动量算符;微扰理论,非简并定态微扰,简并定态微扰,含时间的微扰;自旋及自旋角动量,自旋和全同粒子,全同粒子系统和全同粒子波函数,全同粒子的基本性质,对称和反对称波函数 泡利不相容原理。</p>			
课程英文简介 <b>Course Description</b>			
<p>Quantum mechanics III" is a major fundamental course for Electronic Science and Technology. It provides the foundation for follow-up courses, including Solid state physics, Semiconductor physics, etc. The course introduces the basic concepts and principles of quantum mechanics. The topics include: the blackbody radiation, photoelectric effect, and Bohr hydrogen atom spectrum; the De Broglie hypothesis; the wave function and its statistical interpretation, the uncertainty principle and the principle of superposition of states; the Schrodinger equation, the steady state and steady state Schrodinger equation, one dimensional infinite potential well, the linear harmonic oscillator, the potential barrier, and the hydrogen atom; the mechanical quantity operator, angular momentum and angular momentum operator; the perturbation theory, non degenerate stationary state perturbation, degenerate stationary state perturbation, and time-dependent perturbation; the spin and spin angular momentum, spin and identical particles, identical particle system and identical particle wave function, basic properties of identical particles, symmetric and ant symmetric wave function, and the Pauli exclusion principle.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	统计物理		
课程英文名称 <b>Course Title</b>	Statistical Physics		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程适用于电子信息与控制工程学院电子科学与技术专业本科生，是专业基础课。通过本课程的学习，使学生基本掌握热力学的基本理论，均匀物质的热力学性质，统计物理的基本概念及基本方法，经典粒子的玻尔兹曼统计及其应用，量子性粒子的玻色统计和费米统计及其简单应用。而且能够运用这些理论解决典型问题，使学生理论学习能力，运用理论解决物理问题的能力得到培养和提高，为后面的专业课（固体物理、半导体物理、半导体器件原理等）学习打下理论基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Statistical physics" is a major fundamental course for the undergraduate students major in Electronic Science and Technology. The purpose of the course is for students to learn the basic theory of thermodynamics, thermodynamic properties of homogeneous substance, basic concepts and methods for statistical physics, Boltzmann statistics and applications of classical particles, and Bose statistic and Fermi statistics of quantum particles. The students are expected to apply these theories to solve the typical problems, improve the theoretical learning ability, and establish the theory foundation for the follow-up major courses (such as Solid State Physics, Semiconductor Physics, Semiconductor device theory, etc).</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信网络基础		
课程英文名称 <b>Course Title</b>	Fundamentals of Communication Networks		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程是通信、电子信息类专业学科基础必修课。通过这门课程的学习,使学生获得通信网络方面的基本理论、基本知识和基本技能,培养学生具有分析和应用通信网络的基本能力,为学生从事通信、电子相关的工作岗位打下坚实的基础。通信网络在传统的电话交换网、分组交换网、计算机通信网的基础上得到了飞速发展,出现了多种新型的网络和技术,例如,宽带综合业务网(B-ISDN)、Internet、千兆以太网、第三代移动通信系统(IMT-2000)及其长期演进等。目前正在向下一代Internet、全光网络、第四代移动通信等方向发展。尽管这些网络在形式上千差万别,但它们的基本原理是相同的。本课程的教学任务是系统深入地讨论这些网络的共性原理。</p>			
课程英文简介 <b>Course Description</b>			
<p>Fundamentals of communication networks are the required course for electronic information-majors students. Communication networked systems are at the core of a wide range of human activity, including health, business, science, engineering and social interaction. Communication networks are extremely complex systems consisting of many components whose operation depends on many processes. To understand networks it is essential that students be exposed to the big picture of networks that allows them to see how the various parts of the network fit into one whole. This course attempts to provide a balanced view of all important elements of communication networking. The course describes many of the most popular analytical techniques for design and analysis of communication networks, with an emphasis on performance issues such as delay, blocking, and multiple address techniques. Specific contents include the basic and intermediate theory of queuing systems, the fundamental concepts of communication network architecture, and data link control protocols.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	运动控制系统 (双语)		
课程英文名称 <b>Course Title</b>	Motion Control System(Chinese/English)		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>本课程属于自动化专业的专业限选课, 主要以交、直流电动机为控制对象, 应用自动控制理论和功率电子学的相关知识, 对各种交、直流调速系统的工作原理、性能分析和工程设计等方面进行讲授。要求学生掌握综合运用所学理论知识, 针对具有较高实时性和准确性特点的运动控制系统, 进行性能分析和工程设计的能力。具体知识包括: 转速单闭环直流调速系统、转速/电流双闭环直流调速系统、恒压频比交流变频调速系统。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is one of the elective courses in automation the working principles, performance analysis and engineering design of AC and DC driving system is introduced. So this is a comprehensive and practical course. The students are expected to obtain the performance analysis and design ability for the motion control system with high real-time. The basic topics include: DC driving system with single closed-loop speed control, DC driving system with double closed-loop speed &amp; current control, AC variable-frequency driving system with constant voltage/frequency.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	控制系统仿真技术 I		
课程英文名称 <b>Course Title</b>	Control System Simulation I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>系统地讲授计算机仿真的基本原理、方法，讲授仿真软件的使用方法，具体解决仿真技术在自动控制系统中的应用。培养学生掌握控制系统计算机仿真的基本方法，使学生能够熟练应用仿真技术分析控制系统，为今后从事自动控制系统的分析、设计打下基础。主要内容有：仿真概述；MATLAB 基础知识；系统数学模型及其转换；连续系统数值积分法仿真；连续系统离散相似法仿真；快速仿真方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>The basic concepts, theories, methods of control system simulation are introduced in this course. Besides, the skills on how to solve the problems encountered in application are shown. The students are expected to understand the basic concepts, theories, methods, and techniques of control system simulation and to analyze control systems skillfully by means of simulation technologies. The basic topics include: basis concepts of computer simulation; basis knowledge of MATLAB; mathematical models of control systems and their conversion; numerical integral simulation of continuous systems; discrete similar simulation of continuous systems; fast simulation.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信息论基础		
课程英文名称 <b>Course Title</b>	Elements of Information Theory		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>信息理论基础是电子、信息、计算机等专业的一门理论性很强的专业基础课。课程的目的和任务是通过各种教学环节,让学生理解香农信息论的基本概念、基本原理,了解信息理论在通信及信息工程等领域的应用。主要内容包括:信息的度量、信源及其信息测度、信道及其信道容量、无失真信源编码、有噪信道编码、限失真信源编码。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Elements of information theory” is an important theoretical and specialized basic course in electronics, information, computer and other professional. The course purpose and tasks are to let students understand the basic concepts, the basic principle of the Shannon information theory and the application of the information theory in the field of communication and information engineering. The main contents include: the measure of information, sources and the information measure, channel and the channel capacity, lossless source coding, noisy channel coding and limit distortion source coding.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	无线通信		
课程英文名称 <b>Course Title</b>	Wireless communications		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>通过对无线通信一般原理的讲解、分析与技术的讨论向学生传授有关知识，培养学生的分析、设计能力。要求掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体内容有：常用的无线通信系统，各自的优势与互补。无线传播特性形成的信道基本特性、分析方法及建模方法。无线链路增强技术，如信道编码技术、交织器、调制技术在无线信道下的性能分析和配置、三者结合的编码调制技术原理、结合无线信道变化特性的自适应编码调制等技术原理和性能优势；利用信道独立特性的分集原理及发送接收技术；高性能传输技术，如多天系统（MIMO）的性能分析及空时码、预编码和复用技术，正交频分复用调制（OFDM）技术原理及问题等；扩频通信（CDMA）原理等内容。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through explanation, this course is to have analysis and discussion of the principle of the wireless communications to students, and to develop the students' abilities of analyzing and designing. The students are required to grasp the basic concepts, theories, methods and techniques. The contents include the common wireless communication systems, their respective advantages and complements with each other, the basic characteristics, analysis and modeling methods of the channel, based on wireless propagation characteristics, the wireless link enhanced technologies, such as channel coding technology, interleave, modulation and their performance analysis and configuration in the wireless channel, combination of the three methods base on coding modulation principle, the principle and performance advantages of the adaptive coding modulation based on wireless channel changes, the diversity principle and the sending-receiving technology base on the independent characteristics of the channel, high-performance transmission technology, such as the performance analysis of MIMO, space-time code, recoding and multiplexing technology, the technology principle and the problems of OFDM, the principles of CDMA and so on.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信息技术导论		
课程英文名称 <b>Course Title</b>	The Essential Guide to Signal Processing		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>该课程为电子信息工程和通信工程专业本科高年级专业选修课程,目的是使学生在先修完信号与系统、信息论基础、随机信号分析基础等课程的基础上,了解现代信息技术和信息处理技术发展的最新动向。其内容将涵盖当前最前沿的信息处理技术,主要包括神经网络及其应用、时-频分析、小波变换及其应用、混沌等专题,重点讲解各个专题的基本概念、基本原理及其应用。为学生今后从事信号处理新技术领域的研究工作奠定良好的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is optional for senior students in the majors of the electronic information engineering and communication engineering. The students are expected to learn the recent progress in modern information technology and information processing after completing the correlated curriculum, such as signals and systems, information theory and random signal analysis. The basic topics include: neural networks and its application, time-frequency analysis, wavelet transform and its applications, and Chaos, etc. Basic concepts, principles and application are introduced in each topic, which lays a solid foundation for students engaged in signal processing.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	微波技术		
课程英文名称 <b>Course Title</b>	Microwave Technology		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>微波技术课程是工科电子信息类专业选修课。本课程将以“基础理论与技术并重”为原则，力求突出微波技术的应用性，实践性，加强学生的实际动手能力。课程的任务是使学生掌握微波理论和技术的基础概念、基本理论和基本分析方法，培养学生的分析问题和解决问题的能力，为今后从事微波射频研究和工程设计工作打下良好的基础。本课程需要学生深刻理解与熟练掌握微波技术基本原理、基本技术及其典型的应用系统。课程的具体内容有：均匀传输线理论、规则金属波导、平面传输线、微波网络基础及微波器件。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is professional elective one for the electronic information engineering students. The course is based on principle of the basic theory and technology, striving to highlight the application and practice of microwave technology, and to improve the practical ability of students. The task of the course is to enable students to master the basic concepts, basic theories and basic analysis methods for microwave technology, and to cultivate students' ability to analyze and solve problems, and to lay a good foundation for researching and engineering design job in RF and microwave in the future. The students are expected to understand and master the basic principle, basic technology and typical application system of microwave technique deeply. The specific content of the course includes: the uniform transmission line theory, regular metallic waveguides, plane transmission lines, microwave network foundation, microwave devices.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	集成电路分析与设计 IV		
课程英文名称 <b>Course Title</b>	Integrated circuit analysis and design IV		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>该课程是电控学院非微电子专业学生的平台课，是一门重要的专业课程。21 世纪是信息化世纪，随着高新技术的发展，各种通用、专用集成电路得到更加广泛的应用。因此，通过这门课程的学习，使学生能够深入了解和掌握反映 VLSI 发展的新技术、新器件、新电路，关注 VLSI 领域的新发展，并熟练掌握 IC 设计的基本方法和技术。</p> <p>本课程教学以 CMOS 工艺为主，从电路的单元特性和工作原理出发，学习研究中大规模及 VLSI 的设计特点，熟悉版图设计过程和方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Integrated circuit analysis and design IV” is a course for undergraduate students not major in Microelectronics. The purpose of the course is for students to gain insight of new technologies, new devices and new circuits of VLSI, understand the new development in the field of VLSI, and grasp the basic methods and techniques of IC design. The course focuses on the CMOS process, with the unit characteristic and working principle of the circuit as the starting point. The students are expected to comprehend the large-scale IC and VLSI design, and grasp the process and methods of layout design.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	自动控制原理 II		
课程英文名称 <b>Course Title</b>	Principles of Automatic Control II		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过对自动控制系统的数学描述、时域分析、频率分析及校正方法的讨论，向学生传授自动控制原理方面的知识和解决问题的办法，培养学生的抽象和模型化能力，使学生具有一定的工程计算和设计能力。要求学生掌握自动控制系统的基本概念、基本理论、基本方法和基本技术。具体知识包括：控制理论的发展和闭环控制的基本概念；典型物理系统的传递函数及动态结构图；在时域中对系统性能进行分析，运用劳斯判据分析系统的稳定性以及稳态误差的求解方法；在频域中对系统性能进行分析，典型环节的波德图、频域稳定性判据和开环频率特性分析；运用超前、滞后网络及参考模型法对控制系统进行校正。</p>			
课程英文简介 <b>Course Description</b>			
<p>Mathematical Models of Control systems, Time Response, Frequency Response, and Compensating Method are introduced in this course. The students are expected to understand the basic concepts, theories, methods, and techniques of automatic control principle and the related problem solving methods, through which their abstraction, modeling and engineering abilities will be improved. The basic topics include: the basic history of control theory and practice and the basic concepts of close-loop control, transfer function form of physical systems and dynamic structure diagram, characteristic analysis of control system in time-domain, the Roth stability criterion and the solving methods of steady-state error of feedback control system, characteristic analysis of control system in frequency-domain, Bode plot of typical system, SyQuest criterion and frequency characteristic of open-loop system, compensating a control system using phase-lead, phase-lag and reference model.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信号与系统III		
课程英文名称 <b>Course Title</b>	Signal and System III		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>集中研究确定信号经线性时不变系统进行传输、处理的基本理论、基本分析方法和工程应用。本课程在信号分析方面要求学生掌握信号分析的基本理论和方法,包括:连续周期信号的付里叶级数,连续非周期信号的付里叶变换、连续信号的拉普拉斯变换等。在系统分析方面,要求学生掌握系统的各种描述方法,包括:连续系统微分方程的建立、系统的系统函数的概念及其计算。在分析方法应用方面,则主要涉及卷积积分以及付里叶级数、付里叶变换、拉普拉斯变换等方法求解线性系统;线性系统的稳定性判定等内容。</p>			
课程英文简介 <b>Course Description</b>			
<p>Focus on the same determined signal linear system when transmission, processes, the basic theory of basic analysis method and the engineering application. This course in signal analysis requests the student to grasp the basic theory and signal analysis methods, including: Continuous-time periodic signal Fourier series, Continuous-time no periodic signal Fourier transformation, continuous signal Laplace transforms, etc. In system analysis, demand the students master the description method of system, including: continuous system differential equation, the establishment of system of the concept and the function is calculated. In the analysis method, it mainly involves convolution integral, and the Fourier series, Fourier transformation, Laplace transform the method to solve the linear system; Linear system stability judgment, etc.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	微电子工艺		
课程英文名称 <b>Course Title</b>	Technology of Microelectronics Process		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>讲授半导体制造的基本工艺原理，芯片制作的各种常用方法、设备以及检测手段，现代半导体制作中的典型工艺流程，包括双极晶体管工艺流程和 CMOS 晶体管流程。要求学生理解半导体工艺制备过程中常用的 GROOVE 模型，费克扩散方程等基本工艺原理。掌握基本的半导体制造方法：衬底制备：直拉法制备单晶硅；材料生长技术：四氯化硅氢气还原法、金属有机气相外延等；薄膜制备技术：热氧化生长二氧化硅，常压化学气相淀积、低压化学气相淀积、等离子体增强淀积、溅射和蒸发等；掺杂工艺：扩散和离子注入；图形转移技术、图形制造技术和芯片封装技术。熟悉双极晶体管、CMOS 反相器 and 大规模集成电路的制备流程。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction of the basic theory of fabrication process of semiconductors, common technologies, equipments and testing methods for the fabrication of chips, typical fabrication process for semiconductors, including the bipolar transistors and CMOS transistors. The students are expected to understand the basic theory of semiconductor process, including the Groove model and Flick diffusion equation, grasp the common fabrication technology including the fabrication of substrate and film, growth methods of material, doping technology, Lithography, etching and packaging methods, and get familiar with the fabrication process of bipolar transistors, COMS transistors and large scale integrated circuits.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	专业英语		
课程英文名称 <b>Course Title</b>	Professional English		
总学时 <b>Total Credit Hours</b>	16	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>本课程属于专业选修课。课程以英文形式介绍半导体材料、电子元器件、集成电路、基本放大电路、数字电路等基本知识。通过本课程的学习，使学生掌握电子科学与技术专业常用专业英语词汇对应的汉语词义，以及常规专业词汇的英文表达，逐步提高学生的阅读、理解和翻译电子技术专业书刊资料的能力，使学生获得阅读专业文献并正确解读的能力，为将来从事专业相关的工作奠定良好的外语基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Professional English” is a major elective course for the undergraduate students major in Electronic Science and Technology. The course introduces semiconductor materials, electronic devices, integrated circuits, fundamental amplifying circuits, and digital circuits in English. The students are expected to master the commonly used English vocabulary and translate conventional terms of electronic science and technology into English. The purpose is for students to improve the reading and translation ability and lay a good language foundation for future work.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	可编程逻辑器件基础及应用		
课程英文名称 <b>Course Title</b>	Basic and Application of Programmable Logic Device		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是为自动化专业大三学生所开设的一门专业选修课。通过本课程的学习使学生系统地掌握 FPGA 的基本概念和设计流程、FPGA 的开发工具和硬件描述语言，并能够在开发板上完成系统设计任务。具体包括 VHDL 语言，VHDL 语言的基本结构类型，顺序语句，并行语句，状态机设计方法，数据类型，数据对象，Quartus 开发环境。设计实例包括，计数器设计，电梯设计，A/D 控制设计，寄存器设计，脉宽调制信号发生器设计等。本课程从工程实践的角度出发，安排 12 学时实验，结合典型设计实例系统地介绍了这些内容，有助于提高本科生的实践应用能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>A programmable logic device or PLD is an electronic component used to build reconfigurable digital circuits. Unlike a logic gate, which has a fixed function, a PLD has an undefined function at the time of manufacture. Before the PLD can be used in a circuit it must be programmed, that is, reconfigured. This is a selective course for junior student majoring in automatic control. In this course basic concept, design flow, development tool, and hardware description language of FPGA will be introduced. Students are expected to finish a specific task on the development board. The basic topics include: VHDL language, basic structure of VHDL, the sequence statement, subsequent statement, finit-state-machine, data type, data object, and Quietus development environment. Design examples include: counter, lift, A/D controller, register and pulse width modulation signal generator etc. From the point of engineering practice, 12 hours experiments are designed. Combined with the typical design examples these contents are introduced systematically in this course. This could help to improve students' practical application ability.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	过程控制系统 I		
课程英文名称 <b>Course Title</b>	Process Control System I		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>通过过程控制系统课程的学习,使学生能够达到从事过程控制系统的分析、设计、运行及研究;掌握过程控制工程的基本知识,具备过程控制系统的设计、安装、调试和维护能力培养学生工程实践能力和创新能力。通过拓宽知识面,使学生进一步了解本专业发展趋势及动向。培养学生了解和掌握典型的过程控制系统的原理,并能够理论联系实际;注重技术的先进性和工程实用性相结合,应用各种控制规律实现过程控制,达到解决生产实际问题的目的。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through learning the course of process control system, students will be able to do the work of analysis, design, run and study of process control system. Students are expected to grasp the basic knowledge, to have the ability of design, installation, debugging and maintain the normal operation of process control system, and to develop their engineering practice ability and innovation capability By broadening their knowledge students can learn more about professional development trends. It will pay particular attention to the combination of advanced technology and engineering practice in order to enhance students' ability to solve practical problems.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机控制系统		
课程英文名称 <b>Course Title</b>	Computer Control System		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程为自动化专业课，是自动化专业本科生今后从事计算机控制工作的基础课程。其目的就是培养学生开发、设计与应用计算机控制系统的能力。本课程既注重理论体系的完整性，又要注重这些理论在实际中的应用，力争做到重点突出、理论联系实际。</p> <p>本课程涉及多门课程知识，也是多门课程知识的综合，既要求学生已学习了先修课程，同时也能帮助学生综合利用已学的知识，紧密与实践的联系。通过本课程的学习，学生能较系统地领会计算机控制系统的基本原理、基本控制技术及其实现的手段、方法和基本思想，使学生的知识结构更趋完善合理，解决实际工程问题的初步能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a major course of automation. It's a fundamental course for the undergraduates to engage into the computer control. Its purpose is to train the ability of developing, design and implementing the computer control systems. The course emphasizes both the integrity of the theoretical system and the application of the theory in practice.</p> <p>This course is the combination of multi-courses, which can help the students to comprehensively utilize the knowledge of multi-courses and contact practice. By studying this course, the students can understand the fundamental principles and control technology of computer control system and their implementation method. Thus the knowledge structure of students will be more perfect, and they will have the preliminary ability to solve practical engineering problems.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	运动控制系统		
课程英文名称 <b>Course Title</b>	Motion Control System		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>运动控制系统包括电机、驱动器、控制器和传感器。用于运动控制的电机主要为直流电机、交流电机和伺服电机。驱动器将电网固定的电压、频率改变为可控的电压、频率、电流供给电机，控制电机的转矩、速度、位置、加速度。控制器将特定的工艺要求转变成控制命令，以数字、模拟等信号形式控制驱动器。传感器将物理量转变成特定要求的电压或电流，供控制器感知系统的状态，修正控制命令。通过这门课程的学习，能够设计和开发所需的运动控制系统，驱动机械机构完成规定的动作。学习时应把握基本原理、器件、算法及三者的内在联系。基本原理包括上述各种电机的基本原理和控制理论。器件包括常用的传感器、功率器件、微控制器及电子元件。算法是基本原理和器件的结合，将抽象的理论具体化，零散的器件集成化，程序模块化。</p>			
课程英文简介 <b>Course Description</b>			
<p>Motion control system is composed of the motor, driver, controller and sensor. The motor includes induction motor, permanent magnetic synchronous motor, DC brushless motor and stepping motor. The driver converts the electric power with constant voltage and frequency into one with adjustable voltage, frequency and current so as to control the torque, speed, position and acceleration of the motor. The controller commands the driver by means of digital or analogous signals based on the specified technology. The sensor transforms non-electric signals into the electric ones that are used by the controller. After learning this course, the motion control system can be designed and developed, and the mechanism can be drove to realized specified motion. The learning of motion control system focuses on the relation of fundamental theories, devices and algorithms. The fundamental theories are referred to the principles and control theories of above mentioned motors. The devices are composed of frequently used sensors, power device, micro-controller and electric components. The fundamental theory and the devices are combined into the algorithm that makes the abstract theory concrete, scattered devices integrative and program modular.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	嵌入式系统		
课程英文名称 <b>Course Title</b>	Embedded System		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>嵌入式系统课程是电工基础、电子技术、微机原理、计算机接口技术、C 语言程序设计方法等课程的一门后续专业课程。电类专业诸多课程的内容在本课程中得到综合、灵活运用。本课程的教学培养目标是使学生掌握必需的嵌入式系统设计理论、主流嵌入式系统硬件架构和嵌入式软件编程的技术、方法和工具,使学生基本具有嵌入式系统设计能力。具体内容包括:嵌入式系统的基本概念、系统结构;ARM 的体系结构;ARM7TDMI (-S) 指令系统;嵌入式系统开发方法;LPC2000 系列 ARM 控制器硬件结构与功能;嵌入式实时操作系统 <math>\mu</math>C/OS-II;嵌入式系统硬件设计与软件开发,基于实时操作系统的多任务划分与软件设计等。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Embedded System” is an important specialty course following the course “Circuit Analysis, Analog Electronics, Digital Electronics, Microcontroller and Computer Programming”. The knowledge which students study in these courses is used combined in Embedded System course. The course is intended for the undergraduates to master the embedded system principle and application technology, the design methods of hardware and software. The contents include the following knowledge: the basic concept of embedded system; the structure of embedded system; ARM Architecture; ARM7TDMI (-S) Instructions; the methods of developing embedded systems; LPC2000 series ARM controller; Embedded co/OS-II; Embedded system design including hardware and software based on real time operating system.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字信号处理 II		
课程英文名称 <b>Course Title</b>	Digital Signal Processing II		
总学时 <b>Total Credit Hours</b>	48	总学分 <b>Credit</b>	3
课程中文简介 <b>Course Description</b>			
<p>数字信号处理是自动化专业的一门专业限选课。通过本课程的学习,使学生建立数字信号处理的基本概念、系统地掌握数字信号处理的基础理论和基本分析方法,深入理解离散傅里叶变换的基本原理,学会应用离散傅里叶变换快速算法进行信号谱分析的方法,掌握数字滤波器的设计原理和实现方法,具有初步的算法分析和运用 MATLAB 编程的能力,为后续数字技术相关课程的学习奠定理论基础,并将为 21 世纪信息学科的本科生培养和锻造从事智能信息处理的科学思维与能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>Digital Signal Processing (DSP) is concerned with the representation, transformation and manipulation of signals on a computer. After half a century advances, DSP has become an important field, and has penetrated a wide range of application systems, such as control engineering, pattern recognition, digital communications, medical imaging and so on. With the dramatic increase of the processing capability of signal processing microprocessors, it is the expectation that the importance and role of Digital Signal Processing Technology is to accelerate and expand.</p> <p>This course introduces the basic concepts and theory of DSP. The main topics include: signal representation in time domain, sampling theorem, Fourier transform, linear time-invariant system, discrete convolution, z-transform, discrete Fourier transform, and discrete filter designing. By the end of this course, the students should be able to understand the most important principles in DSP, and able to use Mat lab programming to analyze the frequency-spectrums of discrete-time signals with DFT or FFT algorithm and design IIR or FIR digital filters. The course emphasizes the understanding and implementations of theoretical concepts, methods and algorithms.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代电气控制技术		
课程英文名称 <b>Course Title</b>	Modern Electrical Control Technology		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>课程从工程技术应用角度出发, 学习自动控制系统中的逻辑控制和顺序控制的控制规律, 讲授常用低压电器元件、典型控制单元、基本控制线路、典型应用实例分析, 以及电子电器、可编程控制器、智能组合电器等现代电气元件及其控制技术。课程的重点是继电器接触式电气控制系统典型控制线路分析与设计、可编程控制器基本指令系统与应用; 难点是电气控制电路及可编程控制器的应用设计。通过本课程的学习, 使学生掌握电气控制的基本知识, 掌握和利用先进的控制技术进行分析、设计以及工程应用的方法, 使他们能在实践中会正确、合理地分析、设计和应用电气控制系统, 重点培养学生电气工程设计、应用和实践能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>From the engineering application point of view, the logic and sequential control laws of the automatic control system are introduced, the common low-voltage electrical apparatus, typical control unit, the basic control circuits, the typical application examples analysis, and electronic appliances, programmable controller, intelligent combine apparatus and other electrical components and their control technology are taught in this course. The Course focuses on the typical control circuit analysis and design of relay contact electric control system, the basic command system and applications of programmable controller; the difficulties of the course are the designs of electrical control circuit and the applications of programmable controller. Through this course of study, to make the students master the basic knowledge of electrical control, and can reasonable analysis, design and application of electric control system properly in practice. In the end, to cultivate mainly students' ability of electrical engineering design, application and practice.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	仪表及仪器智能化		
课程英文名称 <b>Course Title</b>	Principle of Intelligent Instrument and Its Applications		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是电工基础、电子技术、微机原理、计算机接口技术、数字信号处理、自控原理、检测技术、单片机原理等课程的一门后续课。电类诸多课程的内容在本课程中得到综合、灵活运用。就如何利用微处理器实现电子仪器及自动测控装置智能化方面的基础及实际设计技术进行深入与提高方面的研究。使学生在智能仪器的系统设计, 软、硬件方面的综合能力得到提高。同时, 也使学生了解智能仪器的新发展“个人仪器”、“VXI 仪器”及“虚拟仪器”等方面的知识。该课程是自动化专业学生的一门重要专业课。</p>			
课程英文简介 <b>Course Description</b>			
<p>This is an important specialized course for students majoring automation, and it is the follow-up to Circuit Analysis, Analog Electronics, Digital Electronics, Microcomputer Principle, Single-chip Microcomputer Principle and Interface, Automatic Inspecting &amp; Measuring Technique. All these prerequisites are integrated and applied with flexibility in this course. It gives deep introductions and descriptions on how to use microprocessors to realize intelligent instruments and automatic measure and control devices. The students need to acquire abilities in system design of intelligent instrument using software and hardware knowledge comprehensively. The course also introduces the recent developments in intelligent instrument such as Personal Instrument, VXI Instrument and Virtual Instrument.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	智能控制技术		
课程英文名称 <b>Course Title</b>	Intelligent Control Technology		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程学习智能控制的理论基础及相关技术, 包含模糊控制系统设计及神经逆控制系统设计两个部分。在模糊控制系统设计中, 首先学习由模糊集、模糊运算、模糊规则、模糊化、解模糊、模糊推理方法等知识点构成的模糊数学, 接着学习标准可加模糊系统数学模型及其基本特性, 以机器人模糊避障控制系统设计为例学习经验型模糊控制系统的系统设计、仿真与开发技术。在神经控制方面, 首先学习包含梯度下降法、牛顿迭代法等优化技术、然后学习感知器、自适应神经网络及反向传播网络的结构设计及神经网络训练方法, 并通过基于 BP 网的倒车控制问题学习神经逆控制系统的设计、仿真及开发技术。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course aims to teach the fundamentals of intelligent control techniques including Fuzzy Control and Neural Net (NN) Inverse Control. Fuzzy control focuses on an introduction to the Fuzzy Math including Fuzzy Sets and operation, fuzzy bases, fuzzy inference, justification and defuzzification. The course also presents SAM (standard additive model) Fuzzy Systems and fundamental properties. And uses several cases including robot obstacle avoiding control based SAM Fuzzy system to show how to design, simulation and implementation of Fuzzy Control System. Neural Net Inverse Control includes the basic optimization method such as gradient descent algorithm and Newton iteration method. The course provides an introduction to neural structure and learning methods including single layer Perception, adaptive linear neural network and back-propagation neural network. Several cases including car back parking control basing BP are used to show how to design, simulate and implement a NN Control System.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	嵌入式系统 I		
课程英文名称 <b>Course Title</b>	Monochip and Embedded System I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>嵌入式系统技术是当今迅猛发展的前沿技术，SoC 技术的发展，使得嵌入式处理器全面进入 32 位时代。嵌入式系统产品正在广泛的应用在通信、航空航天、医疗仪器、工业控制和信息家电等领域，并将逐步渗透到人们生活的各个方面。本课程属于专业课，通过本课程的学习，使本科生了解当今嵌入式系统发展的前沿技术，拓宽专业知识面，掌握嵌入是系统的软硬件设计方法并通过实践，能够在嵌入式系统硬件开发板上完成一定的系统设计任务。将基本原理与实践相结合。面向当今的主流技术是本课程的最大特色。</p>			
课程英文简介 <b>Course Description</b>			
<p>Embedded systems technology is one of the rapid developments of cutting-edge technologies. With the development of Sock technologies, embedded processors are full access to 32-bits times. Embedded system products are widely used in the field of communications, aerospace, medical instruments, industrial control and information appliances, and gradually penetrated into all aspects of people's lives. This course belongs to professional courses. The main tasks of this course are to introduce today's cutting-edge technology of embedded system development, to broaden professional knowledge of the undergraduate students and make them grasp the embedded system hardware and software design methods. Furthermore, lay the foundation for complete the system design task on the embedded system development board. The most significant feature of this course is modern mainstream technology oriented.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电磁兼容技术		
课程英文名称 <b>Course Title</b>	Technology of Electromagnetic Compatibility		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>主要讲授电磁兼容的基本原理和电磁干扰防护技术。给学生提供系统的电磁兼容和抗干扰的基本知识和技能, 以便于他们能够从事实用的电子线路及装置的开发, 设计, 实验, 制造, 调试。内容有电磁兼容的概念, 电磁干扰源, 电磁干扰的传输途径, 屏蔽技术, 接地技术, 隔离技术, 滤波技术, 瞬态干扰的抑制, 箝位技术, 续流技术, 线路板的电磁兼容设计, 计算机系统的抗干扰技术以及实施电磁兼容的措施和方法。本课程用到电磁场和电磁波中的一些基础知识, 但可不必先修。</p>			
课程英文简介 <b>Course Description</b>			
<p>The knowledge and skills of electromagnetic compatibility, methods of anti-interference are introduced in this course. The students are expected to understand the basic concepts, theories, methods, and techniques of electromagnetic compatibility. The basic topics include: the concepts of electromagnetic compatibility; source of the electromagnetic interference; transmission path of the electromagnetic interference; shielding technology; grounding techniques; isolation technology; filtering techniques; clamp technique; technology of continued flow; circuit board design of EMC; anti-interference technology of computer system.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代通信新技术导论 I		
课程英文名称 <b>Course Title</b>	Introduction to the New Technologies of Modern Communications I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>该课程为通信工程和电子信息工程（实验班）本科高年级专业选修课程，目的是使学生在先修完通信系统原理、数字信号处理、通信网络基础等课程的基础上，了解现代通信理论和技术发展的最新动向。其内容包括当前最前沿的无线、移动通信和宽带网络技术，如无线城域网、无线局域网、无线个域网、下一代网络、物联网、云计算、认知无线电、分布式无线网络等。本课程从基本理论、关键技术、新型系统的角度，全面而系统地介绍这方面的最新成果，并开展深入的研讨，这将为学生今后从事现代通信技术领域的研发工作奠定良好的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is for undergraduate students major in Communications Engineering and Electronic Information Engineering in their 4th year. Based on the study of Principles of Communication Systems, Digital Signal Processing and Fundamentals of Communication Networks, the students are supposed to know more about the theories of modern communication, up-to-date communication technologies and technology developing trends. This course is mainly about new wireless, mobile and broad-band networking technologies, including WMAN, WLAN, WPAN, NGN, IOT, Cloud Computing, CR, Distributed Wireless Networks, etc. This course is to introduce and discuss about the fundamental theories, key technologies and novel systems, from which the students will benefit in their professional work afterward.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	DSP 技术与应用 I (双语)		
课程英文名称 <b>Course Title</b>	DSP Technology and Applications I (Chinese/Englis		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>DSP 技术是当今迅猛发展的前沿技术, DSP 处理器所具有的系统构成灵活、可编程、适用面广的特点, 使其成为电子产业中不可或缺的数字信息处理的计算引擎。本课程属于学科基础选修课, 首先介绍当今 DSP 处理器的发展现状, 使学生掌握 DSP 技术的内涵, 建立 DSP 编程模型的概念; 接着讲授 DSP 处理器的体系结构, 包括内核、数据地址产生单元、程序控制器、存储器等, 这是本课程的重点和难点; 最后讲授 DSP 系统的设计方法和硬件开发工具, 使学生能够在 DSP 硬件开发板上完成一定的系统设计任务。将基本原理与实践相结合, 面向当今的主流技术是本课程的最大特色。</p>			
课程英文简介 <b>Course Description</b>			
<p>DSP technology has been rapidly developing in recent 30 years. The systems based on DSP processors have flexible, programmable and widely applied advantages, so that DSP processors has become digital information computing engines which are indispensable to electronic filed. This course is a basic elective course. Firstly, the current status of DSP development is introduced. Then the connotation and DSP programming model are taught to students. Secondly, students will study the architecture of DSP processors, including core, data address generators, program sequencer and memory. This part is of difficulty and importance in the course. At last, the design method and development tools of DSP systems will be taught in order to finish some system design tasks based on DSP hardware boards. Facing the mainstream techniques and combining basic principles with hands-on are the prominent features of the course.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	可编程逻辑电路原理与应用		
课程英文名称 <b>Course Title</b>	FPGA Principle, Design and Application		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过本课程使学生能较好地掌握硬件电子系统的设计技术, 深刻了解利用硬件语言实现进行现代电子系统设计能力。本课程具体知识包括包括基于 CPLD/FPGA 技术的 VHDL 设计流程, 常用大规模可编程逻辑器件的结构和工作原理; 组合电路 VHDL 描述语句结构, 时序描述 VHDL 规则, 常数、变量、信号等数据对象, 进程语句格式、组成, 并行赋值语句格式, IF 语句的 4 种语句结构; 组合电路的 VHDL 描述方法, 时序电路的 VHDL 描述方法, 一般计数器的 VHDL 描述方法; 基于 Quartus II 的 VHDL 文本输入设计流程, 包括设计输入、综合、适配、仿真测试和编程下载等方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>The objectives of this course are to provide students with a working knowledge required to develop digital logic system designs in Hardware Description Languages (HDLs) at behavioral, register-transfer, and structural (gate) levels; to validate and/or verify their logic system designs via automated pre/post-synthesis HDL simulation test-benches; and to then implement their final digital logic system designs to Complex Programmable Logic Devices (PLDs) and/or Field Programmable Gate Arrays (FPGAs) for final post-implementation (place and route) functional and performance simulation testing and final design and operational verification/validation. The topics of this course include: the hardware architectures of CPLD and FPGA programmable logic device; a study of VHDL Hardware Description Languages; their use in digital system design methodologies including design validation and verification via Quartus II EDA software simulation, synthesis, and implementation.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字图像处理 (双语)		
课程英文名称 <b>Course Title</b>	Digital Image processing(Chinese/English)		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程是为电子信息工程专业本科生开设的一门专业选修课程。通过该课程的学习,学生应能掌握图像处理方面的基本理论和方法,包括:二维离散傅立叶变换和图像频谱分析,图像增强(包括图像直方图均衡、平滑、锐化、中值滤波、通带滤波、同态滤波),图像复原(包括图像降质原因及降质模型,图像噪音模型及噪音去除,降质函数估计,逆滤波法,维纳滤波法,运动模糊图像特征及复原),图像压缩编码(包括图像压缩编码的基本概念,图像冗余,统计编码(熵编码),预测编码,变换编码, JPEG 标准简介),彩色图像处理(颜色模型,伪彩色图像处理)和图像重建的基本概念等。同时为了和实际相结合,学生应掌握 BMP 文件格式。同时了解数字图像处理领域的一些基本概念如图像视觉系统组成和视觉特性,图像压缩编码的基础如图像冗余、目前常用的图像编码标准等。为了加深学生对数字图像处理课程相关原理和概念的理解,课程包括三个实验: BMP 文件读写、图像频谱分析和图像直方图均衡。</p>			
课程英文简介 <b>Course Description</b>			
<p>2D Fourier Transform and its properties. Image enhancement (include histogram processing, smoothing, median filtering, sharpening, Filtering; homomorphism filtering), Image restoration (include Image degradation model, noise and its reduction, estimation of the degradation model, inverse filtering, winner filtering.), image compression (include redundancy, image processing model, variable length coding, predictive coding, JPEG standard) color image processing (color model, pseudo-color processing) and basic concepts of image reconstruction. In order to make the course more practical, the students should master the format of BMP file. They should know some basic concepts such as human visual system, the properties of human vision system. In order to make the student understand the concepts deeply, there are three experiments: Read/Write a BMP file, analysis of image frequency spectrum, and Image histogram equalization.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字图像处理 II		
课程英文名称 <b>Course Title</b>	Digital Image processing II		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程是为电子信息工程专业本科生开设的一门专业选修课程。通过该课程的学习,学生应能掌握图像处理方面的基本理论和方法,包括:二维离散傅立叶变换和图像频谱分析,图像增强(包括图像直方图均衡、平滑、锐化、中值滤波、通带滤波、同态滤波和伪彩色增强),图像复原(包括图像降质原因及降质模型,图像噪音模型及噪音去除,降质函数估计,逆滤波法,维纳滤波法,运动模糊图像特征及复原),图像压缩编码(包括图像压缩编码的基本概念,图像冗余,统计编码(熵编码),预测编码,变换编码, JPEG 标准简介)和图像重建的基本概念等。同时为了和实际相结合,学生应掌握 BMP 文件格式。同时了解数字图像处理领域的一些基本概念如图像视觉系统组成和视觉特性,图像压缩编码的基础如图像冗余、目前常用的图像编码标准等。为了加深学生对数字图像处理课程相关原理和概念的理解,课程包括三个实验: BMP 文件读写、图像频谱分析和图像直方图均衡。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Digital Image Processing” is a course for the undergraduate student who is pursuing master degree in the specialization of Electronic Engineering or Communication Engineering. This course is designed to enable student to acquiring basic concepts, theory and methods. The main topics include: 2D Fourier Transform and its properties. Image enhancement (include histogram processing, smoothing, median filtering, sharpening, Filtering; homomorphism filtering, pseudo-color enhancement) , Image restoration (include Image degradation model, noise and its reduction, estimation of the degradation model, inverse filtering, winner filtering.), image compression (include redundancy, image processing model, variable length coding, predictive coding, JPEG standard) and basic concepts of image reconstruction. In order to make the course more practical, the student should master the format of BMP file. They should know some basic concepts such as human visual system, the properties of human vision system, In order to make the student understand the concepts deeply, there are three experiments: Read/Write a BMP file, analysis of image frequency spectrum, and Image histogram equalization.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信号处理与 MATLAB (自学)		
课程英文名称 <b>Course Title</b>	Signal Processing Using Matlab(Self-Taught)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>信号处理与 MATLAB 实现是针对高等院校电子信息工程和通信工程专业学生开设的专业课程。着重介绍 MATLAB 软件的熟练使用及其内嵌的高效率信号处理算法的应用。其主要目的是为电子信息工程和通信工程专业学生应用先进的计算软件解决实际问题打下坚实的基础。</p> <p>通过本课程的学习和实践,使学生掌握基于先进计算机软件技术的信号分析和处理的基本概念、基本理论及应用方法;能对工程应用中的实际问题建立数学模型,并对数学模型求解。同时,通过案例和实验,学生应在分析问题与解决问题的能力及实践技能方面有所提高。</p>			
课程英文简介 <b>Course Description</b>			
<p>Signal Processing and its realization in Malta is an elective course for undergraduates major in electronic information engineering and communication engineering. In this course, skills in metal programming are introduced in details with the brief introduction on high efficient embedded signal processing algorithm. Through the course, students will have strong ability in solving real problems in industry.</p> <p>In this course, more practice is set for students and they should learn more in practice by themselves. Though the issue given at the class, students should develop their own skills and experience for solving the problems to meet in the future.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字语音处理与编码		
课程英文名称 <b>Course Title</b>	Digital Speech Processing and Coding		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程将以语音信号产生的源-系统模型为基础，系统介绍语音信号处理与低速率语音编码的基本原理或技术。主要内容包括语音信号的数字模型、语音信号的数字分析（短时能量、过零率、短时自相关函数、短时傅里叶变换与采样率、短时综合和语谱与倒谱分析）、语音信号的基频检测（预处理、时域与频域基音估计）、语音信号的线性预测分析（原理、解法、应用和线谱频率参数）、语音信号的矢量量化原理（原理与系统、有记忆与无记忆 VQ 和 LSF 参数的矢量量化）和码激励线性预测语音编码原理（编码器模型及参数优化，固定码书和自适应码书搜索，激励码书增益的量化和自适应后滤波）。</p>			
课程英文简介 <b>Course Description</b>			
<p>The basic theories or techniques on speech signal processing and speech coding at low bit rates will be introduced systematically based on speech production model in this course. The main contents of this course include: digital model for speech signal, digital analysis of speech signal (Short-time energy, zero-crossing, short-time autocorrelation function, short-time Fourier transform and its sampling rate, short-time synthesis, spectrum and cestrum analysis), pitch detection of speech signal (pre-processing, pitch estimation in time and frequency domain), linear prediction analysis of speech signal (principle, solution, application and line spectrum frequency representation), vector quantization of speech signal (principle of VQ system, memory VQ and memory less VQ, VQ for LSF parameters) and code-excited linear prediction speech coding (codec model and its parameters optimizing, indexes search of the fixed codebook and adaptive codebook, quantization of excitation gain codebook, adaptive post-filtering).</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	多媒体数据通信技术		
课程英文名称 <b>Course Title</b>	Multimedia Data Communication Technique		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>多媒体数据通信技术课培养目标：使学生掌握多媒体数据编码基本原理、多媒体数据的相关格式、数据通信协议以及对应的多媒体技术在行业中的发展现状等。</p> <p>本课程是本科三年级第二学期或本科四年级及研究生选修课，该课程先修课为数字信号处理、信息论以及数字图像处理中的基础知识。</p> <p>整个课程共 2.5 学分，分 40 学时讲授，其中课堂授课 38 学时，实验授课 2 学时。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course of Multimedia Data Communication Techniques aims to providing students with the ability of understand the fundamental in multimedia source coding, multimedia data format, data communication proposals and the corresponding new development in industry.</p> <p>The course is an elective one for 3rd year or 4th year undergraduate or graduate student. To select this course, students should have the knowledge of digital signal processing, information theory and some fundamentals in digital image processing.</p> <p>The grade for this course is 2.5 and will take 38 lectures with 2 experimental courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	光纤通信原理 (双语)		
课程英文名称 <b>Course Title</b>	Fiber-Optic Communication Theory(Chinese/English)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程属于通信工程的学科基础选修课,旨在介绍光纤通信的基本原理和系统,使学生对光纤通信这一在当今信息领域内高速发展并起着关键作用的技术有较好的了解。课程主要内容包括:光纤传输原理与特性,光源与光发射系统,光探测器与光接收系统,光放大器原理与应用,光纤通信系统与网络等,并将介绍代表当今高速大容量光纤通信技术主流的波分复用光纤通信技术,以及代表未来光纤通信技术发展方向的全光光纤通信技术。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is the discipline based elective course of communication technology. It introduces the basic principle and system of fiber optical communication and makes the students understand the key technology in the modern information filed well. The main contents include: transmission theory and characters of fiber, light source and transmitter system, optical detector and receiver system, principle and amplification of optical amplifier, fiber-optic communication system and network, and WDM which is the key technology of wide bandwidth fiber-optic communication and all-optic network which is the future of fiber-optic communication.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代交换技术 I		
课程英文名称 <b>Course Title</b>	Modern Switching Technology I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>现代交换技术为通信技术专业的核心课程之一，通过该课程的学习应掌握通信急速的基本知识和操作技能。该课程的教学目标为：掌握电路交换技术的概念，程控交换的基本架构，呼叫处理的过程，最新交换技术以及通信网络的发展现状；为后续生产、安装、技术支持、售后服务等通信相关工作做准备；熟悉一种交换机的基本软硬件操作。主要内容：1、电话通信的建立、信令、通信网络以及收费的概念；2、电路交换的基本原理；3、程控交换板的基本结构，功能及控制过程；4、现代交换技术领域内的新技术，如包交换、ATM 交换、软交换等。</p>			
课程英文简介 <b>Course Description</b>			
<p>The Switch Technology is the core course for communication technology major students. Students should have the basic knowledge of communication technology and the ability to do operations. Teaching Objective: to know the concept of the circuit switching, the basic structure of the program switcher, the procedure of the call handling, the latest switching technology and development of the communication network; to fully prepare for the future work in production, installation, maintenance, technical support and after-sale department; to be familiar with the basic software and hardware operation of the switcher. Content: 1. The concept of telephone communication establishment, signaling, communication network, and billing; 2. The basic principles of Circuit switching; 3. The basic structure, function and control process of program-controlled switchboards; 4. New technologies of the switching field, such as packet switching, ATM switching and soft-switching.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代电子测量技术及仪器		
课程英文名称 <b>Course Title</b>	Modern Electronic Measurement Technology and Instrument		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程属于学科基础选修课, 主要阐明近代电子测量实践中所遇到的主要物理量的基本测量原理和方法, 以及工程实验测量误差的基本理论和数据处理知识, 并对近年来新近发展起来的不确定度分析方法进行详细的讲解。针对常见的电子测量仪器的工作原理和使用方法进行说明, 包括时域、频域和数据域的测量, 以及电压、时间频率参数测量, 仪器接口、自动化测试系统。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is the discipline based elective course. It clarifies the basic measurement principle and method of main physical quantity in modern electronic measurement, and the basic theory of measurement error and the data processing, and detailed analyzed uncertainty, which are the new theories of the measurement. This course introduces the operation principles and operation methods of the common electronic measurement instrument, including measurement in time-domain, frequency-domain and data-domain, and measurement of voltage and time-frequency parameters, and instrument interface, automatic test system.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电视原理 (双语 Television Principle(Chinese/English))		
课程英文名称 <b>Course Title</b>			
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>通过对电视系统的原理、组成、工作过程的描述,向学生传授相关知识及分析与解决问题的方法,培养学生对电视系统的理解、分析与综合能力。要求学生掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体知识包括电视成像原理、扫描方式、三基色概念与彩色合成、摄像与显像原理、视频信号的编码与解码原理、黑白与彩色信号构成、同步脉冲构成、扫描与同步原理等。介绍各种显示器及工作原理,CRT、LCD、PDP、LED、OLED等;成像器件工作原理,包括:真空摄像管、CCD。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through the description of television system's working principle, composition and working process, this course is to teach students the relevant knowledge and analysis and the methods to solve the problems, to train students' understanding, analysis and comprehensive ability of the television system. This course requires students to master the basic concept, the basic theories, basic method and the basic technology. Specific knowledge includes TV imaging principles, scanning mode, the concept of the three primary colors and color composite, camera and imaging principles, video signal code and decoding principles, black and white and color signals constitutes, synchronous pulses constitutes, scanning and synchronization principles and so on. This course also describes various monitors and working principles, CRT, LCD, PDP, LED, OLED, etc, and imaging devices working principles, including: vacuum camera tube, CCD.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代电子电路设计方法		
课程英文名称 <b>Course Title</b>	Design on modernized electric circuit		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是电子工程、信息工程等电类专业本科生的专业选修课程。本课程是向学生介绍流行的电子电路与系统的自动化设计方法、设计工具和设计实例。其教学目的是使学生了解电子设计自动化技术的有关发展情况及发展趋势，掌握模拟电路和数字电路自动化设计技术的理论基础和设计方法，提高电子电路的设计能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This is an elective course for the undergraduate students major in electronic and information engineering. The purpose of this course is to let students know the situation and development trend of the electronic design, master the theory and method on the analog circuit and digital circuit design, improve the ability of electronic circuit design by means of introducing the popular design methods, design tools and design examples of the electronic circuits and systems.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	移动通信		
课程英文名称 <b>Course Title</b>	Mobile communications		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>通过围绕移动通信的讲解,使学生全面地了解移动通信系统、移动通信系统发展动态、通信标准的制定和发展及最新成果,具备一定的分析和设计移动通信系统的能力。具体内容有:移动通信特点和基本技术,目前使用的移动通信系统及各自特点。移动蜂窝网的基本原理,其干扰受限特性和提高容量的设计方法。移动通信组网技术,包括网络结构、信令结构和网络管理。目前使用的民用移动通信系统,如 2G 系统(GSM、IS-95CDMA)和 3G 系统(WCDMA、CDMA2000、TD-SCDMA)不同系统采用的主要技术、网络接口和网络规划管理。对于广泛研究的 4G 系统理念和发展进程进行介绍,从而对移动通信系统有全面的了解和掌握。</p>			
课程英文简介 <b>Course Description</b>			
<p>Through the explanation of mobile communications, students can get comprehensive understanding of the mobile communication systems, the developments of the mobile communication systems, the formulation and development of the communication standards and the latest results. Students will have the ability to analysis and design the mobile communication systems. The contents include characteristics and basic technologies of the mobile communications, the mobile communications systems in use and their characteristics, the basic principles of mobile cellular network, the design method of the interference-limited characteristics and improving the capacity. Mobile communications networking technologies include network architecture, signaling structure and network management, and the civilian mobile communication systems currently in use, such as 2nd Generation Communication System (GSM, IS-95CDMA) and 3rd Generation Communication System (WCDMA, CDMA2000, TD-SCDMA). Different systems have different main technologies, network interfaces, network planning and managements. This course will also explain the concept and the development process of 4th Generation Communication System for students to have comprehensive understanding of the mobile communication system.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	： 卫星通信		
课程英文名称 <b>Course Title</b>	Satellite Communications		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是为通信、电子信息类专业本科生开设的一门专业课程。本课程涉及卫星通信的基本原理和技术，并结合系统的组成介绍主要设备及当前所达到的水平，同时包括了卫星通信的一些新技术和典型的实际系统。课程内容包括卫星通信概述，卫星轨道知识，VSAT 通信网及卫星定位及导航等。通过这门课程的学习，使学生掌握卫星通信的基本原理和技术，了解卫星通信领域的新进展和新技术，为学生从事通信、电子相关的工作岗位打下坚实的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Globalization of network and services is stimulating a new awareness about the role of satellites and related applications. Modern Earth-orbiting satellites are sophisticated machines that have transformed all aspects of human civilization from communications and navigation to defense, global monitoring, and intelligent stewardship of our planet. The basic ideas of orbital mechanics are covered, and radio wave propagation, the earth and satellite space segment, satellite access techniques, satellite services such as VSAT, are discussed. And the new and important integration strategy concerns Navigation and Communications architectures and services are discussed in this course.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	单片机应用技术		
课程英文名称 <b>Course Title</b>	Single Chip Microcomputer Application Technologies		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课是现代科学技术与实践应用十分紧密的电子工程学类课程,侧重于应用技术理论和实践的结合。课程介绍主要内容如下:</p> <p>89C51 单片机的片内硬件结构及片内各功能部件的工作原理及应用,包括时钟电路、复位电路;中断系统、定时器/计数器、串行口。汇编语言指令系统、基本的 AT8951 汇编程序设计基础。各种扩展接口设计,包括:存储器、I/O, 键盘、显示器等接口电路设计以及驱动程序设计。单片机应用系统的软硬件设计, 以及应用系统的抗干扰设计。</p> <p>通过本课的学习,使学生在单片机控制系统领域有一个较深刻的认识,培养学生对单片机的开发应用能力,对本科生在大学最后一个阶段的电子工程课程设计、毕业设计等重要学习环节都将起到十分重要的作用。</p>			
课程英文简介 <b>Course Description</b>			
<p>Application Technique of Single-chip Microcomputer" is a course of electronic engineering with the combination of technique theory and practice. The purpose of the course is for students to understand the new technology, and master the basic skills in the development of SCM. The course is based on the MCS-51 single-chip microcomputer (SCM), giving a comprehensive introduction of the basic principle and application of SCM. The principle of MCS-51 SCM and the development technology of software and hardware are explained through examples. The function of SCM is realized by the assembly language program and C program, respectively. The topics include: the principle of hardware and structure of SCM, memory expansion, I/O expansion, A/D and D/A conversion, instruction system of assembly language and C language, and program design technology.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	ASIC 设计与应用 (自学)		
课程英文名称 <b>Course Title</b>	ASIC Design and Application (Self-learning)		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程属于电子信息类相关专业的学科专业课程。本课程的学习目的在于使学生理解专用集成电路(ASIC)的概念,初步掌握 ASIC 的设计方法和设计流程,培养学生的系统和工程思想,关注 ASIC 设计技术的最新进展,为学生从事与集成电路相关的工作奠定良好的基础。本课程结合先进的技术和设计方法,以 Verilog HDL 为工具,针对 ASIC 设计的重要内容和工程设计技术进行了全面深入的讨论。内容安排上倾向于培养学生的“工程设计”能力,着重讲述了使用 Verilog 进行数字系统的设计、验证及综合,使培养学生初步掌握 RTL 级数字电路模块和系统描述、设计、验证的基本流程和工程设计方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>ASIC design and application” is a major course in the area of electronic information. The purpose of the course is for students to understand the concept of application specific integrated circuit (ASIC), master the methodology and process of the ASIC design, develop the idea of system and project, realize the latest development in the technology. The course discusses the important content of ASIC design and engineering technology based on the advanced technology and design methods. It focuses on the design, verification, synthesis and physical implementation of digital system using Verilog HDL. The students are expected to develop the ability of “project design” and grasp the preliminary method and process for modern ASIC.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体理论		
课程英文名称 <b>Course Title</b>	Semiconductor theory		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>半导体物理实验课程是电子科学与技术专业的专业必修课,是面向电子科学与技术方向本科生所开设的微电子技术的专业基础与专业综合课程,是培养方案中的核心实践教学环节之一。</p> <p>开设的目的是使学生熟悉半导体物理的基础理论和半导体的主要性质,以适应后续专业课程的学习和将来工作的需要。</p> <p>半导体物理是在量子力学和固体物理的基础上,关于半导体基本性质、基本理论和实验方法的一门科学,本课程主要介绍固体晶格结果、固体量子理论、平衡半导体性质、载流子输运过程、半导体中非平衡过剩载流子、PN结、半导体异质结等。。</p>			
课程英文简介 <b>Course Description</b>			
<p>Semiconductor Theory” is a major elective course for the undergraduate students major in Electronic science and technology. The course will discuss the properties, theories and experimental methods of semiconductors. The purpose of the course is for students to comprehend the basic concept and theory of semiconductor physics and to prepare for the follow-up major courses and future work. The topics include the crystal structure and quantum theory of solids, transport process of carriers, non-equilibrium excess carriers, properties of PN junction, heterojunction and field effect transistors.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体器件仿真与设计		
课程英文名称 <b>Course Title</b>	Simulation and Design of Semiconductor Devices		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程属于专业选修课。主要介绍半导体器件应用、结构设计、仿真验证与版图实现等，培养学生知识运用能力。要求学生了解半导体器件的应用，明确工程应用对半导体器件关键电参数的具体要求，明确常规半导体器件（二极管，功率 MOSFET）电参数指标与器件结构参数、工艺参数及物理参数的关系，明确工艺过程对器件结构参数与物理参数的影响，掌握相关的软件工具进行器件辅助设计的基本方法。具体知识包括：1) 二极管相关参数：反向耐压（含场终端结构），反向恢复特性，导通压降与快恢复要求的折衷。2) MOSFET 相关参数：阻断电压，导通电阻，跨导，阈值电压，栅电荷因子，开关时间与开关损耗，工艺实现，元胞设计与仿真，特性仿真，版图设计。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Simulation and design of semiconductor devices” is a major elective course. The course is an introduction of the applications, structure designs, simulation verifications, and layout designs of semiconductor devices. The students are expected to understand the application of common used devices, such as diodes and Misfits, and the effect of structure and fabrication process on the performance of devices, and master the software to perform process and device simulations. The topics include: 1) key parameters for diode: breakdown voltage (including field terminal structure), diode reverse recovery performance, trade-off between on-stage voltage and switching speed of diode; 2) key parameters for MOSFET: Blocking voltage, on-state resistance, trans-conductance, threshold voltage, gate charge, switching time and switching loss, cell design and simulation, layout design, and etc.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子材料与器件 (双语)		
课程英文名称 <b>Course Title</b>	Electronic Materials and Devices (Chinese/English)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是电子科学与技术专业选修课。通过本课程的教学,应使学生理解与掌握电子材料与器件的概念、原理与应用基础,了解不同功能的电子元器件及发展趋势,培养学生对电子材料功能特性的应用能力,拓宽知识面,获得必要的专业常识和认识不同的专业方向,激发学生的学习兴趣 and 构建合理的知识结构,为今后的工作打下良好的基础。具体知识包括电子材料的发展与应用,各种电功能材料包括导电材料、超导材料、半导体材料、电介质材料(包括电容器介质材料、铁电材料、压电材料、热释电材料)、磁性材料、光电子材料、敏感电子材料以及电功能材料在相关方面的应用。</p>			
课程英文简介 <b>Course Description</b>			
<p>Electronic materials and devices" is a major elective course for the Undergraduate students major in Electronic Science and Engineering. The students are expected to understand the concepts and theories of electronic materials and acquaint themselves with the functions of different electronic devices. The topics include: conductors, superconductors, semiconductors, dielectric materials (ferroelectric materials, piezoelectric materials, piezoelectric materials), magnetism materials, photo electronic materials, susceptible materials, and the related devices.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	功率半导体器件及应用		
课程英文名称 <b>Course Title</b>	Power Semiconductor Devices and Applications		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是电子科学与技术专业任选课。要求学生在已学过的器件原理和电路分析知识的基础上了解和掌握功率半导体器件及其应用电路（电力电子电路）的基本工作原理，熟悉相关的描述、评价、分析和计算方法。具体内容包括功率半导体器件基本原理，AC/DC、AC/AC、DC/AC、DC/DC 变换变换技术等。本课程有利于本专业学生拓宽知识面，获得必要的专业常识和认识不同的专业方向，为将来从事功率半导体或电力电子相关的职业奠定良好基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Power semiconductor devices and applications” is a major elective course. The purpose of the course is for students to understand the basic operation principle of power semiconductor devices and the circuits (power electronic circuits), get familiar with the methods of description, evaluation, analysis and calculation, broaden the scope of knowledge, acquire necessary common sense, and get to know different subjects. The topics include the basic principle of power semiconductor devices, conversion technology for AC/DC, AC/AC, DC/AC and DC/DC, and etc. The course will lay foundation for the field of power semiconductor or power electronics.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	光电子技术基础 (双语)		
课程英文名称 <b>Course Title</b>	Fundamentals of Optoelectronics Technology(Chinese/English)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>光电子技术是光子与电子技术相结合而形成的一门技术。 主要研究光与物质中的电子相互作用及其能量相互转换的相关技术,以光源激光化、传输波导(光纤)化、手段电子化、现代电子学中的理论模式和电子学处理方法光学化为特征,是一门新兴的综合性交叉学科。该课程介绍光电子技术的基本理论和应用基础,光电子系统中关键器件的原理、结构、应用技术和新的发展。通过本课程的学习,使学生掌握光电子技术的基本概念、基本原理与应用基础,掌握常用的光电子器件的性能和技术特点,了解光电子技术发展动态,为今后从事激光技术、光通信技术、光纤技术、光信号探测技术、显示技术等方面学习与工作打下专业技术基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Fundamentals of optoelectronics technology” is an area of physics and engineering that deals with devices and systems, which are based on the interaction of light with matter and the transfer process of energy. While this area only began to grow rapidly after the discovery of the laser, optoelectronics is not equivalent to laser physics. The course will introduce the basics of optoelectronic devices, including wave nature of light, dielectric waveguides and optical fibers, waveguide-based devices, semiconductor Light Emitting Diodes (LED) and lasers, photo-detectors, and photovoltaic devices, such as solar cells, polarization and modulation of light, etc. The emphasis is placed on the basic concepts/operating principles/structures of typical optoelectronic devices, the applications in the real world (e.g. Blue-ray discs, Fiber-To-The-Home, LED lighting, etc.), and the current state of the art and the future progress of these devices or technology.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	集成电路 CAD		
课程英文名称 <b>Course Title</b>	Computer Aided Design (CAD) for Very Large Scale Integrated Circuit (VLSI)		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>通过本课程的学习, 使学生对集成电路的迅速发展有所了解, 对 CAD 的重要性有清醒的认识, 要求掌握全定制、定制、半定制、可编程逻辑器件设计、混合模式等的设计方法, 掌握集成电路高级综合技术, 逻辑综合技术, 版图综合技术, 以及逻辑模拟、电路模拟、器件和工艺模拟、集成电路测试技术的基本知识。为学生从事与集成电路相关的工作奠定良好的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course will provide students with a realization of the rapid development of VLSI and the importance of CAD in design of VLSI. The topics of the course include: design of custom, semi-custom, mixed style and programmable VLSI; advanced synthesis technique; logical synthesis technique; physical synthesis technique; logical simulation; circuits simulation; device and process simulation; VLSI test techniques. The course will lay a foundation for students to conduct work in VLSI.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	集成电路 EDA		
课程英文名称 <b>Course Title</b>	Electronic Design Automation(EDA) of Integrated Circuits		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>了解集成电路设计技术的发展过程和发展趋势，熟悉并初步掌握常用 EDA 软件的使用方法，为从事集成电路设计工作打下良好的基础。学习内容包括：掌握集成电路设计流程；EDA 软件使用的操作系统 UNIX 的基本知识和操作；逻辑模拟 VHDL 和 Verilog、电路模拟、逻辑综合 Design Compiler、版图设计和布局布线 Soc Encouter 等基本 EDA 技术和工具；集成电路工艺仿真 Tsuprem-4；特种器件和集成电路器件仿真 Medici 等知识。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is for students to understand the history and development of IC design, get familiar with the preliminarily software of Electronic Design Automation (EDA), and lay a good foundation for work in IC design. The topics include: the process of integrated circuit design; basic knowledge and operation of the EDA software using the operating system UNIX; logic simulation software of VHDL and Virology, circuit simulation, logic synthesis software of Design Compiler, layout design software of Soc Encounter and other EDA technologies; IC process simulation software of Tsuprem-4; special devices and integrated circuit device simulation software of Medici, and etc.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	片上系统集成 (SOC) (双语)		
课程英文名称 <b>Course Title</b>	System on a chip(SOC)(Chinese/English)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>随着微电子技术和计算机技术的迅速发展,集成电路的设计允许将一个完整的系统集成在一个半导体芯片上,以缩小体积、降低功耗。本课程的任务是向学生讲解当今集成电路设计的新方向---片上系统集成。其教学目的是使学生了解片上系统集成对集成电路设计提出的新要求、片上系统集成的设计环境等,掌握以片上系统集成为设计目标的理论基础和设计方法,提高学生对新技术的适应能力,为今后的工作打下良好基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>As the development of micro-electronic technology and computer technology, the modern integrated circuit design allows the integration of a whole system on a single silicon chip, for small size and low power consumption. The course will discuss the advanced method of integrated circuit design—System on Chip (SoC). The purpose is for students to understand new requirement of integrated circuit design for SoC, methodology of SoC design and the design environment, adapt to new technology, and prepare for future work.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	嵌入式系统 I		
课程英文名称 <b>Course Title</b>	Monochip and Embedded System I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过对 ARM 系列 32 位处理器架构体系、现代嵌入式软硬件系统工作原理及设计方法的讨论向学生传授有关知识和问题求解方法，培养学生的系统集成思想和理论与实践相结合的能力。要求学生掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体知识包括嵌入式系统的基本概念，处理器架构体系、编程模型和指令、流水线及其在 ARM 中的应用、thumb、ARM 状态、工作模式和权限；ARM 处理器的硬件结构和集成思想、存储器的结构 and 应用、中断控制器、LCD 控制器、USB、UART、I2C、SPI 等串行端口；嵌入式系统软件的开发模式和流程、汇编语言、C 语言和中断程序设计、嵌入式实时操作系统的基本概念和基本原理、操作系统的任务调度和进程通信、操作系统的移植方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction of the architecture of ARM 32-bit processor, and the working mechanism and design methodology of modern embedded hardware and software systems. The students are expected to understand the basic concepts, theories, methods, and techniques of the related problems. The topics include: the concept of embedded systems, embedded hardware architecture, processor architecture, interfacing techniques, buses and protocols, hardware and software interrupts, embedded software programming, modeling, inter-process synchronization and embedded real-time operating systems, application of memory, interrupt controller, LCD controller, USB, UART, I2C and SPI serial ports.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	射频集成电路分析与设计		
课程英文名称 <b>Course Title</b>	Analysis and Design of RF Integrated Circuits		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是现代科学技术与实践应用十分紧密的电子工程学类课程,侧重于应用技术理论和实践的结 合,重点培养学生认识新技术和应用新技术的能力。通过本课的学习,使学生了解射 频集成电路关键功能块结构和性能,掌握射频集成电路的基本概念和设计方法,包括无线通信 应用、传输线分析、Smith 圆图,单端口网络、多端口网络、匹配网络、偏置网络、射频晶体 管放大器设计等方面的知识。通过本门课程的学习,使学生较为熟练地掌握射频集成电路的基 本设计方法和设计原则,从而有能力进一步从事相关的科研和开发工作。同时,使学生能够适 应当今科学技术的飞速发展,将其培养成高素质、创新型的工程技术人才,为毕业后的就业打 下坚实的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Analysis and Design of RF Integrated Circuits” is a course of electronic engineering combining modern science technology and practical application. The purpose is for students to understand the structure and performance of the key function model in RFIC, master the basic concept and design methodology of RFIC, such as the application of wireless communication, transmission line analysis, Smith chart, one-port network, multi-port network, matching network, bias network, and design of RF transistor amplifier etc, and develop the ability to do scientific research and future work.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	特种器件与敏感器件		
课程英文名称 <b>Course Title</b>	Special Devices and Sensitive Devices		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过对典型的特种器件（光电器件、敏感器件等）的讲述，向学生传授有关基本结构和工作原理，培养学生的分析与设计能力。要求学生掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体知识包括基本物理概念（光电效应、等离子体等）；真空光电管基本结构及原理；半导体光敏及探测器件基本结构及原理；发光器件与显示器件基本结构及原理；其它典型敏感器件基本结构及原理；微波与电力器件基本结构及原理等等。本课程着重于器件的基本原理与概念，需要具备相关物理理论。通过学习该课程，学生将获得器件原理及相关器件设计以及提升器件性能的经验。</p> <p>推荐教材或主要参考书：</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction of the typical special devices (photoelectrical devices and sensitive devices, etc) and the basic structure and mechanism. The students are expected to comprehend the basic concepts, theories, approaches and technologies of such devices. The topics include: the basic concepts (photoelectric effect, plasma etc.), basic structures and mechanisms of vacuum photoelectric devices, semiconductor light sensitive devices, detectors, lighting and display devices, other typical sensitive devices and electricity devices. Theoretical background knowled</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	异质结与光电子器件		
课程英文名称 <b>Course Title</b>	Heterojunction and Optoelectronic Devices		
总学时 <b>Total Credit Hours</b>	40	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程介绍半导体科学和技术的前沿相关的理论和技术基础及其最新的进展。主要内容是半导体异质结物理及其在光电子和超高速微电子器件上的应用。包括异质结的基本理论，异质结生长技术，应变层、超晶格、量子阱、二维电子气等。异质结双极型晶体管，共振隧道器件的工作机理和热电子器件的原理。半导体光跃迁、受激辐射的基本原理，异质结、量子阱激光器和发光管的工作原理，基本结构，异质结、量子阱在其他光电子器件中的应用等。通过本课程的学习，学生应掌握关于异质结物理方面的基础知识和异质结在光电子器件方面的应用优势，了解其常用制备方法和特点，以及目前国际上光电子器件技术的最新的发展。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction of the science and technology of semiconductors, the related forefront theory, and latest development. The main content is the physics of semiconductor heterojunction and its application in optical and super high speed microelectronics devices, including the epitaxial of heterojunction, strained layer, super lattice, quantum well, 2D electronic gas, double heterojunction transistor, the working principle of resonant tunnel device and the theory of hot electronic device, semiconductor optical transition, basic principle of stimulated radiation, operation principle and the application of quantum well semiconductor laser devices, heterojunction, light emitting diode and other optical devices. The students are expected to master the basic knowledge of heterojunction and the advantage of application in optical devices, and understand the common preparation methods, devices features and the latest development of the optical devices in the world.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	机器人技术概论		
课程英文名称 <b>Course Title</b>	Introduction to Robot Technology		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>机器人技术概论是自动化专业学科选修课程，以机器人学相关知识为基础，涉及计算机科学、机械学、电子学、控制科学、人工智能等多个学科。本课程力图使自动化专业的本科学生全面了解当今机器人领域的研究和发展情况，认识机器人技术所涵盖的诸多领域，掌握机器人技术（机器人学）的基本概念、基本理论以及机器人的设计与控制方法，具备初步的机器人系统分析和设计能力。具体知识包括：机器人的机械结构、机器人的传感系统、机器人的视觉及其应用、机器人运动学和动力学、机器人的控制基础(伺服系统、控制系统的硬件结构及接口)以及移动机器人定位、规划与导航等。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Introduction to Robot Technology” is an elective course for the students majoring in automatic control. It bases on the related knowledge of Robotics. Linear state-space model and it is involved in various subjects, such as Computer Science, Mechanics, Electronics, Control Science, Artificial Intelligence, etc. The course tries to make the undergraduates majoring in automatic control widely understand the research and the development of today's robot field, know the domains involving in the Robot Technology, master the basic concept, theory and the design and control methods of robot, have the initial capabilities of system analysis and design. The contents include the following knowledge: mechanical structure, sensory system, machine vision and application, kinematics and dynamics, the control basic of robot (servo system, hardware structure and the interface of control system), mobile robot localization, path planning, and navigation, and so on.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机网络及应用		
课程英文名称 <b>Course Title</b>	Computer Network Application		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是一门适用于电子信息类本科生学习的专业课程，学生在学习本课程之前应当具有计算机基础和微机原理与接口的预备知识，通过本课程的学习可以系统、全面地掌握计算机网络工作原理及其在实际中的应用，尤其在自动控制领域的应用，对于现代高科技人才的培养具有重要作用。网络是通讯技术和计算机技术相结合的产物，因此学生学习该课程后，对于数据通信系统的结构和工作过程、计算机网络组成及其体系结构理论、网络互连设备及广域网等知识点从整体上有较全面的掌握。并且具备一定的计算机网络操作、日常管理和维护、典型局域网组建、Internet 应用等实践能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a professional curriculum for the undergraduate majoring in electronic information. Students should have pre-knowledge of the Basis of Computer Engineering and Microcomputer Principles and Interface Technology. Through the study of this curriculum, students can systematically and comprehensively master the principle of computer network and its practical application, especially in the field of automatic control. It has a significant value for the education of the modern high-tech talents. Computer network is a product of combining the technology of communications and computer. Therefore, students will have a more comprehensive grasp of the structure and working process of the data communication system, computer network composition and its theory of architecture, network interconnection equipment and knowledge of WAN after learning this curriculum. And they will also possess the ability to operate, manage and maintain a computer network, to set up a typical local area network, and to apply the Internet.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机网络及应用 (双语)		
课程英文名称 <b>Course Title</b>	Computer Networks and Application (Chinese/English)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是一门适用于自动化专业本科生学习的课程, 学生在学习本课程之前应当具有计算机原理的预备知识, 通过本课程的学习可以系统、全面地掌握计算机网络工作原理及其在实际中的应用。网络是通讯技术和计算机技术相结合的产物, 因此学生学习该课程后, 对于数据通信系统的结构和工作过程、计算机网络组成及其体系结构、网络互连及现代网络基础等知识点从整体上有较全面的掌握。具体知识包括数据通信的多路复用、调制编码、差错控制、同步控制。网络体系中的 OSI/RM、TCP/IP 和 IEEE802。局域网的拓扑结构、传输介质、介质访问控制技术。网络互联中的交换机、路由器配置, 子网划分, TCP 的流量控制和拥塞控制。通过学习可使学生具备一定的计算机网络操作、日常管理和维护、典型局域网组建、广域网规划和配置、Internet 应用等实践能力, 为将来在 IT 领域就业打下必要的网络应用知识储备。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is adapted to undergraduate students major in automatic control. Before learning this course, students should have prior knowledge of computer theory. After learning this course, students can have a comprehensive grasp of the working principles of computer network and its application in engineering. The network is the product of the combination of communications and computer technology. So students can learn more about the structure and working process of the data communications systems, the construction and architecture of computer networks, network interconnection and modern network technology. Specific knowledge, including data communications, division multiplexing, coding and modulation, error control, synchronization control. Network standard of OSI/RM, TCP/IP and the IEEE80 2. LAN topologies, transmission media, MAC technology. Switches, routers, subletting, TCP flow control and congestion control. Learning of this course allows students to have some practical ability of computer network operations, management and maintenance, for instance, building of some typical Local Area Networks, planning and configuration of the WAN, Internet applications, and to lay the necessary knowledge of network applications reserves for future employment in the IT field.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	可视化程序设计语言 (自学)		
课程英文名称 <b>Course Title</b>	Fundamental of Visual programming Language(Self-learning)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>讲解面向对象分析与设计方法、c++语言面向对象程序设计的基础知识以及 Windows 程序设计基础的有关基本概念、基本原理和基本技术、MFC 编程方法, 通过 Visual c++集成开发环境的编程实践训练, 培养学生结合实际问题背景应用所学理论知识及开发工具给出设计方案并具体实现的研究开发能力。要求学生掌握面向对象分析与设计、面向对象程序设计的基本概念、基本方法和基本技术。具体知识包括: UML 基本图形符号, 用况图, 类图, 交互图, 状态机图, 类, 继承, 虚函数, 窗口, 窗口函数, 事件驱动, 设备上下文, GDI, 画笔, 画刷, 映射模式。具体技能包括利用 Visual studio IDE 创建应用程序项目, 制作对话框、菜单等资源文件, 以及编程调试的基本技能等。</p>			
课程英文简介 <b>Course Description</b>			
<p>Object-oriented analysis and design methodology, object oriented programming in c++ language, Microsoft Windows programming essentials and Visual c++ programming are introduced in this course. The students are expected to understand the basic concepts, principles, techniques of Object-oriented technology of software design and implementations. Through a series of practical programming experiments covering the knowledge elements of c++ programming language and a comprehensive project design, the students are expected to be trained in mastering the Visual studio IDE to practical design and programming in C++ language and to acquire the beginning experiences in utilizing theoretical knowledge and computing tools to solve practical problem. The basic topics include: UML notations, use case diagram, interaction diagram, class diagram, object diagram, state machine diagram, class, object, inheritance, virtual function and dynamic binding, window and its handle, window procedure, event-driven program mode, device context, graphics device programming interface, pen, brush, mapping mode between logical window and physical viewport. The techniques include creating appropriate project in visual studio IDE, making resources such as dialog modal and menus, as well as debugging skills.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	模式识别基础		
课程英文名称 <b>Course Title</b>	Fundamental of Pattern Recognition		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>模式识别基础是面向自动化专业本科高年级学生开设的专业选修课。本课程要求通过对模式识别的基本理论、方法及实例的学习,使学生掌握模式识别的基本概念、基本理论和研究思路,培养学生利用模式识别方法和技能解决本专业及相关领域实际问题的能力。主要课程内容包括:模式和模式识别的概念,聚类分析方法,几何分类法(线性和非线性判别函数),概率分类法,特征选择与特征提取方法,模糊模式识别法以及神经网络模式识别法等。学生通过学习,为走上工作岗位后解决工程技术问题或后续研究生阶段模式识别与智能系统专业的学习和深入研究奠定基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Pattern recognition is a specialty elective course for automation senior undergraduates. With the learning of basic theories, methods and examples in pattern recognition, students should master basic concepts, theories and research method of pattern recognition, and should acquire the ability of using pattern recognition methods and skills to solve practical problems in profession and related fields. The basic topics include: The concept of patterns and pattern recognition, cluster analysis method, geometric classification (linear and nonlinear discriminate function), probabilistic classification, feature selection and feature extraction methods, fuzzy pattern recognition method and neural network pattern recognition method and so on. This course can lay foundation for students engaged in both solving engineering technical problems in his/her future jobs and learning and researching in the following postgraduate stage of Pattern Recognition and Intelligent System specialty.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数据库原理及应用 (自学)		
课程英文名称 <b>Course Title</b>	Theory and Application of Database		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是一门计算机类基础性课程,是我校电子信息类专业本科教学计划中的一门专业任意选修课程,通过本课程的学习,使学生掌握数据库系统基本的理论、设计和实现方法,为解决实际生活中的数据库问题的打下必要的基础,使学生具备一定的动手能力与解决实际问题的能力,使得学生毕业后更好地适应社会的需要。具体知识包括:数据库系统的基本概念和基本原理,关系数据模型、关系数据理论和关系数据库系统,数据库设计的方法、步骤,需要简单数据库系统的设计,SQL Server 数据库管理系统、Transact SQL 语言及相关软件的使用,基于Internet/Intranet 的网络数据库的开发。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a basic computer curriculum. It is a specialty elective course of undergraduates Major in the electronic information and control engineering. This course enable students to master the basic theory of database systems, design and implementation and to have the necessary foundation and the ability to solve practical problems, which can ensure that students better adapt to the needs of the community after graduation. The basic topics include: basic concepts and principles of database systems, relational data model, relational data theory and relational database systems, database design and its steps, implementation of a real simple database system, the usage of SQL Server database management system, the Transact SQL language and related software, development of Internet/Intranet-based network database.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	系统工程导论		
课程英文名称 <b>Course Title</b>	Introduction to System Engineering		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>系统工程是在工程技术和工程管理中得到广泛应用的学科。这门课要求学生基本地了解系统工程基础理论的整体发展，掌握系统工程的基本概念、原理和方法。课程主要包括系统的概念与分类，系统工程的概念，系统工程方法论，系统建模概念、方法和步骤，以技术经济分析、成本效益分析为例介绍系统分析的方法和原则，系统评价的主要方法，连续和离散系统仿真的方法步骤，系统可靠性设计等。通过学习，初步建立处理问题的系统观点，培养从系统总体出发观察和解决问题的能力，从而适应自动化专业人才培养的需要，为学生毕业后从事技术或管理打下基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>System engineering is the discipline which is widely used in engineering technology and engineering management. In the learning process, students are required to understand the global development of the basic theory in system engineering, and master the basic concepts, principles and methods in this discipline. This course mainly consists of the following contents: concepts and classification of system, concepts of system engineering, methodology in system engineering, concepts, methods and procedures of system modeling, system analysis methods and principles (technical and economic analysis, cost-benefit analysis, etc), the key methods used for system evaluation, methods and procedures of continuous and discrete system simulation, system reliability design and so on. Students are required to establish the fundamental systematic standpoint in dealing with technical problems encountered in practice, and have the capability of observing and solving problems from the global system viewpoints. This course will meet the education requirement of Automation specialty, and lay the foundation for graduate students engaged in engineering technical development or management jobs.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代运动控制技术的应用与实践		
课程英文名称 <b>Course Title</b>	Application & Realization of Modern Motion Control Technology		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程属于自动化专业的专业任选课，主要以交、直流电动机为控制对象，对常用的运动控制系统的设计实现、实用技术和工程实践等方面进行讲授。对于自动化专业的学生，本课程以前期先修课程为基础，以培养学生理论联系实际的工程分析与实践能力为目的开设。具体知识包括：电机拖动技术应用、变流器技术、数字控制的直流调速技术和基于 DSP 的交流变频调速技术。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is one of the elective courses in automation. The design, realization, application and engineering practice of common motion control systems around AC and DC motors are introduced. The course is set for students to improve their engineering design and practical ability. The basic topics include: application of electric machine technology, modern power electronics, DC driving system based on digital control and AC variable-frequency driving technology based on DSP.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	智能交通系统		
课程英文名称 <b>Course Title</b>	Intelligent Transportation Systems		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>智能交通系统为自动化专业学生了解智能交通系统(ITS)的基本知识而开设,使学生具备在智能交通相关技术领域较宽广的知识面和专业面。作为许多高新技术综合集成的载体,智能交通系统吸引越来越多信息、自动化相关专业人士的加入。本课程的授课对象为自动化及相关专业本科生,是专业选修课。本课程主要介绍智能交通系统的发展背景,概念、特征和研究目标,美国、日本、欧洲智能交通系统发展历程和发展动向以及体系结构等基本概念,详细阐述了信息采集、智能控制等相关技术;并以此为基础全方位介绍与 ITS 关系密切的内容,包括先进的交通管理系统(ATMS)、先进的出行者信息系统(ATIS)、先进的车辆控制系统(AVCS)、先进的公共交通系统(APTS)、商用车运营管理系统(CVOS)等六类系统的主要功能和应用;最后介绍了智能交通系统的标准化及技术经济评价问题。</p>			
课程英文简介 <b>Course Description</b>			
<p>As an integration of many high-tech research areas, the purpose of this course is to make the students from the relative majors of automation acquire a comprehensive understanding of the basic knowledge of ITS. This course introduces the background of intelligent transportation systems in the United States, Japan and the European, the current developments in our country, varieties of related technologies, such as the collection of traffic information, intelligent control, etc. The course mainly introduces the ITS knowledge including advanced traffic management systems (ATMS), advanced traveler information system (ATIS), advanced vehicle control system (AVCS), advanced public transportation systems (APTS), Commercial Vehicle Operation Management System (CVOS), and the standardization of intelligent transportation systems.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	最优化基础		
课程英文名称 <b>Course Title</b>	Fundamentals of Optimization Theory		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>最优化是一个应用广泛、实用性很强的学科，它对于提高学生解决实际问题的能力具有重要作用。通过本课程的学习，使学生掌握最优化最基本的理论和方法，为解决实际中的优化问题的打下必要的基础，使学生毕业后更好地适应社会的发展需要，同时也为学生的继续学习和深造打下良好的基础。主要内容是：最优化问题的基本概念、实际中优化问题的数学建模方法，一般最优化问题的基础理论和方法，线性规划的单纯形方法，凸规划，非线性规划的一般和典型的求解方法和算法。</p>			
课程英文简介 <b>Course Description</b>			
<p>Optimization is widely used in science and engineering. The aim of this course is let students learn the most basic theory and method in optimization and provides them with a necessary foundation of future use such as further study or solving problems in practice. The main contents are: the basic concept of optimization, the math model of optimization problems in practice, the general theory and method in optimization, linear programming and simplex method, the concept of convex optimization, and some typical methods and algorithms for non-linear programming.</p>			

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北京工业大学  
成绩单证书专用  
Beijing University of Technology  
教务处





北京工业大学

BELJING UNIVERSITY OF TECHNOLOGY

100 Ping Le Yuan • Chaoyang District • Beijing 100124 • P.R.China

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机网络应用 I		
课程英文名称 <b>Course Title</b>	Computer Network Application I		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是适用于通信工程、电子信息工程类的一门重要专业课程。采用由简单到复杂的方法使学生掌握计算机网络的基本原理及应用技术。通过本课程的学习要使学生能够比较全面地理解和掌握计算机网络技术的基本知识、基本理论和网络的基本工作原理，比较全面地了解和掌握计算机网络应用技术。</p> <p>本课程主要内容包括：计算机网络的产生、定义、组成与分类；计算机数据通信基础知识；计算机网络的体系结构与网络协议；计算机局域网；网络互连与广域网。本课程配套有相关应用实验，通过实验使学生具备一定的计算机网络操作、日常管理和维护、典型局域网组建、Internet 应用等实践能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an important professional course offered for the professional student of the communication engineering and the electronic information engineering. This course introduces the student to master the based principle and the application technology from the simple to the complex. By learning this course, the student may comprehensively understand and master the basic knowledge, basic theory and basic working principle of the computer network, and the student may comprehensively understand and master the technology of computer network application. The basic topics include: the development, the definition, the structure and the type of the computer network; the foundation of the computer data communication; the architecture and the network protocol of the computer network; the LAN; the network interconnection and wide area network. This course also includes some application experiments. The experiment may train the student the ability of the computer network operation, the daily management and maintenance, the establishment of typical LAN and the internet application.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数据库技术应用 II		
课程英文名称 <b>Course Title</b>	Database Technique and Application II		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是培养学生使用数据库和编写数据库应用程序能力的基础课程。开设本课程的目的使学生理解关系型数据库理论,并会设计、建立关系型数据库,了解掌握大型数据库的管理与使用方法。具体知识包括:数据库的基本概念、数据库的作用、数据库管理系统的功能、数据模型的概念、关系模型的转换和完善、主键、外键、概念模型到关系模型的转换、函数的依赖性及关系的规范化、数据库查询语言 SQL 等。</p>			
课程英文简介 <b>Course Description</b>			
<p>Database and SQL are introduced in this course. The students are expected to understand relational database theory and design based on relational database, grasp the large-scale data management and use, through which their using the database and writing database applications abilities will be improved. The basic topics include: Database concepts, database users and the role of databases in organizations. Functions of the DBMS, Conceptual Data Model e.g., Entity Relationship and Extended entity relationship diagrams., The relational model, Entity constraints, referential integrity, cardinality and participation constraints, enterprise constraints, Primary, foreign, candidate keys, Mapping a Conceptual Model to a Relational Schema, Functional dependencies and normalization for relational databases, Database query and manipulation languages e.g. SQL, ORACLE.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信号、系统与变换		
课程英文名称 <b>Course Title</b>	Signals, Systems and Transforms		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过本课程的学习,要求学生牢固掌握信号与系统的基本概念和理论;牢固掌握确定性信号经过 LTI 系统传输与处理的基本分析方法,包括连续系统与离散系统的时域分析、连续系统的频域分析、连续系统的复频域分析和离散系统的 z 域分析等;了解上述各种分析方法相互间的联系及其具体应用;具备应用信号与系统的观点和方法处理实际问题的能力,为进一步学习后续课程和今后参加工作奠定坚实的基础。零输入响应与零状态响应;冲激响应与阶跃响应的求解;卷积的性质及其计算技巧;零输入响应与零状态响应、冲激响应与阶跃响应的求解;卷积和的性质及其计算技巧;常用函数的 Z 变换、Z 变换的基本性质以及 Z 反变换的计算方法等。</p>			
课程英文简介 <b>Course Description</b>			
<p>Studying of this course requests a student fully understand the basic concept and theories of the signal and system and basic analysis method of the certain signals pass LTI system, including time domain analysis of continuous system and discrete system and the spectrum domain analysis of continuous system and the z domain analysis of discrete system etc. Understand above-mentioned various analysis method and they are concretely applied to solve practical problem. Fourier transform and analysis, Laplace transform and inverse Laplace transform, convolution theorem, Z transform and inverse Z transform, Discrete time signal and discrete time system analysis, zero-state response, zero-input response, linear time-invariant system, unit impulse response, Convolution, convolution theorem, sampling theorem, parseval theorem etc.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	面向对象程序设计 C++		
课程英文名称 <b>Course Title</b>	Object Oriented Programming with C++		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是一门现代编程理论与实践应用结合十分紧密的课程,侧重于加强同学实际编程能力培养,是学生掌握计算机技术的一个重要基础部分。课程系统介绍 C++ 语言的基本概念、基本特点和面向对象程序设计的基本方法。要求学生掌握有关方面的基本概念、基本理论、基本方法和基本技术。具体知识包括:类和对象、数据类型、语句结构、构造函数、析构函数、重载、友元、函数的重载、运算符重、继承与派生、多重继承、多态与虚函数、函数的模板、C++ 的输入输出等的概念。通过本课的学习,培养同学们软件开发能力,使同学们掌握运用 C++ 进行编程的方法,适应今后科研和工作的要求。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is combined tightly with modern programming theory and practical applications. This course focuses on strengthening the students' actual programming ability. It is an important foundation for students to master computer technology. The basic concept of the C++ language, the basic characteristics and the design of object-oriented programming methods is introduced in this course. The students are expected to understand the basic concepts, theories, methods, and techniques of C++ language. The basic topics include: the concept of class, object, data types, sentence structure, constructor, destructor, overloading, friend, function overloading, operator weight, inheritance and derivation, multiple inheritance, polymorphism and virtual functions, function templates, C + + input and output. The software development capabilities of student can be trained in this course. By learning of this course, students can master the method of C++ programming. It is useful for them to adapt research and work in future.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体器件可靠性技术 (自学)		
课程英文名称 <b>Course Title</b>	Reliability Technology of Semiconductor Devices(Self-learning)		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>	<p>半导体可靠性技术是 60 年代后期崛起的一门新兴的边缘学科。目前正在不断发展和完善过程中。它是在半导体器件物理学、器件工艺学、材料学、化学、冶金学、电子学、环境工程和系统工程等多种学科的基础上发展起来的。本课程的重点是阐述半导体可靠性的基本概念, 寿命试验的数据处理, 半导体器件的表面、体内、电极系统及封装对器件性能的影响, 半导体器件常见的失效机理, 失效分析技术和器件的正确使用等内容。</p> <p>通过本课程的学习能够让学生掌握有关半导体器件可靠性的一般基础知识和基本概念, 并把这些知识灵活的与所学过的半导体器件原理和集成电路等有关知识结合起来, 运用到实际中去。</p>		
课程英文简介 <b>Course Description</b>	<p>The course will discuss the basic concepts of reliability, data analysis of lifetime test, interface failure, body failure, effect of electrode system and packaging on the devices, etc. The students are expected to grasp the basic knowledge of reliability and the design of reliable devices.</p>		

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	单片机应用技术		
课程英文名称 <b>Course Title</b>	Single Chip Microcomputer Application Technologies		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课是现代科学技术与实践应用十分紧密的电子工程学类课程，侧重于应用技术理论和实践的结合，重点培养学生认识新技术和应用新技术的能力。课程以 MCS-51 系列单片机为基础，全面介绍单片机的基本原理和应用。以实用为宗旨，用丰富的实例讲解 MCS-51 单片机原理和软硬件开发技术，并采用对比方法，同一功能分别以单片机汇编语言程序和单片机 C 语言程序实现。本课程共分 8 章进行讲授，主要包括：单片机芯片的硬件原理和结构、存储器扩展、I/O 扩展、A/D 及 D/A 转换；掌握汇编语言和 C 语言的指令系统和程序设计技术等内容，使学生较为熟练地掌握一种单片机产品的应用开发技术，从而具有对单片机应用系统进行研制开发的基本技能。</p>			
课程英文简介 <b>Course Description</b>			
<p>Application Technique of Single-chip Microcomputer” is a course of electronic engineering with the combination of technique theory and practice. The purpose of the course is for students to understand the new technology, and master the basic skills in the development of SCM. The course is based on the MCS-51 single-chip microcomputer (SCM), giving a comprehensive introduction of the basic principle and application of SCM. The principle of MCS-51 SCM and the development technology of software and hardware are explained through examples. The function of SCM is realized by the assembly language program and C program, respectively. The topics include: the principle of hardware and structure of SCM, memory expansion, I/O expansion, A/D and D/A conversion, instruction system of assembly language and C language, and program design technology.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	多媒体技术		
课程英文名称 <b>Course Title</b>	Multimedia Technology		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>多媒体技术是电子科学与技术专业的一门限定性选修专业课程。本课程的目的与任务是使学生理解多媒体技术的基本概念和主要功能，掌握常用的多媒体工具软件的使用方法，了解如何进行多媒体软件开发和多媒体制作，从而为学生学习后续专业课程和工作打下基础。通过学习本课程使学生理解多媒体的基本概念和多媒体计算机系统的构成、工作原理。了解多媒体应用系统的开发方法和常用开发工具的使用。基本概念和基本知识包括：多媒体、位图、矢量图、图像、图形、MIDI、图像文件的格式、数据压缩和解压、动画、数字音频的制造、数字图像的制造、多媒体开发环境、多媒体开发工具、多媒体软件开发。</p>			
课程英文简介 <b>Course Description</b>			
<p>Multimedia technology is a limited elective course of Electronic Science and technology specialty. The purpose and task of this course is to enable students to understand the basic concept and the major function of multimedia technology, master commonly used multimedia software tools to use and learn how to do multimedia software development and multimedia production, and for students to study follow-up professional courses and work to lay the foundation. By studying this course, the students understand the basic concepts of multimedia and the composition and working principle of the multimedia computer system. Understanding of multimedia application system development methods and the use of commonly used development tools. The basic concepts and basic knowledge including: multimedia, bitmap, vector graphics, images, graphics, MIDI, image files format, data compression and decompression, animation, digital audio, digital image manufacturing, multimedia development environment, multimedia development tools, multimedia software development.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	计算机网络应用 I		
课程英文名称 <b>Course Title</b>	Computer Networks and Application		
总学时 <b>Total Credit Hours</b>	32	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是一门适用于非计算机专业的电子类本科生学习的专业课程，学生在学习本课程之前应当具有计算机原理的预备知识，通过本课程的学习可以系统、全面地掌握计算机网络工作原理及其在实际中的应用。网络是通讯技术和计算机技术相结合的产物，因此学生学习该课程后，对于数据通信系统的结构和工作过程、计算机网络组成及其体系结构、网络互连及现代网络基础等知识点从整体上有较全面的掌握。具体知识包括数据通信的多路复用、调制编码、差错控制、同步控制。网络体系中的 OSI/RM、TCP/IP 和 IEEE802。局域网的拓扑结构、传输介质、介质访问控制技术。网络互联中的交换机、路由器配置，子网划分，TCP 的流量控制和拥塞控制。通过学习可使学生具备一定的计算机网络操作、日常管理和维护、典型局域网组建、广域网规划和配置、Internet 应用等实践能力，为将来在 IT 领域就业打下必要的网络应用知识储备。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an important professional course offered for the professional student of the communication engineering and the electronic information engineering. This course introduces the student to master the based principle and the application technology from the simple to the complex. By learning this course, the student may comprehensively understand and master the basic knowledge, basic theory and basic working principle of the computer network, and the student may comprehensively understand and master the technology of computer network application. The basic topics include: the development, the definition, the structure and the type of the computer network; the foundation of the computer data communication; the architecture and the network protocol of the computer network; the LAN; the network interconnection and wide area network. This course also includes some application experiments. The experiment may train the student the ability of the computer network operation, the daily management and maintenance, the establishment of typical LAN and the internet application.</p>			





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## 北京工业大学课程描述（Course Description）

课程名称 <b>Course Title</b>	程序设计实践训练		
课程英文名称 <b>Course Title</b>	Practical Training of Program Design		
总学时 <b>Total Credit Hours</b>	30	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>程序设计实践训练是面向通信与电子技术相关专业本科生的重要课程。本实践环节的目的在于使学生了解 C 语言程序设计中相关的高级知识，包括结构体、文件和可视化程序设计及其在实践中的应用，掌握程序设计工程的完整过程，包括问题分析、算法设计、编译调试以及撰写报告等。学生应在本实践训练环节中完成实践课题，提高程序设计实践能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>Practical Training of Program Design is an important course for undergraduates in communications and electronic related major. The purpose of this practical training is to enable students to understand advanced principles of the C language program design, including the design of the structure, files operation, and visualization programming and to master the complete process of program design engineering, including problem analysis, algorithm design, compile, debug and report writing. Students will complete the practical projects in the practical training sessions and improve the practical ability of the program design.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	：电子技术实验-1		
课程英文名称 <b>Course Title</b>	The Electronic Technology Experiments -1		
总学时 <b>Total Credit Hours</b>	24	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>本课程是独立设置的实验课程，与对应的理论课数字电子技术和模拟电子技术在同一学期开出。本课程的内容包括三个方面：第一是电子技术实验的知识。第二是电子仪器的使用方法。第三是关于数字电子技术和模拟电子技术的基本实验。实验基础知识包括：实验的安全、实验的规范、电子元器件的知识、电路板焊接和实验的经验。电子仪器使用包括：实验箱、万用表、直流电源、示波器和信号源等。数字和模拟实验包括了基本的单元实验：单管放大器、负反馈放大器、运算放大器应用、组合逻辑电路和时序逻辑电路等。</p> <p>本课程的目的：通过学习知识、完成实验的过程，提高动手操作能力、培养科学作风，</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an independently running experimental course, with the corresponding theory course “Digital Electronic Technology” and “Analog Electronic Technology” in the same semester. This course includes three aspects: The first is knowledge of electronic technology experiment. The second is usage of electronic instruments. The third is basic experiments about digital and analog Electronic Technology. The experimental basis knowledge include: The safety of experiment, the rules of experiment, knowledge about electronic components, circuit board welding and the experiments of experience. Electronic equipments including: Experimental box, MultiMate, DC power supply, Oscilloscope and Signal generator, etc. Digital and Analog experiments including: Single pipe amplifiers, negative feedback amplifier, operational amplifier applications, the combinational logic circuit and sequential logic circuit, etc.</p> <p>The objectives of this course is that through the process of learning knowledge and completing the experiments, students will improve the ability to operate, develop precise science style and get experiences of the electronic experiment.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子技术实验-2		
课程英文名称 <b>Course Title</b>	The Electronic Technology Experiments -2		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程是独立设课的实验课程，它是电子技术实验 I-1 的后续课程。</p> <p>本课程分为包括三个方面：首先是 EDA 实验部分，使用 EDA 平台，分别完成一个数字电路实验和一个模拟电路实验。第二是数字电路为主的综合设计题目。第三是模拟电路为主的综合设计题目。在 EDA 实验部分，首先需要学习 EDA 软件，然后完成软件仿真和 FPGA 硬件下载、调试。在数字和模拟综合课题设计部分，需要完成资料查找、方案选择、硬件组装、调试测试等工作。最后要提交设计报告。</p> <p>本课程的目的：熟悉电子设计自动化（EDA）的方法；掌握电子模块的设计方法。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an independently running experimental course, which is a subsequent courses of "The Electronic Technology Experiment I-1". This course includes three parts: first is the EDA experiment, using EDA platform to complete a digital circuit experiment and a analog circuit experiment respectively. The aim of second experiments is to finish a comprehensive design based on digital circuit. The third is to achieve a comprehensive design based on analog circuit. In the experiment of EDA, first of all, the students need to learn EDA software, and then finished the software simulation and hardware to download and debugging on FPGA. In the digital and analog comprehensive design part, the students need to complete information search, plan selection, hardware assembling, debugging test, etc and submit design report in the end.</p> <p>The objectives of the course are to enable students to familiar with electronic design automation (EDA) methods and to master methods of electronic module design.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子工程设计 I -1		
课程英文名称 <b>Course Title</b>	Electronic Engineering Training I -1		
总学时 <b>Total Credit Hours</b>	45	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>电子工程设计是电子信息工程、通信工程、自动化等多个专业本科生必修的实践类课程。该课程以小型电子系统的设计为载体,使学生了解产品研发的一般过程、掌握产品设计的基本方法、积累初步的实际工作经验,为从工科大学生向工程师的角色转换做好准备。</p> <p>电子工程设计-1 是课程的第一阶段,学习如何在产品设计初期收集资料、设计方案,如何进行产品的模块化设计,如何绘制设计图纸和设计印刷电路板,并且完成产品中部分电路模块的设计与实现。通过该阶段的学习,使学生掌握一个电路系统中各个单元电路分别实现、单独调试的方法,提高电路实现过程中故障的排查能力,提高电路的组装、焊接水平。</p>			
课程英文简介 <b>Course Description</b>			
<p>Electronic Engineering Training” is a compulsory practice undergraduate course for students of Electronic Information Engineering, Communication Engineering, Automation and other majors. The course is based on a small electronic system design, which enables the students to understand the general process of product development, the basic method in product design and the accumulation of the preliminary practical work experience. It is like a bridge to convert participants from engineering students to the role of the actual engineers.</p> <p>“Electronic Engineering Training-1” is the first part of the course. The students will learn how to collect data in the early stage of product design, how to give design proposal, how to design the modular of the product, how to draw the design drawings and how to design of printed circuit board. In this course student will finish the each parts of the circuit and products design till to the implementation of the module. Through each stages of learning, it enables the students to master each unit circuit and realization of a circuit system, separate debug and improve the ability to detect the circuit failure investigation and improve the circuit assembly and welding level.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子工程设计 I -2		
课程英文名称 <b>Course Title</b>	Electronic Engineering Training I -2		
总学时 <b>Total Credit Hours</b>	75	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>电子工程设计-2 是电子工程设计课程的第二阶段,学习如何进行多个电路模块相互协调的电路系统设计,如何在多模块电路系统实现过程中进行阶段性成果评估,如何进行系统级故障的诊断与排除,并且完成由多个电路模块和程序模块组成的电路系统的联调、联测工作。通过该阶段的学习,将达到使学生了解产品研发的一般过程、掌握产品设计的基本方法、积累初步的实际工作经验的课程设置目标。</p> <p>电路系统按模块进行成果评估以及系统级故障的诊断与排除是该阶段授课的重点,也是学生能力提升的关键点。这二个过程为学生理论联系实际,分析、综合,观察、判断等能力提供了较大的提升空间。也对学生科学严谨的工程素养形成起到重要作用。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Electronic Engineering Training-2” is the second part of the Electronic Engineering Training courses. The students will learn how to conduct several circuit modules coordinated circuit system design, how to evaluate the stages results a multi-module circuit system, how to solve system-level fault diagnosis and troubleshooting,. Finally the students will complete the joint observation and debugging and connection of the whole circuit system consisting of multiple circuit modules and software program modules. Through the stages of learning, it will reach the goal of the curriculum to enable students to understand the general process of product development, to master the basic methods of product design, and the accumulation of the preliminary practical work experience.</p> <p>The focus instruction of this stage is the circuit module outcome assessment and system-level fault diagnosis and elimination, which is also the key to enhance the students’ ability. These two processes provide students greater room for improvement in theory, actual analysis, observation and judgment ability. At meanwhile, it plays an important role in the formation of rigorous engineering science literacy for students.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电子工程设计 I -3		
课程英文名称 <b>Course Title</b>	Electronic Engineering Training I -3		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>电子工程设计-3 是电子工程设计课程的第三阶段。前二个阶段为强化学习过程,特点是教师主导课程内容和进程,并且全程辅导。第三阶段为自主学习过程,特点是学生脱离教师的帮助,自主完成一个完整电路系统的设计与实现工作。电子工程设计-3 提供了 9 个以上的设计选题,其内容与前面所做工作具有关联性。包括功能补充、性能升级、方案更新、有线和无线通信能力扩展等设计方向。</p> <p>电子工程设计-3 将使学生逐步具备独立完成小型产品研发任务的能力,积累更多的分析问题、解决问题的经验。该阶段的学习是学生本科学习阶段的一段准工作经历,将成为学生从工科大学学生向工程师角色转换的“催化剂”。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Electronic engineering training-3” is the third part of the electronic engineering training courses. The first two stages are to strengthen the learning process, which is teacher-led curriculum content and process, plus the entire counseling. The third stage is the self-learning process. Students will finish independently circuit design and implementation work of the entire system without teachers' help. “Electronic engineering training-3” course provides more than nine design topics, which is connecting to the previous work in content. The design directions include feature additions, performance upgrades, program updates, wired and wireless communications capacity expansion.</p> <p>“Electronic Engineering Design-3” enables the students to improve the independently design and implementation ability of a small product development tasks. The students will gradually accumulate more analysis, problem-solving experience. This stage of learning is a quasi-work experience for undergraduate student at school, which will become a “catalyst” conversion for students from engineering students to actual engineer roles.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	毕业设计 (论文)		
课程英文名称 <b>Course Title</b>	Senior Project		
总学时 <b>Total Credit Hours</b>	480	总学分 <b>Credit</b>	16
课程中文简介 <b>Course Description</b>			
<p>毕业设计 (论文) 是本科教学非常重要的环节。要求学生在教师指导下, 独立完成一项与专业相关的工程项目, 并撰写毕业论文。具体包括针对课题任务要求, 开展项目立项 (开题)、资料收集、加工与整理, 工程方案确定、项目实施、评估与报告等工作。使学生掌握工程设计的程序、方法与技术规范, 提高工程设计计算、图纸绘制、编写技术文件的能力。该过程是对学生社会责任感; 团队意识; 严谨的工作作风; 科学的态度; 系统的项目设计、归纳、整理与分析; 规范地论文撰写与翻译等能力的综合培养与训练, 为学生今后的工作与学习打下良好的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Senior Project is an important link for the undergraduate education. The project help students to have a comprehensive knowledge and understanding of the whole process of engineering project design and science research, and to further improve the ability of analysis and solving problem in engineering design, scientific research. The students are expected to complete a professional project associated to Automation independently under the guidance of teachers. There are several types of projects such as engineering design, experimental study and software engineering. The tasks of each type include project determination (thesis proposal), information material collection, material sorting and material summarizing, solution determination, project implementation, estimation and report. The main training targets are comprehensively cultivating students' abilities and literacy of social responsibility, team consciousness, rigorous work style, scientific attitude, system method of design, induction, sorting and analysis, and so on. It will lay a good foundation for future students' work and study.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	认识实习		
课程英文名称 <b>Course Title</b>	Cognitive Practice		
总学时 <b>Total Credit Hours</b>	30	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>认知实习是在学生进入专业课程学习之前,增加学生专业感性认识的一项实践活动。通过实习,学生应对本专业所涉及的控制系统的设计、维护、应用等领域有所了解,有一个直观、全面的专业概念,能使学生在后续课程中能较好地理解有关的概念、过程及原理。培养学生学习该专业兴趣,增强对专业的认识。通过本次认识实习,总体上了解自动化技术的发展程度,了解企事业单位对自动化专业人才需求的基本情况,深入了解本专业的专业特点、专业的知识结构和技能,了解本专业的发展趋势、本专业在社会中的地位、本专业的定位以及未来就业方向,并为后续课程的学习提供感性认识,对今后的就业意向有一个初步的考虑。</p>			
课程英文简介 <b>Course Description</b>			
<p>Cognitive practice aims to increase the students' perceptual knowledge about automation before they learn their professional courses. This practice should let the students to be familiar with the design, maintenance, application of control systems involved in automation, let them have an intuitive, comprehensive professional concepts, can help them to understand the concepts, processes and principles in the follow-up courses, and train their professional interest and cognition. Through this practice, the students should have a general concept of the development of automation technology, the requirements of modern enterprises and institutions for automation talents, and have a good understanding of the properties, knowledge structures and skills of their specialty. The practice let the students know the development trend, status in society, professional orientation and employment orientation, give them a perceptual knowledge of subsequent courses, and provide them with a preliminary consideration for their future employment intentions.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	工作实习		
课程英文名称 <b>Course Title</b>	Professional Practice		
总学时 <b>Total Credit Hours</b>	120	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>通过自动化专业实习,使学生印证、巩固和丰富自己的专业知识,逐渐了解自动化学科领域在国内外工程应用中的最高水平及重要性,熟悉现代企业中生产组织情况及产品的生产过程,扩大知识面。培养学生学习及巩固所学专业知</p> <p>识,培养专业兴趣和专业技能,同时提高解决实际问题的能力,深刻理解专业的知识体系结构,对自动化控制系统中的多个环节及多门课程起到导学和助学的功能。培养学生在现代化企业中思维和工作的习惯和方式,了解现代化企业中自动化人才应具备的素质,强化学生工程意识、工程素质,为工程能力的培养人才打下一定的基础。实习期间要求学生严格按照企业规章制度工作,为期4周。</p>			
课程英文简介 <b>Course Description</b>			
<p>The practice helps the students to proof, consolidate and enrich their professional knowledge, gradually be familiar with the highest level and importance of engineering application of automation and control, have an experience in production organization and production process in modern enterprises, and increase their knowledge. Train students to learn and consolidate professional knowledge, cultivating professional interest and professional skills, and improve their ability to solve practical problems, understand professional knowledge structure, and help students to learn specialized courses associated with automation control system. Train students to have good work habits, ways of thinking in the modern enterprise, and a quality requisite to automation talents in modern enterprise, cultivate students to strengthen the students' engineering awareness, engineering quality, and lay a foundation for engineering ability training. The period of practice is four weeks.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	工作实习		
课程英文名称 <b>Course Title</b>	Professional Practice		
总学时 <b>Total Credit Hours</b>	120	总学分 <b>Credit</b>	4
课程中文简介 <b>Course Description</b>			
<p>工作实习要求学生深入到工程应用第一线,了解并熟悉实习单位的产品设计、开发、制造、测试等环节,熟悉企业运作管理方式等。工作实习以企业的实际工程环境为依托,通过工程项目或子项目的参与,培养学生的工程实践能力、工程创新能力、团队协作能力,借助社会力量,培养出具有良好职业道德的、具有国际化视野的应用型工程技术人才。具体要求学生到企业的产品开发、性能测试、销售服务等岗位进行顶岗实习,具体工作包括集成电路设计、半导体器件设计、电路与器件测试、技术服务与支持、管理工作等。实习期间要求学生严格按照企业规章制度工作,为期4周。</p>			
课程英文简介 <b>Course Description</b>			
<p>Professional Practice is one of the important practical courses for undergraduates in Electronic and Information Engineering major. Professional Practice purpose is to enable students to understand and grasp the actual production of the typical electronic systems and product design, and manufacturing characteristics through practice so that students can practice after the establishment of electronic system design and manufacturing concepts. The students will involve into the design process, the principle research and application of electronic product, corporation organization and management. The object of this practice is to train students to integrate theory with practice, analyze problems and solve the problem with the survey research skills. This course will lay the foundation for subsequent courses and graduate design.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	电机拖动实验		
课程英文名称 <b>Course Title</b>	Electrical Engineering Experiment		
总学时 <b>Total Credit Hours</b>	24	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>本课程要求学生了解并掌握常用交、直流电机及变压器基本结构、工作原理及电力拖动的基本知识，具备解决电机与拖动实际问题的基本能力。主要教学内容包括：他励直流电动机启动及调速方法；测试直流电动机工作特性，包括转速、转矩和效率特性；测试他励直流电动机固有机械特性和人为机械特性，包括改变电枢电压、改变励磁电流和电枢回路串电阻特性；测定三相变压器变比、空载实验、短路实验和纯电阻负载实验；测试鼠笼式三相异步电动机的直接启动、Y-<math>\Delta</math>启动、自耦变压器启动性能；绕线式三相异步电动机转子回路串电阻启动与调速；三相异步电动机变频调速和能耗制动。</p>			
课程英文简介 <b>Course Description</b>			
<p>The students are expected to understand the basic concepts, theories, methods, and techniques of electric machine and transformer and electric drive, and improve their practical ability. The basic contents include: start and speed regulating method of separately excited dc motor; operating characteristic about separately excited dc motor about speed, torque and efficiency characteristic; inherent characteristic and artificial characteristic about armature voltage change, excitation current change and series resistance in armature loop; ratio measurement of three phase transformer; no-load test and short circuit test of transformer; rat trap type three-phase asynchronous motor performance test in multiple start-up control modes including direct, star/triangle and autotransformer start-ups; starting and adjusting speed about wound-rotor induction motors by connecting resistors in series to rotor circuits; variable frequency speed regulation and resistance braking about three-phase asynchronous motor.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	检测技术实验		
课程英文名称 <b>Course Title</b>	Detecting Technology Experiment		
总学时 <b>Total Credit Hours</b>	24	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>随着信息技术的飞速发展,信息的获取、处理已经成为信息领域的关键技术,同时检测技术是过程控制、运动控制等各类闭环测控/监控系统中必不可少的重要组成部分,涉及各个行业的自动化。因此,自动检测及仪表课程是培养自动化专业人才的重要专业基础课。</p> <p>检测技术实验课程与自动检测及仪表课程同期开设,就是为了使学生在掌握信息的获取、变换、处理、传输和显示等方面的原理的同时,加强动手实验环节,在解决实际问题的过程中达到理论结合实践,牢固掌握系统的组成、原理、性能指标和评价方法等。</p>			
课程英文简介 <b>Course Description</b>			
<p>With the rapid development of information technology, information acquisition and processing has become the key technology in the field. At the same time detection technology is the essential component of process control, motion control and closed loop control of other types and is involved all sectors of automation.</p> <p>Detection Technology Experiment will make students firmly grasp the composition, principle, performance indicators and evaluation methods of detection systems.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	控制系统设计与实现		
课程英文名称 <b>Course Title</b>	Control System Design and Implementation		
总学时 <b>Total Credit Hours</b>	36	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>控制系统设计与实现是信息控制类专业本科生的专业必修实验课程，是学生在完成“自动控制原理”课程的学习之后的综合性实践环节。其意义在于巩固、提高、综合自动控制原理理论教学的内容，使学生在实践过程中，真正理解、领会所学的知识，加以融会贯通。课程采用案例教学、模块化实验训练的方式。通过教师对典型控制系统案例的分析与示范，引导学生学习控制理论的理论与方法，通过学生的实验训练，培养学生利用自动控制的理论与方法分析实际问题，解决问题的综合实践能力。其主要内容包括物理对象的建模方法，控制系统性能的各种分析方法，系统控制器的设计与调试的方法，以及简单控制系统的设计与实现的一整套的设计与实验研究工作的训练。</p>			
课程英文简介 <b>Course Description</b>			
<p>Control System Design and Implementation is the compulsory experimental course of college student major in information control. It is the comprehensive experimental part after learning Control Principle. Its significance lies in consolidated and enhanced the learning of Control Principle and makes students understanding and manipulating it through practice processes. Course select case teaching and modular experimental training complete the teaching purpose. Through the case teaching, let student learn the principle of control theory; and with modular experimental training, cultivating students' ability of solving practical problems. The main content of this course includes: the modeling method of physical objects, analysis method of control system characters, the design and manipulate of system controller and the design and realize some simple control systems.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	专业实践训练		
课程英文名称 <b>Course Title</b>	Professional practice training		
总学时 <b>Total Credit Hours</b>	75	总学分 <b>Credit</b>	2.5
课程中文简介 <b>Course Description</b>			
<p>本课程设计环节是学生在完成基础课、专业基础课和大部分专业课学习后的一个实践教学环节，是培养学生应用已学到的理论知识来解决实际工程问题的一次训练，并为毕业设计奠定基础。该环节包括四个可供选择的课设题目：电气控制与 PLC 综合课程设计、ARM 嵌入式系统课程设计、程序设计综合课程设计、仪表及仪器智能化课程设计，每个学生四选一。电气控制与 PLC 综合课程设计是利用松下或西门子系列 PLC，根据设计题目和要求进行控制系统的编程设计与调试，并通过使用天工或其它组态软件，使学生掌握组态设计的方法及调试方面的知识；嵌入式系统课程设计是采用 ARM 嵌入式处理器，设计完成嵌入式控制系统硬件平台，采用 C 语言编写控制器的驱动程序、控制算法程序和计算机监控程序，设计并完成一个可独立运行的嵌入式控制系统；程序设计综合课程设计是进一步掌握了 C 语言、C++ 语言程序设计、SQL Server 数据库结构化语言的基本方法，熟悉这些语言在字符处理、绘图、人机交互、数据结构存储和应用、通讯等一些实用方面的编程技巧；仪表及仪器智能化课程设计的同学自己动手、独立设计、调试、实现温度控制系统。</p>			
课程英文简介 <b>Course Description</b>			
<p>The Course Project is a part of Practices and is given when students have completed the basic course, Major Requirements courses and most of professional courses. The purpose is to cultivate students' ability to use theoretical knowledge to solve practical engineering problems, and to lay the foundation for undergraduate thesis. The Course Project includes four optional projects: electrical control and PLC, the ARM embedded system design, programming design, and instrument and intelligent instrument design. Each student selects one of the four. In the project of electrical control and PLC design Panasonic or Siemens series PLC and configuration software's are used. According to the requirements of a project theme, students will design, program and debug a control system. This enables students to master the configuration design method and debugging knowledge; in the project of embedded system design ARM embedded processor is used. Students will design hardware platform of an embedded control system, write a driver for the controller, control law programs and computer monitoring programs using C language, and finally complete an embedded control system. Programming design project is designed to further understand the C language, C++ language</p>			

programming, structured language for database such as SQL Server, familiar with programming skills using these language in character processing, graphics, human-computer interaction, data structure, storage and application of communication and some other practical aspects. In the project of instrument and intelligent instrument design students will realize a temperature control system through designing and debugging independently.



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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	专业课程设计		
课程英文名称 <b>Course Title</b>	Curricula Project of Specialty		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是通信电路与系统设计的高级阶段课程，通过课程，能使使学生掌握频谱变换电路、数字调制与解调电路、宽带高频功率放大电路以及频率、功率合成电路等高频电子线路的设计、应用和开发，掌握调幅、调频发射与接收系统的工作原理和整机设计，掌握单片无线发射与接收电路设计和应用。在课程中，学生们独立进行选题、设计，并按照开题报告的课题内容、性能指标独立完成所选课题的开发和系统联调。通过系统硬件电路的仿真和设计、元器件选择、软件编程、电路安装与调试和小系统测试，进一步加深对通信电路和通信系统的基本知识和基本理论的理解。同时，进行电路设计和小系统调试的基本技能训练，也能提高他们进行通信电子系统的综合设计能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an advancing course for the communication circuit and system design. This course enables students to master the frequency adjusting, digital modulation and demodulation circuits, broadband high-frequency power amplifier and frequency combination electronic circuit design, application and development. The students are expected to master the theory and designing of AM, FM, single chip transmitter and receiving system in the curriculum. In this course the students will choose independently project, perform their design, and in accordance with the performance indicators in the opening report, the students will finish the selected topic development and systems debugging. Through making hardware simulation and hardware circuit design, component selection, circuit installation, software programming and debugging and system testing, this course enables students to deepen their understanding of the basic theory, basic knowledge of communication circuits. At the same time, by taking the hardware circuit design and debugging skills training on small system, students will analyze the application of communication circuit unit but also telecommunication electronic system.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信电路课设 II		
课程英文名称 <b>Course Title</b>	Curricula Project of Communication Circuits II		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>本课程是通信电路与系统设计的高级阶段课程,通过课程,能使使学生掌握数字调制与解调电路、宽带高频功率放大电路等高频电子线路的设计、应用和开发,掌握调幅、调频发射与接收系统的工作原理和整机设计,在课程中,学生们独立进行选题、设计,并按照开题报告的课题内容、性能指标独立完成所选课题的开发和系统联调。通过对小型接收、发射系统硬件电路的设计、元器件选择、电路安装与调试和小系统测试,使学生加深对通信电路基本理论、基本知识的理解。同时,进行硬件电路设计和小系统调试的基本技能训练,培养学生具有分析、应用通信各单元电路及典型接收、发送系统的能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is an advancing course for the telecommunication circuit and system design. This course enables students to master the digital modulation and demodulation circuits, broadband high-frequency power amplifier and high-frequency electronic circuit design, application and development. The students are expected to master the theory and designing of AM, FM transmitter and receiving system in the curriculum. In this course the students will choose independently project, perform their design, and in accordance with the performance indicators in opening report. The students will finish the selected topic development and systems debugging. Through making small receiver, launch system hardware circuit design, component selection, circuit installation and debugging and system testing, this course enables students to deepen their understanding of the basic theory, basic knowledge of communication circuits. At the same time, by taking the hardware circuit design and debugging skills training, students will analyze the application of communication circuit unit but also a typical receiver and the capacity of the transmission system.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	信号处理工程应用训练		
课程英文名称 <b>Course Title</b>	Engineering Application Training of Signal Processing		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通过对信号与系统研究手段、研究方法和研究对象的训练,培养学生掌握该门课的用途和发展方向,在训练中提高动手能力,加深对理论知识的工程应用理解。研究手段主要以 C 和 C++为主,使学生熟练掌握以研究各种信号与系统问题。研究方法包括规范化、正确性检验、模仿与发挥、构建工具函数、单一方式解决到多种方式解决、大课题切小、小课题拓展变大等。研究对象包括语音信号处理、图象信号处理、机械信号处理和特殊系统设计。</p>			
课程英文简介 <b>Course Description</b>			
<p>By means of teaching signal and system research tools, methods and object, this training course enables students to master the application and development direction of the course content. It focuses on the hands-on training to improve ability and to deepen the understanding of the theoretical knowledge engineering applications. In the aspect of research tools, this course is based in C and C++ language programming training, which to enable students to have an experience to know a way to master a variety of signals and systems. Including standardization, correctness test, imitation and play to build utility functions, the teacher will teach the students research methods, such as how to use a single way to solve a variety of problems, and to solve the major issue by cutting into small pieces and to make the small issues to expand larger. The objects of study include speech signal processing, image signal processing, and mechanical signal processing and special systems design.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信电路与系统实验		
课程英文名称 <b>Course Title</b>	Communication Circuits and Systems Experiment		
总学时 <b>Total Credit Hours</b>	36	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>本课程是通信工程专业、电子信息工程专业，电路与系统方面的学科基础课的综合性实验项目，是通信电路原理、通信系统原理、锁相技术等理论教学课程在实验教学方面的延伸。基本内容包含了通信电路课程中的高频电子电路实验和通信系统中课程的通信原理实验。同时安排了高频电路和通信原理电路的系统 and 开发实验。通过本实验课程，可进一步加深对通信电路、通信系统的理解和认识。经过熟悉各实验箱和相关实验仪器的使用和操作，并通过掌握振荡、混频、中放等电路，以及幅度、角度调制解调电路和 PAM、PCM、CVSD、FSK、PSK 等数字调制解调等电路的工作原理和设计方法，完成各项实验任务。</p>			
课程英文简介 <b>Course Description</b>			
<p>This course is a comprehensive experimental course for Communication Engineering, Electronic and Information Engineering students. Based on the communication circuit theory, telecommunication systems theory and lock-in techniques, the course is a theory extension of the curriculum. The content includes labs in telecommunication theory experiment, in the telecommunication circuit, high-frequency electronic circuit and telecommunication system experiments and developmental course. Through the course, the students are expected to further deep the understanding and awareness of the communication circuit, a communication system and be familiar with the use and operation of the experimental system and the experimental apparatus.</p> <p>The students will also learn the theory and design methods by taking labs on circuit oscillation, mixing input, the amplitude and angle modulation and demodulation circuit, PAM, PCM, CVSD, FSK, PSK, and other digital modulation and demodulation the experimental task.</p>			







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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	通信系统工程应用训练		
课程英文名称 <b>Course Title</b>	Engineering Application Training of Communication Systems		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>通信系统工程应用训练是通信、电子信息类专业实践必修课，本训练提供了分析与设计通信系统方面的最主要的分析方法和大量训练专题，主要分为信号处理基础部分和专题训练部分，训练内容涉及卷积、傅里叶变换、滤波器设计、噪声信号分析等。针对通信、电子等相关专业课程的学习，加深学生对基本知识理论的理解，提高综合运用所学知识的能力。通过此环节，提高学生的动手能力和工程设计能力，同时培养学生实事求是、严肃认真的科学作风和良好的实践习惯，为学生从事通信、电子相关的工作岗位打下坚实的基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Engineering Application Training of Communication Systems is a required practice course for undergraduate students in communication engineering major. The training provides abundant popular analytical techniques and issues for design and analysis in communication systems. The training is divided into two parts, basic signal processing and special training phase. Its contents cover convolution, Fourier transform, filter design, and noisy signal analysis, and etc. Through this training, the students are expected to understand the basic concepts, theories, methods, and techniques of signal processing, by their understanding of the basic theories. The ability of comprehensive using of the knowledge and serious practice and well foundation for the future in communications, electronics technology work will be improved and enhanced.</p> <p>Recommended Textbooks/References:</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	现代通信课设		
课程英文名称 <b>Course Title</b>	Curricula Project of Modern Communication		
总学时 <b>Total Credit Hours</b>	60	总学分 <b>Credit</b>	2
课程中文简介 <b>Course Description</b>			
<p>现代通信课程设计是基于嵌入式系统开发平台（软硬件结合），通过通信模块的具体设计达到由理论知识去解决实际工程问题，提升通信工程专业知识和实际设计能力。课程的设置本着：任务驱动---实践—总结---再实践的模式进行。</p> <p>本次实践课程是一门综合性的课程，它涉及电子、计算机等诸多专业知识，综合性强。</p> <p>具体通过 ARM7 内核处理器 S3C44B0 架构的实际演练，进行数据传输与通信模块设计(IC 同步串行模块设计，RS-232 异步串行通讯设计, GPRS 无线通信传输模块开发与应用等)</p>			
课程英文简介 <b>Course Description</b>			
<p>Curriculum project of modern communication is based on the embedded system hardware and software. Development platform the specific design of the communication module is expend the theoretical knowledge to solve practical engineering problems. This course enhances communications engineering expertise and design capabilities, which is in such practice mode: Task-driven, Practice, Summary, and Practice again.</p> <p>This practice course is a comprehensive curriculum, which involves electronics, computers and many other expertises. It is comprehensive and strong ability requirement. Concentrating through the architecture of the ARM7 core processor S3C44B0 practical exercises, the tasks include data transmission and communication module design Such as IC synchronous serial module design, the RS-232 asynchronous serial communication design, GPRS wireless communication transmission module development and application, and etc.</p>			





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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体工艺实习 II		
课程英文名称 <b>Course Title</b>	Practice for Semiconductor Process II		
总学时 <b>Total Credit Hours</b>	45	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>通过工艺实习,使学生建立起对半导体器件的制造工艺、测试技术的感性认识。通过实际半导体二极管、三极管或小规模集成电路的制作,掌握半导体工艺原理,不同工艺条件、结构参数、器件特性之间的基本关系,了解集成电路制造工艺的完整流程。实习需要学生亲自动手制备二极管、三极管等半导体器件,整合工艺流程,给出实习报告,并能对实验数据和制备流程中遇到的问题进行分析。主要内容是:半导体制造工艺安全操作规定和基本操作规程,半导体制造工艺安全操作规定和基本操作规程,扩散工艺模拟,流片制备双极型晶体管,完成整个流程并进行测试。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course will provide students with knowledge of fabrication process and testing procedure of semiconductor devices. The students are expected to understand the device fundamentals and relationships between process conditions, structure parameters and device characteristics through fabrication of diode and bipolar transistors, analyze problems occurred during the practice, and give report at the end of the work. The tasks include safety operation and basic operation procedure of semiconductor fabrication processes, simulation of diffusion processes, test of bipolar process and wafer.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体器件实验		
课程英文名称 <b>Course Title</b>	Semiconductor Device Laboratory		
总学时 <b>Total Credit Hours</b>	12	总学分 <b>Credit</b>	0.5
课程中文简介 <b>Course Description</b>			
<p>半导体器件实验是面向电子科学与技术方向本科生所开设的微电子技术的专业基础与专业综合的本科生独立设课实验。是培养方案中的核心实践教学环节之一。</p> <p>开设的目的是使学生熟悉半导体器件的基础理论和半导体器件的基本应用,以适应后续专业课程的学习和将来工作的需要。</p> <p>通过本实验,加深同学对半导体器件等课程理论的认识;理解相关测量系统的工作原理、测量技术;掌握数据采集、误差分析及撰写报告的能力。为集成电路等后续课程知识的学习打下良好的实践基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>Semiconductor devices laboratory” is a major compulsory course for undergraduate students major in electronic science and technology. The course will provide students with a training program of core practice. The purpose of the course is for students to understand the basic theory of semiconductor physics and the correlated working mechanism of measurement systems, improve the skills of data acquisition, error analysis and report writing, lay foundation for the course of integrated circuits and other follow-up major courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半导体物理实验		
课程英文名称 <b>Course Title</b>	Semiconductor Physics Laboratory		
总学时 <b>Total Credit Hours</b>	24	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>半导体物理实验课程是电子科学与技术专业的专业必修课，是面向电子科学与技术方向本科生所开设的微电子技术的专业基础与专业综合的本科生独立设课实验，是培养方案中的核心实践教学环节之一。</p> <p>开设的目的是使学生熟悉半导体物理的基础理论和半导体的主要性质，以适应后续专业课程的学习和将来工作的需要。</p> <p>通过本实验，加深同学对半导体物理课程理论的认识；理解相关测量系统的工作原理、测量技术；掌握数据采集、误差分析及撰写报告的能力。为半导体器件、集成电路等后续课程知识的学习打下良好的实践基础。</p>			
课程英文简介 <b>Course Description</b>			
<p>“Semiconductor physics laboratory” is a major compulsory course for undergraduate students major in electronic science and technology. The course will provide students with a training program of core practice. The purpose of the course is for students to understand the basic theory of semiconductor physics and the correlated working mechanism of measurement systems, improve the skills of data acquisition, error analysis and report writing, lay foundation for the course of integrated circuits and other follow-up major courses.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	半定制 ASIC 设计		
课程英文名称 <b>Course Title</b>	Semi-Custom ASIC Design		
总学时 <b>Total Credit Hours</b>	45	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>本课程以设计实例的形式,引导学生完成从设计任务的编程到硬件功能实现的 FPGA 设计全过程,培养学生建立系统设计和按照设计流程进行设计的思想。提高在设计中提出问题,发现问题,解决问题的能力,以此达到理论与实际相结合、进一步加深对 EDA 技术的理解和全面提高学生的创造及开发能力。具体内容包括:掌握 FPGA 设计方法及流程,熟悉硬件描述语言;熟悉软硬件平台及时序设计的方法和要点;通过相应规模的实验进一步提高设计能力;自主实验设计,由学生提出设计方案并实施,培养独立进行系统设计的能力。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course is an introduction of the whole process of FPGA design, from programming based on design requirements to realizing the hardware function, in the form of design examples. The purpose is for students to establish the idea of system design and complete design task in accordance with the design process, master the EDA technology and improve the ability of creation and innovation, discover and solve problems in experiments, and etc. The topics include: FPGA design methods and processes, hardware description language; timing design methods and software and hardware platform; independent design experiment, and etc.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	功率晶体管设计		
课程英文名称 <b>Course Title</b>	Power Transistor Design		
总学时 <b>Total Credit Hours</b>	30	总学分 <b>Credit</b>	1
课程中文简介 <b>Course Description</b>			
<p>通过高频、大功率晶体管设计方案的制定，设计过程、设计结果、理论验算、设计报告的实现。培养学生建立系统设计和按照设计流程进行设计的思想。要求学生掌握有关方面的基本概念、基本理论、基本方法和基本技术。提高在设计中提出问题，发现问题，解决问题的能力。理解 (<math>f</math>; <math>p_0</math>; <math>K_p</math>; <math>V_{cc}</math>; <math>\eta</math>;) 几个设计参数的含义和它们与器件参数之间的关系，完成高频大功率晶体管综合设计方案。功率晶体管详细设计包括全部横、纵向参数设计、光刻版图设计、封装设计、工艺设计、测试条件及典型测量值设计，设计验算全部过程。在绘制版图及工艺过程仿真中，要求熟练运用设计应用软件 L-EDIT。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course includes the concept design of high-frequency and high power transistor, detail design, sample design, theoretical calculation, and design report. The students are expected to establish philosophy based on system design and process design, understand the basic concepts, theories, methods, and techniques of formal languages, automata, and the related problem solving methods, and edit layout emulate process using L-EDIT. The design parameters (<math>f</math>; <math>p_0</math>; <math>K_p</math>; <math>V_{cc}</math>; <math>\eta</math>) and device parameters will be understood, and the design scheme will be submitted. The detail design includes: longitudinal and transverse parameter design; layout design; package design; test condition; and checking computations.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	集成电路版图设计		
课程英文名称 <b>Course Title</b>	Integrated Circuit Layout Design		
总学时 <b>Total Credit Hours</b>	56	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>课程的主要目的是使学生在熟悉集成电路制造技术及掌握集成电路 EDA 设计与仿真的基础上,熟悉和掌握集成电路版图设计规则与设计方法,并完成具有一定规模的电路版图设计与仿真工作,从而掌握系统设计→电路设计→版图设计→版图验证等整个系统集成设计过程。课程内容主要包括:掌握集成电路版图设计方法与流程;熟悉 N 阱 CMOS 制造工艺;进行部分标准单元库的设计工作;利用所建立的标准库单元合作完成完整的版图设计。要求学生掌握集成电路的物理版图设计方法,熟练使用设计工具,并利用工具软件完成基于 CMOS 工艺的标准单元电路的版图设计与仿真以及一个完整电路的版图设计与仿真。</p>			
课程英文简介 <b>Course Description</b>			
<p>The main purpose of the course is for students to master the integrated circuit top-down design process, from system requirement to circuit design to layout design and to the last layout verification, which requires the students to be familiar with integrated circuit manufacturing technology and master the EDA design and verification methods. The course includes: integrated circuit layout design method and process; N-Well CMOS manufacturing process, standard library units design, and an independently designed circuit layout used in the units of the standard library. The students are expected to grasp the layout design methods of integrated circuit, use the EDA design tools skillfully, complete a circuit layout design and simulation based on the standard CMOS process.</p>			

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## 北京工业大学课程描述 (Course Description)

课程名称 <b>Course Title</b>	数字集成电路设计		
课程英文名称 <b>Course Title</b>	Digital Integrated Circuit Design		
总学时 <b>Total Credit Hours</b>	45	总学分 <b>Credit</b>	1.5
课程中文简介 <b>Course Description</b>			
<p>通过数字集成电路设计的学习和训练, 培养学生在数字集成电路设计方法与流程方面的能力, 使其在熟悉集成电路制造技术、硬件描述语言及先进的数字集成电路设计软件的基础上, 掌握系统集成设计方法和 HDL 程序设计技巧, 进而掌握系统设计→电路设计→版图设计→版图验证等整个系统集成设计过程。课程要求学生完成一个基于 Synopsys 的数字集成电路设计项目, 即首先选择合适难度的题目, 然后对项目工作原理进行分析, 模块划分, 最终使用硬件描述语言完成所选题目的电路设计 (要求用编写 Testbench 的方法完成仿真), 利用 Synopsys DC 工具完成设计综合, 利用 Synopsys ICC 工具完成自动布局布线。</p>			
课程英文简介 <b>Course Description</b>			
<p>The course will provide students with the digital IC design methods and processes. The purpose is for students to master methods of system integration design and HDL programming based on the IC manufacturing technology, hardware description language and advanced digital integrated circuit design software. The students are expected to complete a digital integrated circuit design project using Synopsys tools. The work includes the selection of subject, analysis, module division, HDL (hardware description language) design, function simulation, logic synthesis, physical synthesis, and etc.</p>			

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