# 计算机卓越工程师本科培养计划

# Undergraduate Experimental Program in Computer Science and Technology for Exemplary Engineer Education

### 一、培养目标
### Ⅰ．Program Objective

培养德、智、体全面发展，具有系统、扎实的信息学科和计算机学科的理论基础，在信息的获取、传递、处理及应用等方面，具有较宽广的专业知识和实践动手能力的研究型、复合型人才。毕业生具有良好的人文素质、创新精神和较强的英语能力，能在信息技术产业，科研部门，高等院校及其相关领域从事信息科学与技术的研究、设计、开发及管理等方面的工作，并可继续攻读计算机科学与技术、相关学科与交叉学科的硕士学位。

This program is designed to provide a thorough grounding in the theoretical principles and knowledge of information retrieval, transformation, processing and application. It remains committed to systematic education for high-level researchers and doers, who have particular interests in the area of electronics, communication, computer, automation, optical information and information sensing. Students with good command of English and personality of innovation can be prepared for any professional role they might choose—research, design, integration, practice in information technology industries, research institutes, universities, the professions and other community groups, and pursue their advanced degrees in computer science and technology, other related fields and cross subjects.

### 二、基本规格要求
### Ⅱ．Learning Outcomes

毕业生应获得以下几个方面的知识和能力：

1．具有较扎实的信息学科所需的数理基础；

2．掌握信息学科、计算机科学与技术的基本理论和方法；

3．具有研究计算机科学与技术领域理论问题和解决工程实际问题的能力；

4．具有较强的英语语言能力；

5．掌握文献检索、资料查询的方法和撰写科学论文的能力；

6．具有较好的人文社科知识和人文素质，以及较强的协调、组织能力；

7．了解信息学科、计算机学科的发展动态,了解本专业领域技术标准，相关行业的政策、法律和法规。

8．具有较强的创新意识和进行信息系统开发、设计、技术改造和创新的初步能力；

9.掌握扎实的工程基础知识；

10.具有良好的质量、安全、效益、环境、职业健康和服务意识。

Students are expected to gain:

1. Sound grounding in both mathematics and physics;

2. Principles of information science, electronics and computer science;

3. Research and problem solving skills;

4. Skills to use English language;

5. Ability in document searching, data querying and thesis writing;

6. Attainment in humanities & art, cooperative and organizational skills;

7.Skills to Understand the development trends of Information Technology and Computer Science, along with relevant technology standards, industry policies, as well as laws and regulations.

8.Obtain strong creativity ability and basic capabilities of information system development, design, technique improvement and innovation.

9.Accumulate solid and fundamental engineering knowledge and experience.

10.Have professional senses of quality, security, efficiency, healthy and service.

### 三、培养特色
### Ⅲ．Program Highlights

以数理为基础，以信息学科为平台，以计算机科学与技术为方向，以培养创新能力为重点，面向系统，兼顾应用，软硬结合，计算机科学与计算机工程并重。采用基于问题/项目的教学方法，培养在计算机系统结构与计算机网络系统、软件系统、应用支撑环境的研究、分析、设计、开发和工程组织等方面具有综合能力的复合型人才。

Based on math and science, built on information science, directed towards computer science and technology and systems oriented, this program emphasizes on creativity, bears applications in mind, combines software and hardware, and keeps a balance between computer science and computer engineering. Based on Problem-Based-Learning, This Program cultivates talents in analysis of computer systems and computer networking architecture, as well as in research, analysis, design, development and engineering management of software design, tools and supporting environment.

### 四、主干学科
### Ⅳ．Main Disciplines

计算机科学与技术 Computer Science & Technology

### 五、学制与学位
### Ⅴ．Program Length and Degree

学制：四年
Duration：4 years
授予学位：工学学士
Degrees Conferred：Bachelor of Engineering

### 六、学时与学分
### Ⅵ．Credits Hours and Units

完成学业最低课内学分（含课程体系与集中性实践教学环节）要求：159.8 学分

Minimum Credits of Curricular(Comprising course system and intensified internship practical training)：159.8 credits

完成学业最低课外学分要求：5 学分
Minimum Extracurricular Credits：5 credits

1．课程体系学时与学分
Course Credits Hours and Units

| 课程类别 | 课程性质 | 学时/学分 | 占课程体系学分比例（％） |
|---|---|---|---|
| 素质教育通识课程 | 必修 | 512/28 | 20.1 |
| | 选修 | 160/10 | 7.1 |
| 学科大类基础课程 | 必修 | 912/52.8 | 37.9 |
| 专业核心课 | 必修 | 440/23.5 | 16.9 |
| 专业选修课程 | 选修 | 400/25 | 18 |
| 合计 | | 2424/139.3 | 100 |

| Course Classified | | Course Nature | Hrs/Crs | Percentage (%) |
|---|---|---|---|---|
| Essential-qualities-oriented Education General Courses | | Required | 512/28 | 20.1 |
| | | Elective | 160/10 | 7.1 |
| Basic Courses in General Discipline | | Required | 912/52.8 | 37.9 |
| Courses in Specialty | Common Core Courses | Required | 440/23.5 | 16.9 |
| | Specialty-Oriented Courses | Elective | 400/25 | 18 |
| Total | | | 2424/139.3 | 100 |

2．集中性实践教学环节周数与学分

Practicum Credits

| 实践教学环节名称 | 课程性质 | 周数/学分 | 占实践教学环节学分比例（％） |
|---|---|---|---|
| 军事训练 | 必修 | 2/1 | 4.9 |
| 电工实习 | 必修 | 2/1 | 4.9 |
| 企业认知实习 | 必修 | 1/0.5 | 2.4 |
| 企业实训/综合+生产实习 | 必修 | 14/7 | 34.1 |
| 课程设计 | 必修 | 8/4 | 19.6 |
| 毕业设计（论文） | 必修 | 14/7 | 34.1 |
| 合计 | | 41/20.5 | 100 |

| Course Credits | Required/elective | Weeks/Credits | Percentage (%) |
|---|---|---|---|
| Military Training | Required | 2/1 | 4.9 |
| Electrical Engineering Practice | Required | 2/1 | 4.9 |
| Professional Practice | Required | 1/0.5 | 2.4 |
| Engineering Internship/comprehensive Training + Professional Practice | Required | 14/7 | 34.1 |
| Course Project | Required | 8/4 | 19.6 |
| Undergraduate Thesis | Required | 14/7 | 34.1 |
| Total | | 41/20.5 | 100 |

3．课外学分

Extracurricular Credits

| 序号 | 课外活动名称 | 课外活动和社会实践的要求 | | 课外学分 |
|---|---|---|---|---|
| 1 | 社会实践活动 | 提交社会调查报告，通过答辩者 | | 2 |
| | | 个人被校团委或团省委评为社会实践活动积极分子者，集体被校团委或团省委评为优秀社会实践队者 | | 2 |
| 2 | 英语及计算机考试 | 全国大学英语六级考试 | 考试成绩达到学校要求者 | 2 |
| | | 全国计算机等级考试 | 获二级以上证书者 | 2 |
| | | 全国计算机软件资格、水平考试 | 获程序员证书者 | 2 |
| | | | 获高级程序员证书者 | 3 |
| | | | 获系统分析员证书者 | 4 |
| 3 | 竞赛 | 校级 | 获一等奖者 | 3 |
| | | | 获二等奖者 | 2 |
| | | | 获三等奖者 | 1 |
| | | 省级 | 获一等奖者 | 4 |
| | | | 获二等奖者 | 3 |
| | | | 获三等奖者 | 2 |

续表

| 序号 | 课外活动名称 | 课外活动和社会实践的要求 | | 课外学分 |
|---|---|---|---|---|
| 3 | 竞赛 | 全国 | 获一等奖者 | 6 |
| | | | 获二等奖者 | 4 |
| | | | 获三等奖者 | 3 |
| 4 | 论文 | 在全国性刊物发表论文 | 每篇论文 | 2~3 |
| 5 | 科研 | 参与科研项目时间与科研能力 | 每项 | 1~3 |
| 6 | 实验 | 视创新情况 | 每项 | 1~3 |

注：参加校体育运动会获第一名、第二名者与校级一等奖等同，获第三名至第五名者与校级二等奖等同，获第六至第八名者与校级三等奖等同。

| No. | Extracurricular Activities and Social Practice | Requirements | | Extracurricular Credits |
|---|---|---|---|---|
| 1 | Activities of Social Practice | Submit report and pass oral defense | | 2 |
| | | Entitled as Activist by the Communist Youth League of HUST or Hubei Province;<br>Membership of the group which is entitled as Excellent Social Practice Group by the Communist Youth League of HUST or Hubei Province | | 2 |
| 2 | Examinations in English and Computer | CET-6 | Students whose Band-6 exam scores accord our requirements | 2 |
| | | National Computer Rank Examination | Win certificate of Band-2 or higher | 2 |
| | | National Computer Software Qualification | Win certificate of programmer | 2 |
| | | | Win certificate of Advanced Programmer | 3 |
| | | | Win certificate of System Analyst | 4 |
| 3 | Competitions | University Level | Win first prize | 3 |
| | | | Win second prize | 2 |
| | | | Win third prize | 1 |
| | | Provincial Level | Win first prize | 4 |
| | | | Win second prize | 3 |
| | | | Win third prize | 2 |
| | | National Level | Win first prize | 6 |
| | | | Win second prize | 4 |
| | | | Win third prize | 3 |
| 4 | Thesis | Those whose thesis appears in national publications | Per piece | 2~3 |
| 5 | Scientific Research | Depending on both the time spent in and ability demonstrated in scientific research project | Each item | 1~3 |
| 6 | Experiments | Depending on innovative extent | Each item | 1~3 |

Note: In HUST Sports Meeting, the first and the second prize, the third to the fifth prize, and the sixth prize to the eighth prize are deemed respectively the first prize, the second prize and the third prize of university level.

## 七、主要课程
## Ⅶ. Main Courses

离散数学 Discrete Mathematics、数据结构 Data Structure 、数字电路与逻辑设计 Digital Circuit and Logic Design、汇编语言程序设计 Assembly Language Programming、C 语言程序设计 Advanced Programming Language (C)、操作系统原理 Operating System、数据库系统原理 Database System、计算机组成原理 Computer Organization、计算机通信与网络 Computer Telecommunications & Network、计算机系统结构 Computer Architecture。

### 八、主要实践教学环节（含专业实验）
### Ⅷ．Practical Module (experiments Included)

C 语言课程设计 Course Project of C Programming Language、 数字电路与逻辑设计课程设计 Course Project of Digital Circuit and Logic Design、数据结构课程设计 Course Project of Data Structure 、操作系统课程设计 Course Project in Operating System、计算机组成原理课程设计 Course Project of Computer Organization、企业认知实习 Professional Practice，系统能力培养综合实践 Comprehensive training of system ability、生产实习 Engineering internship 或 企业实训 Enterprise Training ，企业工程实践/毕业设计（论文） Enterprise Project/Undergraduate Thesis

### 九、教学进程计划表
### Ⅸ．Course schedule

院（系）：计算机科学与技术学院　　　　　　　　　　专业：计算机科学与技术
School (Department)：School of Computer Science & Technology　　　Specialty：Computer Science & Technology

| 课程类别<br>course type | 课程性质<br>required/ elective | 课程代码<br>course code | 课程名称<br>course name | 学时<br>hrs | 学分<br>crs | 其中<br>Including | | 设置学期<br>semester |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 实验<br>exp. | 上机<br>operation | |
| 素质教育通识课程 Essential-qualities-oriented Education General Courses | 必 修<br>Required | 0301901 | 思想道德修养与法律基础<br>Morals & Ethics & Fundamentals of Law | 48 | 3 | | | 1 |
| | 必 修<br>Required | 0100721 | 中国近现代史纲要<br>Survey of Modern Chinese History | 32 | 2 | | | 2 |
| | 必 修<br>Required | 0100732 | 马克思主义基本原理<br>Basic Theory of Marxism | 48 | 3 | | | 3 |
| | 必 修<br>Required | 0100321 | 毛泽东思想和中国特色社会主义理论体系概论<br>General Introduction to Mao Zedong Thought and Socialist Theory with Chinese Characteristics | 64 | 4 | | | 4 |
| | 必 修<br>Required | 0100741 | 形势与政策<br>Current Affairs and Policy | 32 | 2 | | | 5-7 |
| | 必 修<br>Required | 0510071 | 中国语文<br>Chinese | 32 | 2 | | | 1 |
| | 必 修<br>Required | 0508453 | 综合英语（一）<br>Comprehensive English （Ⅰ） | 56 | 3.5 | | | 1 |
| | 必 修<br>Required | 0508463 | 综合英语（二）<br>Comprehensive English （Ⅱ） | 56 | 3.5 | | | 2 |
| | 必 修<br>Required | 0400111 | 大学体育（一）<br>Physical Education(Ⅰ) | 32 | 1 | | | 1 |
| | 必 修<br>Required | 0400121 | 大学体育（二）<br>Physical Education(Ⅱ) | 32 | 1 | | | 2 |
| | 必 修<br>Required | 0400131 | 大学体育（三）<br>Physical Education(Ⅲ) | 32 | 1 | | | 3 |
| | 必 修<br>Required | 0400141 | 大学体育（四）<br>Physical Education(Ⅳ) | 32 | 1 | | | 4 |
| | 选 修<br>Elective | 0800171 | 大学计算机基础<br>Fundamentals of computer technology | 32 | 1 | | 32 | 1 |
| | 必 修<br>Required | 1200011 | 军事理论<br>Military Theory | 16 | 1 | | | 2 |

| 课程类别<br>course type | 课程性质<br>required/<br>elective | 课程代码<br>course code | 课程名称<br>course name | 学时<br>hrs | 学分<br>crs | 其中<br>Including | | 设置学期<br>semester |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 实验<br>exp. | 上机<br>operation | |
| | | | 人文社科类选修课程<br>Electives in Humanities and Social Science | 160 | 10 | | | |
| 学科大类基础课程 Basic Courses in General Discipline | 必 修<br>Required | 0700011 | 微积分（一）上<br>Calculus（Ⅰ） | 88 | 5.5 | | | 1 |
| | 必 修<br>Required | 0700012 | 微积分（一）下<br>Calculus（Ⅰ） | 88 | 5.5 | | | 2 |
| | 必 修<br>Required | 0700048 | 大学物理（一）<br>Physics（Ⅰ） | 64 | 4 | | | 2 |
| | 必 修<br>Required | 0700049 | 大学物理（二）<br>Physics（Ⅱ） | 64 | 4 | | | 3 |
| | 必 修<br>Required | 0706891 | 物理实验（一）<br>Physical Experiments（Ⅰ） | 32 | 1 | 32 | | 2 |
| | 必 修<br>Required | 0706901 | 物理实验（二）<br>Physical Experiments（Ⅱ） | 24 | 0.8 | 24 | | 3 |
| | 必 修<br>Required | 0700051 | 线性代数（一）<br>Linear Algebra（Ⅰ） | 40 | 2.5 | | | 2 |
| | 必 修<br>Required | 0700063 | 概率论与数理统计（三）<br>Probability and Mathematics Statistic（Ⅲ） | 40 | 2.5 | | | 3 |
| | 必 修<br>Required | 0700071 | 复变函数与积分变换<br>Complex Function and Integral Transform | 40 | 2.5 | | | 3 |
| | 必 修<br>Required | 0833031 | 工程导论<br>Introduction to Engineering | 16 | 1 | | | 1 |
| | 必 修<br>Required | 0810012 | C 语言程序设计<br>Advanced Programming Language（C） | 48 | 3 | | | 2 |
| | 必 修<br>Required | 0828231 | C 语言程序设计实验<br>Advanced Programming Language Experiments | 32 | 1 | | 32 | 2 |
| | 必 修<br>Required | 0800115 | 电路理论（五）<br>Circuit Theory（Ⅴ） | 64 | 4 | | | 3 |
| | 必 修<br>Required | 0800122 | 模拟电子技术（二）<br>Analogue Electronics（Ⅱ） | 48 | 3 | | | 4 |
| | 必 修<br>Required | 0800771 | 数字电路与逻辑设计（一）<br>Digital Circuit and Logic Design（Ⅰ） | 56 | 3.5 | | | 4 |
| | 必 修<br>Required | 0843351 | 数字电路与逻辑设计实验<br>Digital Circuit and Logic Design Experiments | 16 | 0.5 | | | 4 |
| | 必 修<br>Required | 0801653 | 计算机通信与网络<br>Computer Telecommunications & Network | 40 | 2.5 | | | 5 |
| | 必 修<br>Required | 0828401 | 计算机通信与网络实践<br>Computer Telecommunications & Network Experiments | 32 | 1 | 32 | | 5 |
| | 必 修<br>Required | 0700186 | 离散数学（一）<br>Discrete Mathematics | 40 | 2.5 | | | 2 |
| | 必 修<br>Required | 0700182 | 离散数学（二）<br>Discrete Mathematics | 40 | 2.5 | | | 3 |

| 课程<br>类别<br>course<br>type | 课程<br>性质<br>required/<br>elective | 课程<br>代码<br>course<br>code | 课程名称<br>course name | 学时<br>hrs | 学分<br>crs | 其中 Including | | 设置<br>学期<br>semester |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 实验<br>exp. | 上机<br>operation | |
| 专业核心课程 Common Courses in Speciality | 必 修<br>Required | 0800413 | 数据结构<br>Data Structure | 48 | 3 | | | 3 |
| | 必 修<br>Required | 0800418 | 数据结构实验<br>Data　Structure Experiments | 32 | 1 | | 32 | 3 |
| | 必 修<br>Required | 0803256 | 汇编语言程序设计<br>Assembly Language Programming | 24 | 1.5 | | | 4 |
| | 必 修<br>Required | 0828271 | 汇编语言程序设计实践<br>Assembly Language Programming | 32 | 1 | | 32 | 4 |
| | 必 修<br>Required | 0801615 | 计算机组成原理<br>Computer Organization | 48 | 3 | | | 5 |
| | 必 修<br>Required | 0828391 | 计算机组成原理实验<br>Computer Organization Experiments | 16 | 0.5 | 16 | | 5 |
| | 必 修<br>Required | 0800424 | 操作系统原理<br>Operating System | 56 | 3.5 | | | 5 |
| | 必 修<br>Required | 0828291 | 操作系统原理实验<br>Operating System Experiments | 16 | 0.5 | 16 | | 5 |
| | 必 修<br>Elective | 0804042 | 算法设计与分析<br>Algorithmic Design & Analysis | 48 | 3 | | | 5 |
| | 必 修<br>Required | 0803303 | 数据库系统原理<br>Database System | 48 | 3 | | | 6 |
| | 必 修<br>Required | 08033305 | 数据库系统原理实践<br>Database System Experiments | 32 | 1 | | 32 | 6 |
| | 必 修<br>Required | 0804022 | 计算机系统结构<br>Computer Architecture | 40 | 2.5 | | | 6 |
| 专业选修课程 Specialty-oriented Courses Specialit | | | A 组选修课程 （至少从该组选修 3 分） | | | | | |
| | 选 修<br>Elective | 0844551 | 大数据平台及应用（IBM）<br>Big Data Processing and Applications | 32 | 2 | | | 5 |
| | 选 修<br>Elective | 0806491 | 数据分析与挖掘 （IBM）<br>Data Analysis and Mining | 32 | 2 | | | 6 |
| | 选 修<br>Elective | 1302561 | 大数据课程设计 （IBM）<br>Big data Curriculum Design | 32 | 1 | | 32 | 6 |
| | | | B 组选修课程(除 A 组及计算机文化基础外的其它选修学分) | | | | | |
| | 选 修<br>Required | 0803313 | 编译原理<br>Compiler Principles | 48 | 3 | | | 6 |
| | 选 修<br>Required | 0835732 | 接口技术<br>Interface Techniques | 48 | 3 | | | 6 |
| | 选修<br>Elective | 0800442 | 信息技术导论<br>Introduction to Information Technology | 16 | 1 | | | 1 |
| | 选修<br>Elective | 0828361 | 计算思维<br>Computational Thinking | 32 | 2 | | | 1 |

续表

| 课程类别<br>course type | 课程性质<br>required/elective | 课程代码<br>course code | 课程名称<br>course name | 学时<br>hrs | 学分<br>crs | 其中 Including<br>实验<br>exp. | 其中 Including<br>上机<br>operation | 设置学期<br>semester |
|---|---|---|---|---|---|---|---|---|
| 专业选修课程 Specialty-oriented Courses Specialit | 选修<br>Elective | 0716913 | Verilog 语言<br>Verilog language | 32 | 1 | 32 | | 4 |
| | 选修<br>Elective | 0842282 | 计算机系统基础<br>Foundation of Computer System | 40 | 2.5 | | | 4 |
| | 选修<br>Elective | 0803172 | 软件工程<br>Software Engineering | 32 | 2 | | | 4 |
| | 选修<br>Elective | 0807423 | C++ 程序设计<br>Advanced Programming Language (C++) | 40 | 2.5 | | | 5 |
| | 选修<br>Elective | 0810661 | 嵌入式系统<br>Embedded System | 32 | 2 | 24 | | 6 |
| | 选修<br>Elective | 0833122 | 机器学习<br>Machine Learning | 24 | 1.5 | | | 6 |
| | 选修<br>Elective | 0809121 | JAVA 语言程序设计<br>Advanced Programming Language (JAVA) | 40 | 2.5 | | | 6 |
| | 选修<br>Elective | 0842261 | 并行编程原理与实践<br>Parallel Programming Principle and Practice | 32 | 2 | | | 6 |
| | 选修<br>Elective | 0843841 | 函数式编程原理<br>Principles of Functional Programming | 32 | 2 | | | 6 |
| | 选修<br>Elective | 0828251 | 基于平台的编程<br>Platform based programming | 24 | 1.5 | | | 6 |
| 实践环节 practical training items | 必修<br>Required | 1300013 | 军事训练<br>Military Training | 2w | 1 | | | 1 |
| | 必修<br>Required | 1304411 | 电工实习<br>Electrical Engineering Practice | 2w | 1 | | | 3 |
| | 必修<br>Required | 1300287 | C 语言课程设计<br>Course Project of C Programming Language | 1w | 0.5 | | | 3 |
| | 必修<br>Required | 1304152 | 企业认知实习(暑期进行)<br>Professional Practice | 1w | 0.5 | | | 3 |
| | 必修<br>Required | 1300289 | 数字逻辑课程设计<br>Course Project of Digital Logic | 2w | 1 | | | 5 |
| | 必修<br>Required | 1300303 | 数据结构课程设计<br>Course Project of Data Structure | 1w | 0.5 | | | 4 |
| | 必修<br>Required | 1303481 | 操作系统课程设计<br>Course Project of Operating System | 2w | 1 | | | 6 |
| | 必修<br>Required | 1320053 | 计算机组成原理课程设计<br>Course Project of Computer Organization | 2w | 1 | | | 6 |
| | A与B两个模块二选一 | 1302552 | 系统能力培养综合实践 A<br>Comprehensive training of system ability | 4w | 2 | | | 7 |
| | | 130008b | 生产实习 A<br>Engineering internship | 10w | 5 | | | 7 |
| | | 1306291 | 企业实训 B<br>Enterprise Training | 14w | 7 | | | 7 |
| | 必修<br>Required | 1304232 | 企业工程实践/毕业设计（论文）<br>Enterprise Project/Undergraduate Thesis | 14w | 7 | | | 8 |