

计算机科学与技术全英联合班,全英创新班（本硕、本博连读）

Computer Science and Technology (English Teaching Innovation Class)

专业代码：080901

学 制：4 年

Program Code:080901

Duration: 4 years

培养目标：

培养基础扎实、知识面宽、德智体全面发展，富有探索创新精神、团队合作精神，具有自我提升能力、解决复杂工程问题的能力以及跨文化沟通能力，在计算机科学领域从事创新研究的高素质、具有国际化视野的研究型人才。

Educational Objectives:

Cultivate the research personnels who have solid basis, wide range of knowledge, all-round development of moral, intellectual and physical qualities and international perspectives.

毕业要求：

№1.工程知识：培养学生熟练掌握英语，掌握扎实的计算机科学与技术专业基本原理、方法和手段等方面的基础知识用于解决复杂工程问题，并通过计算机系统分析、建模和计算等方面的先进方法，为将所学基础知识应用到计算机科学与技术研发和工程实践做好准备。

№2.问题分析：培养学生能够创造性地利用计算机科学基本原理解决计算机领域遇到的问题。

№3.设计/开发解决方案：能够设计针对计算机工程复杂问题的解决方案，设计满足特定需求的计算机软硬件系统，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

№4.研究：培养学生具备计算机系统相关知识并对计算机工程复杂问题进行研究，具有计算机系统研发基本能力、具备问题分析和建模的能力，具有系统级的认知能力和实践能力，掌握自底向上和自顶向下的问题分析方法。

№5.使用现代工具：能够针对计算机工程复杂问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具。

№6.工程与社会：能够基于计算机工程相关背景知识进行合理分析，评价计算机工程实践中的复杂问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

№7.环境和可持续发展：能够理解和评价针对计算机工程复杂问题的工程实践对环境、社会可持续发展的影响。

№8.职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

№9.个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

№10.沟通：能够就计算机工程复杂问题与全球业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备良好的国际视野，能够在跨文化背景下进行沟通和交流。

№11.项目管理：理解并掌握计算机工程管理原理与经济决策方法，并能在多学科环境中应用。

№12.终身学习：学生能够胜任研究性工作，可继续深造攻读硕士、博士，并具备终身学习的能力。

Student Outcomes:

№1.Engineering Knowledge: An ability to apply knowledge of English, solid knowledge of professional basic principles, methods and means of computer science and technology for solving complex engineering problems, to well prepare the required knowledge applied to the computer science and technology research & development and engineering practice through computer systems analysis, modeling and calculation and any other aspects of the advanced approach.

№2.Problem Analysis: An ability to creatively use the basic principles of computer science to solve the problems encountered in the computer field.

№3.Design / Development Solutions: An ability to design solutions for computer engineering complex problems, to design computer hardware and software systems that meet with specific requirements, and to embody innovation awareness in the design process and take into account social, health, safety, cultural and environmental factors.

№4.Research: An ability to develop computer system-related knowledge and research computer engineering complex issues, to develop the basic capacity of computer systems research & development, systematic cognitive and practice, master the Bottom-up and top-down problem analysis methods.

№5.Applying Modern Tools: An ability to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex computer engineering issues.

№6.Engineering and Society: An ability to conduct a reasonable analysis and evaluation of the impact of the solutions of complex problems in computer engineering practice to the social, health, safety, legal and cultural based on computer engineering related background knowledge, and understand the obligation of taking responsibility.

№7.Environment and Sustainable Development: An ability to understand and evaluate the impact of solutions of complex engineering problems in environmental and societal contexts and demonstrate knowledge of and need for sustainable development.

№8.Professional Standards: An understanding of humanity science and social responsibility, being able to understand and abide by professional ethics and standards responsibly in engineering practice.

№9.Individual and Teams: An ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

№10.Communication: An ability to communicate effectively on complex computer engineering problems with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions, and communicate in cross-cultural contexts with international perspective.

№11.Project Management: Demonstrate knowledge and understanding of computer engineering management principles and methods of economic decision-making, to function in multidisciplinary environments.

№12.Lifelong Learning: An ability to be qualified for research work and can continue their studies for master and doctor degrees, and have the ability for life-long learning.

专业简介:

华南理工大学计算机科学与技术专业为国家特色专业、广东省首批名牌专业和广东省一级重点学科。学院于 2008 年开设第一门全英课，2009 年吸取联合班和双语班的优点，成立“双语联合班”，该班以全英教学为主要目标，2010 年该专业成立“计算机类本硕博连读全英创新班”，直接列入高考招生目录。2011 年计算机科学与技术专业成为华南理工大学首批全英教学试点专业。该班所有专业课程均采用国外原版英语教材，基础课和专业领域必修课采用全英语教学。目前已经开设全英课程 28 门，建立了 20 多人的全英师资队伍，并且每年聘请海外名师为本科生授课，开设本硕博连读全英创新班，该班着力构建高水平研究型大学的培养目标，注重学生计算机创新意识、研究能力和应用能力的培养，与国际计算机科学知识接轨。首届毕业生已被卡内基梅隆大学，香港科技大学，香港中文大学，新加坡国立大学等世界国际名校录取攻读博士学位，培养了一批具有国际视野、具有创新能力的精英人才。

Program Profile:

The major of computer science and technology of South China University of Technology is the national specialty and belongs to the first batch of famous majors and first-degree priority discipline of Guangdong province. The school of Computer Science and Engineering of South China University of Technology opened the first full English course in 2008, set up the bilingual union class in 2009, set up the full English innovative class in 2010 and employed the students officially by the national college entrance examination, which further became the first full English major of South China University of Technology. All the professional courses for this class are taught with original English textbooks and materials, and the disciplinary basic courses and specialty-related courses were taught by using full English language. At present, this class has set up 28 full English courses, established a full English teaching team with more than 20 teachers, and also hired famous overseas teachers for undergraduate teaching each year. This class focuses on the training objectives of building a high level of research-style university, pays attention to the students' computer innovation consciousness, research ability and application ability training, and keep trace with international computer science knowledge. The first session of graduates have been employed by

the University of Carnegie Mellon University, Hong Kong University of Science and Technology, the Chinese University of Hong Kong, the National University of Singapore and other international elite universities for doctoral degrees. This class has cultivated a group of elite talent with international vision and innovative ability.

专业特色：（限 100 字以内）

专业特色为“本-硕-博”连读，通过全英语教学培养具有国际视野和创新能力的研究型计算机人才。

Program Features:

It is a Bachelor-Master or Bachelor-Doctor Successive Program, which cultivates research-style computer talents with international perspectives through full English teaching.

授予学位：工学学士学位

Degree Conferred: Bachelor of Engineering

主干课程：

离散数学、数据结构、计算机组成与体系结构、操作系统、数据库、软件工程、算法设计与分析、计算机网络、人工智能。

Core Courses:

Discrete Mathematics, Data Structure, Computer Organization and Architecture, Operating Systems, Database, Software Engineering, The Design and Analysis of Computer Algorithms, Computer Networks, Artificial Intelligence

特色课程：

全英语教学课程：高级语言程序设计、计算机概论，新生研讨课 I：计算机科学技术的发展与展望，新生研讨课 II：机器学习的过去、现在与将来、离散数学、数据结构，数据库，数字逻辑、计算机组成与体系结构、编译原理、操作系统、计算机网络、软件工程、计算方法、算法设计与分析、计算机图形学、数据挖掘与数据仓库、模式识别导论、人工智能、视觉计算，模式识别导论、数据仓库与数据挖掘。

研究型课程：智能机器人技术，视觉计算，计算方法。

新生研讨课：计算机科学技术的发展与展望、机器学习的过去、现在与将来

MOOC：软件工程，计算机网络，编译原理，Java 程序设计，视觉计算，Python 语言程序设计

本研贯通课：计算机网络，数据库，计算机图形学，数字图像处理，人工智能

校企合作课：移动应用开发（Android）（Google）、高性能计算与云计算（Google, IBM），移动终端开发进阶版-Android 应用设计与开发（腾讯）

竞教结合课程：高级语言程序设计，数学建模与实验，ACM 程序设计竞赛

工作坊：二年级本科生进团队

创业教育课程：数字系统创意设计

Featured Courses:

Courses Taught in English: Advanced Language Programmer, Foundations of Computer Science, Development and Trends of Computer Science Technology, Machine Learning: in Past, Current and Future, Discrete Mathematics, Data Structure, Computer Organization and Architecture, Operating Systems, Digital Logic, Database, Principles of Compiler, Software Engineering, Computer Networks, Software Engineering, Computation Methods, The Design and Analysis of Computer Algorithms, Computer Graphics, Introduction to pattern Recognition, Artificial Intelligence, Visual Computing, Introduction to pattern Recognition, The Design and Analysis of Computer Algorithms.

Research Courses: Intelligent Computer Technology, Visual Computing, Computation Methods.

Freshmen Seminars: Development and Trends of Computer Science Technology, Machine Learning: in Past, Current and Future

MOOCs: Software Engineering, Computer Networks, Principles of Compiler, Introduction to JAVA Programming, Python Language Programming, Visual Computing

Baccalaureate-Master's Integrated Courses: Computer Networks, Database, Computer Graphics, Digital Image Processing, Artificial Intelligence

Cooperative Courses with Enterprises: Mobile Application Development (Android) (Google modular course), High Performance Computation and Cloud Computation (Google modular course), Mobile Ends Development Progress (Tencent modular course)

Workshops: Participate mentor team in the second year

Contest-Teaching Integrated Courses: Advanced Language Programmer, Mathematical Modeling and Experiment, ACM Programming Design Contest

Innovation Practice: Innovation Research Training, Innovation Research Practice 1, Innovation Research Practice 2, Starting Business Practice.

Entrepreneurship Courses: Creative design of digital systems

一、教学计划总体安排表 (General Teaching Schedule)

| 学 年 | 学 期 | 教 学 进 度 安 排 (周) | | | | | | | | | | | | | | | | | | 理 论 教 学 | 考 试 | 入 学 教 育 | 军 训 | 课 程 设 计 | 大 作 业 | 工 程 训 练 | 电 子 实 验 | 社 会 实 践 | 生 产 实 习 | 毕 业 实 习 | 其 它 实 习 | 中 外 合 作 项 目 | 毕 业 设 计 | 就 业 安 排 | 机 动 | 假 期 | 小 计 | | | | | |
|--------|--------|-------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|------------------|--------|------------------|--------|------------------|-------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------------------|------------------|------------------|--------|--------|--------|----|----|----|-----|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | | | | | | | | | | | | | | | | | | | 19 | 20 | | | |
| | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | | | | | | | | | | | | | | | | | | | | | | | |
| 一 | 1 | | C | A | A | A | A | A | A | A | A | A | A | A | A | A | B | D | D | D | 14 | 1 | 1 | 3 | | | | | | | | | | | | | | 19 | | | | |
| | 2 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | Q | Q | B | B | 16 | 2 | | | | | | | | | | | | | | 2 | 20 | | | | | |
| 二 | 3 | A | A | A | A | A | A | A | G | G | A | A | A | A | A | A | A | B | B | 16 | 2 | | | | 2 | | | | | | | | | | | | 20 | | | | | |
| | 4 | F | A | A | A | A | A | A | H | H | A | A | A | A | A | A | A | B | B | 15 | 2 | | | 1 | 2 | | | | | | | | | | | | 20 | | | | | |
| 三 | 5 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | F | F | B | B | 16 | 2 | | | 2 | | | | | | | | | | | | | 20 | | | | | |
| | 6 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | F | F | B | B | 16 | 2 | | | 2 | | | | | | | | | | | | | 20 | | | | | |
| 四 | 7 | 研究生阶段学习, 并完成本科毕业设计 (论文) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 20 | | |
| | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 15 | 2 |
| | | 合 计 (周) | | | | | | | | | | | | | | | | | | 93 | 11 | 1 | 3 | 0 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 15 | 5 | | | | 159 | |

二、各类课程学分登记表 (Registration Form of Curriculum Credits)

1. 学分统计表 (Credits Registration Form)

| 课程类别 Course Category | 课程要求 Requirement | 学分 Credits | 学时 Academic Hours | 备注 Remarks |
|---|-------------------------|---------------|----------------------|---------------|
| 公共基础课 General Basic Courses | 必修 Compulsory | 60.5 | 940 | |
| | 通识 General Education | 10.0 | 160 | |
| 学科基础课 Disciplinary Basic Courses | 必修 Compulsory | 46.0 | 816 | |
| | 选修 Elective | 0.0 | 0.0 | |
| 专业领域课 Specialty-related Courses | 必修 Compulsory | 0.0 | 0.0 | |
| | 选修 Elective | 19.5 | 351 | |
| 合 计 Total | | 136.0 | 2267 | |
| 集中实践教学环节 (周) Practice Training (Weeks) | | 41.0+2.0 | 43 周 | |
| 毕业学分要求 Credits Required for Graduation | 136.0+43.0=179.0 | | | |

备注: 硕士、博士阶段课程修读要求及毕业资格按照学生修读的研究生专业培养方案执行, 第四年在导师的指导下修读相关课程; 学生本科阶段在取得专业教学计划规定学分的同时, 还必须第二课堂取得 2 个人文素质教育学分和 4 个创新能力培养学分。

2. 类别统计表 (Category Registration Form)

| 学时 Academic Hours | | | 学分 Credits | | | |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 总学 | 其中 Include | 其中 Include | 总 | 其中 Include | 其中 Include | 其中 Include |
| | | | | | | |

| 时数 Total | 必修 学时 Compulsory | 选修 学时 Elective | 理论 教学 学时 Theory Course | 实验 教学 学时 Lab | 学 分 数 Tot al | 必修 学分 Comp ulsory | 选修 学分 Electi ve | 集中实践 教学环节 学分 Practice-con centrated Training | 理论教 学学分 Theory Course Credits | 实验 教学 学分 Lab | 创新创业教 育学分 Innovation and Entrepreneurshi p Education |
|-------------|------------------------|----------------------|------------------------------------|-----------------------|--------------------------|----------------------------|--------------------------|---|---|-----------------------|--|
| 2267 | 1756 | 511 | 1892 | 390 | 179 | 147.5 | 31.5 | 43 | 124 | 12 | 21.5 |

三、专业教学计划表 (Teaching Schedule)

| 类别 Course Category | 课程 代码 Course No. | 课程名称 Course Title | 是否 必修 C/E | 学时数 Total Curriculum Hours | | | | 学分 数 Credits | 开课 学期 Semester | 毕业 要求 Student Outcomes |
|--------------------------------|------------------------|--|-----------------|-------------------------------|---|--------------------|-------------------------|--------------------|----------------------|---------------------------------|
| | | | | 总学 时 Class Hours | 上机 Computer-ai ded Class Hours | 实验 Lab Hours | 实践 Practice Hours | | | |
| 公共基础课 General Basic Courses | 143093 | 思想道德修养与法律基础 Cultivation of Thought and Morals & Fundamental of Law | 必修 课 C | (40) (36) | | | | 2.5 | 4 | №8 |
| | 143091 | 中国近现代史纲要 Skeleton of Chinese Modern History | | (32) 24 | | | | 2.0 | 3 | №8 |
| | 143106 | 毛泽东思想和中国特色社会主义理论体系概论 Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics | | (80) 48 | | | | 5.0 | 6 | №8 |
| | 143090 | 马克思主义基本原理 Fundamentals of Marxism Principle | | (40) 36 | | | | 2.5 | 5 | №8 |
| | 143094 | 形势与政策 Analysis of the Situation & Policy | | (128) | | | | 2.0 | 1-8 | №8 |
| | 144001 | 大学英语 (一) College English(1) | | 64 | | | | 4.0 | 1 | №10 |
| | 144002 | 大学英语 (二) College English(2) | | 64 | | | | 4.0 | 2 | №10 |
| | 152001 | 体育 (一) Physical Education (1) | | 32 | | | 32 | 1.0 | 1 | №12 |
| | 152002 | 体育 (二) Physical Education (2) | | 32 | | | 32 | 1.0 | 2 | №12 |
| | 152003 | 体育 (三) Physical Education (3) | | 32 | | | 32 | 1.0 | 3 | №12 |
| | 152004 | 体育 (四) Physical Education (4) | | 32 | | | 32 | 1.0 | 4 | №12 |
| | 106001 | 军事理论 Military Principle | | (16) | | | | 1.0 | 2 | №9 |
| | 140195 | 数学分析 (一) Mathematics Analysis(1) | | 80 | | | | 5.0 | 1 | №1,2 |
| | 140196 | 数学分析 (二) Mathematics Analysis(2) | | 112 | | | | 7.0 | 2 | №1,2 |
| | 140197 | 线性代数与解析几何 Linear Algebra & Analytic Geometry | | 48 | | | | 3.0 | 1 | №1,2 |
| | 140019 | 概率论与数理统计 Probability & Mathematical Statistics | | 48 | | | | 3.0 | 2 | №1,2 |
| | 141005 | 大学物理 II (一) General Physics (1) | | 64 | | | | 4.0 | 2 | №1,2 |
| | 141006 | 大学物理 II (二) General Physics (2) | | 64 | | | | 4.0 | 3 | №1,2 |
| | 141007 | 大学物理实验 (一) Physics Experiment(1) | | 32 | | | 32 | 1.0 | 2 | №1,2 |
| | 141008 | 大学物理实验 (二) Physics Experiment(2) | | 32 | | | 32 | 1.0 | 3 | №1,2 |

| | | | | | | | | | | |
|--|----------------------------|---|------------------|------|----|----|-----|------|---|------|
| | 145218 | 高级语言程序设计 C++ (一) Advanced Language Programming(C++) (1) | | 64 | 16 | | | 3.5 | 1 | №3,5 |
| | 145219 | 高级语言程序设计 C++ (二) Advanced Language Programming(C++) (2) | | 32 | 6 | | | 2.0 | 2 | №3,5 |
| | | 人文科学领域 Humanities | 通 识 课 E | 96 | | | | 6.0 | | №8 |
| | | 社会科学领域 Social Science | | 64 | | | | 4.0 | | №8 |
| | 合 计 Total | | | 1100 | 22 | 64 | 128 | 70.5 | | |

三、专业教学计划表 (续) (Teaching Schedule)

| 类别 Course Category | 课程 代码 Course No. | 课程名称 Course Title | 是否 必修 C/E | 学 时 数 Total Curriculum Hours | | | 学分 数 Credits | 开课 学期 Semester | 毕业 要求 Student Outcomes |
|-------------------------------------|---------------------------|---|-----------------|---------------------------------|-------------------------------------|--------------------|--------------------|----------------------|---------------------------------|
| | | | | 总学 时 Class Hours | 上机 Computer-aided Class Hours | 实验 Lab Hours | | | |
| 学科基础课 Disciplinary Basic Courses | 145272 | 计算机科学概论 Foundations of Computer Science | 必 C | 16 | | | 1.0 | 1 | №1 |
| | 145285 | IT 前沿技术 IT Frontier Technology | 必 C | 16 | | | 1.0 | 1 | №1 |
| | 145259 | 计算机科学技术的发展与展望 Development and Trends of Computer Science Technology | 必 C | 16 | | | 1.0 | 1 | №1 |
| | 145267 | 机器学习的过去、现在与将来 Machine Learning: in Past, Current and Future | 必 C | 16 | | | 1.0 | 2 | №1 |
| | 145261 | 离散数学(一) Discrete Mathematics(1) | 必 C | 56 | 4 | | 3.5 | 2 | №1,2 |
| | 145262 | 离散数学(二) Discrete Mathematics(2) | 必 C | 40 | 4 | | 2.5 | 3 | №1,2 |
| | 135003 | 电路与电子技术 Electric Circuit and Electronics (Bilingual) | 必 C | 64 | | | 4.0 | 3 | №1,2,4 |
| | 135037 | 电路与电子技术实验 Experiment of Electric Circuits and Electronics | 必 C | 32 | | 32 | 1.0 | 4 | №1,2,4 |
| | 145216 | 数字逻辑 Digital Logic | 必 C | 32 | | 8 | 2.0 | 3 | №1,2,3 |
| | 145196 | 计算机组成与体系结构 Computer Organization and Architecture | 必 C | 64 | | 16 | 3.5 | 4 | №2,3,4 |
| | 145055 | 数据结构 Data Structure | 必 C | 64 | 16 | | 3.5 | 3 | №3,4 |
| | 145158 | 操作系统 Operating Systems | 必 C | 64 | 16 | | 3.5 | 5 | №3,4,5 |
| | 145036 | 计算机网络 Computer Networks | 必 C | 64 | | 16 | 3.5 | 5 | №3,4,5 |

| 类别 Course Category | 课程 代码 Course No. | 课程名称 Course Title | 是否 必修 C/E | 学时数 Total Curriculum Hours | | | | 学分 数 Credits | 开课 学期 Semester | 毕业 要求 Student Outcomes | |
|-------------------------------------|-------------------------------------|---|-----------------|---|-------------------------------------|--------------------|----------------|--------------------|----------------------|---------------------------------|------------|
| | | | | 总学 时 Class Hours | 上机 Computer-aided Class Hours | 实验 Lab Hours | 实践 Practice | | | | |
| | 145148 | 数据库 Database | 必 C | 64 | 16 | | | 3.5 | 4 | №3,4,5 | |
| | 145214 | 软件工程 Software Engineering | 必 C | 64 | 16 | | | 3.5 | 5 | №3,9,10,11 | |
| | 145153 | 数学建模与实验 Mathematical Modeling and Experiment | 必 C | 40 | 16 | | | 2.0 | 3 | №1,2,3,4 | |
| | 145120 | 算法设计与分析 Algorithm Design and Analysis | 必 C | 64 | 16 | | | 3.5 | 4 | №3,4,5 | |
| | 145172 | 人工智能 Artificial Intelligence | 必 C | 40 | | | | 2.5 | 4 | №4,5,6,7 | |
| | 合计 Total | | 必 C | 816 | 104 | 72 | | 46.0 | | | |
| | | | 选 E | 选修课修读最低要求 学分 minimum elective course credits required: | | | | | | | |
| 专业领域课 Specialty- related Courses | 145100 | 编译原理 Principles of Compiler | 选 E | 48 | 16 | | | 2.5 | 4 | №3,4,5 | |
| | 145210 | Java 程序设计 JAVA Programming | 选 E | 40 | 8 | | | 2.5 | 2 | №3,5 | |
| | 145305 | Python 语言程序设计 Python Language Programming | 选 E | 32 | 8 | | | 2.0 | 3 | №3,5 | |
| | 1.多媒体技术方向 Multimedia Technology | | | | | | | | | | |
| | 145164 | 计算机图形学与虚拟实现 Computer Graphics and Virtual Reality | 选 E | 48 | 16 | | | | 2.5 | 5 | №4,5 |
| | 145161 | 多媒体技术 Multimedia Technology | 选 E | 40 | 8 | | | | 2.5 | 6 | №4,5 |
| | 145176 | 数字图象处理 Digital Image Processing | 选 E | 32 | 8 | | | | 2.0 | 5 | №4,5 |
| | 145284 | 视觉计算 Visual Computing | 选 E | 48 | 16 | | | | 2.5 | 6 | №4,5 |
| | 2.智能计算方向 Intelligent Computation | | | | | | | | | | |
| | 145030 | 智能机器人技术 Intelligent Robot Technology | 选 E | 48 | 12 | | | | 2.5 | 5 | №3,4,5,6,7 |
| | 145143 | 模式识别导论 Introduction to pattern Recognition | 选 E | 40 | 8 | | | | 2.5 | 6 | №4,5,6,7 |
| | 145013 | 数据仓库与数据挖掘 Data Warehouse and Data Mining | 选 E | 48 | 16 | | | | 2.5 | 6 | №4,5,6 |

| 类别 Course Category | 课程 代码 Course No. | 课程名称 Course Title | 是否 必修 C/E | 学时数 Total Curriculum Hours | | | | 学分 数 Credits | 开课 学期 Semester | 毕业 要求 Student Outcomes |
|---|---------------------------|---|-----------------|-------------------------------|-------------------------------------|--------------------|----------------|--------------------|----------------------|---------------------------------|
| | | | | 总学 时 Class Hours | 上机 Computer-aided Class Hours | 实验 Lab Hours | 实践 Practice | | | |
| | | | | | | | | | | |
| | 145310 | 机器学习 Machine Learning | 选 E | 32 | | | | 2.0 | 7 | №4,5,6,7 |
| | 145309 | 神经网络与深度学习 Neural Networks and Deep Learning | 选 E | 32 | | | | 2.0 | 6 | №4,5,6,7 |
| 3.高性能计算方向 High Performance Computation | | | | | | | | | | |
| | 145112 | 分布式计算技术 Distributed Computing Technology | 选 E | 48 | 16 | | | 2.5 | 6 | №3,4,5 |
| | 145022 | 计算方法 Computation Methods | 选 E | 48 | 8 | | | 3.0 | 6 | №1,2,4,5 |
| | 145273 | 高性能计算与云计算 (Google, IBM) High Performance Computation and Cloud Computation (Google, IBM) | 选 E | 48 | 16 | | | 2.5 | 5 | №3,4,5 |
| | 145279 | 移动应用开发 (Android) (Google) Mobile Application Development (Android) (Google) | 选 E | 48 | 16 | | | 2.5 | 3 | №3,5 |
| 4.其它选修课 4.Other Selective Courses | | | | | | | | | | |
| | 145276 | 物联网技术 Internet of Things Technology | 选 E | 32 | | | | 2.0 | 7 | №3,6,7 |
| | 145170 | 嵌入式系统 Embedded System | 选 E | 64 | | 16 | | 3.5 | 7 | №3,6,7 |
| | 145146 | 计算机安全 Computer Security | 选 E | 48 | 16 | | | 2.5 | 5 | №3,5,6,8 |
| | 145180 | 网络信息检索 Web Information Retrieval | 选 E | 48 | 16 | | | 2.5 | 6 | №3,4,5 |
| | 145291 | ACM 程序设计竞赛 ACM Programming Design Contest | 选 E | 32 | | | | 2.0 | 3 | №1,2,3,4 |
| | 145292 | 移动终端开发进阶版-Android 应用设计与开发 (腾讯) Advanced Mobile Application Development (Tencent) | 选 E | 32 | | | | 2.0 | 6 | №3,5 |
| 创新实践课程 | | | | | | | | | | |
| | 120003 | 创新研究训练 Innovation Research Training | 选 E | 32 | | | | 2.0 | | №4,12 |

| 类别 Course Category | 课程 代码 Course No. | 课程名称 Course Title | 是否 必修 C/E | 学时数 Total Curriculum Hours | | | 学分 数 Credits | 开课 学期 Semester | 毕业 要求 Student Outcomes |
|--------------------------|---------------------------|---|-----------------|--|-------------------------------------|--------------------|--------------------|----------------------|---------------------------------|
| | | | | 总学 时 Class Hours | 上机 Computer-aided Class Hours | 实验 Lab Hours | | | |
| | 120004 | 创新研究实践 I Innovation Research Practice 1 | 选 E | 32 | | | 2.0 | | №4,12 |
| | 120005 | 创新研究实践 II Innovation Research Practice 2 | 选 E | 32 | | | 2.0 | | №4,12 |
| | 120006 | 创业实践 Entrepreneurial Practice | 选 E | 32 | | | 2.0 | | №4,12 |
| | 合计 Total | | 选 E | 选修课修读最低要求 19.5 学分 minimum elective course credits required:19.5 | | | | | |

三、专业教学计划表（续）国际顶尖大学 MOOC 课程

Teaching Schedule (MOOC provided by the top universities in the world)

| 课程名称 Course Title | 是否必修 C/E | 总学时 Class Hours | 开课学校 Provider | MOOC 平台 Platform | 学分 数 Credits | 建议开课 学期 Semester |
|---|-------------|--------------------|------------------|------------------------|--------------------|------------------------|
| Artificial Intelligence | 选 E | 180 | UC Berkeley | Edx | 3 | 4 |
| Data Science and Engineering with Spark | 选 E | 180 | UC Berkeley | Edx | 3 | 5 |
| Introduction to Computational Thinking and Data Science | 选 E | 150 | MIT | Edx | 3 | 2 |
| Introduction to Computer Science and Programming Using Python | 选 E | 135 | MIT | Edx | 2.5 | 3 |
| Mobile Application Experiences: Part1-Part3 | 选 E | 144 | MIT | Edx | 2.5 | 3 |
| Cloud Computing (5 courses) | 选 E | 150 | UIUC | Coursera | 3 | 6 |
| Big Data (6 courses) | 选 E | 75 | UC San Diego | Coursera | 2 | 5 |
| Computer Science | 选 E | 80 | Stanford | Coursera | 2 | 1 |
| Algorithm Design and Analysis: Part1-Part2 | 选 E | 102 | Stanford | Coursera | 2 | 4 |

备注：1.学生可选修多媒体技术、智能计算、高性能计算三个方向中的任意方向，每个方向的模块课程至少选修3门。
2.学生自觉在线选修国际顶尖大学 MOOC 课程列表中的 2 门课程，既可在建议学期内修课，也可根据自己情况选择修课学期，课程列入专业领域课中。3.学生根据自己开展科研训练项目、学科竞赛、发表论文、获得专利和自主创业等情况申请折算为一定的专业选修课学分（创新研究训练、创新研究实践 I、创新研究实践 II、创业实践等创新创业课程）。每个学生累计申请为专业选修课总学分不超过 4 个学分。经学校批准认定为选修课学分的项目、竞赛等不再获得对应第二课堂的创新学分。

Remarks:

- The student may choose any direction in the multimedia technology, intelligent computation and high performance computation, and at least choose 3 courses in a direction.
- The student may select 2 online MOOC courses provided by the high level universities in the world as suggested in the list, which may be taken in the suggested semester or decided by the student.
- The total accumulated credits of Innovation and Entrepreneurship Education for each student should not exceed 4 credits. Specifically
 - Students who preside over college students innovation and entrepreneurship training projects at

school-level or above and are qualified to finish the project, can apply for taking “Innovation Research Training” course as a professional elective course(2 credits), and apply for taking the planning research project of Innovation Research Training as graduation design(thesis);

- Students who published one or more papers in core journals as the first author, can apply for taking “Innovation Research Practice 1” course as a professional elective course(2 credits);
- Students who obtained the inventive patent as main participant(top three), can apply for taking “Innovation Research Practice 2” course as a professional elective course(2 credits);
- Students who participated in independent entrepreneurship and won a prize at “Internet+” college students innovation and entrepreneurship competition, “Challenge Cup” series of competition or “youth” series contest at the provincial level or above, can apply for “Entrepreneurship Practice” course as a professional elective course (2 credits).

四、集中实践教学环节(Practice-concentrated Training)

| 课程代码 Course No | 课程名称 Course Title | 是否必修 C/E | 学时数 Total Curriculum Hours | | 学分 Credits | 开课学期 Semester | 毕业要求 Student Outcomes |
|-------------------|--|-------------|--|---------------------|---------------|------------------|--------------------------|
| | | | 实践 Practice weeks | 授课 Lecture Hours | | | |
| 106002 | 军训 Military Training | 必 C | 3周 3 weeks | | 3.0 | 1 | №9 |
| 143197 | 马克思主义理论与实践 Marxism Theory and Practice | 必 C | 2周 2 weeks | | 2.0 | 假期 | №8 |
| 130356 | 工程训练 I Engineering Training | 必 C | 2周 2 weeks | | 2.0 | 3 | №1,2,5,9,10 |
| 141073 | 电子工艺实习 II Practice of Electronic | 必 C | 2周 2 weeks | | 2.0 | 4 | №1,2,5,9,10 |
| 145241 | 高级语言程序设计大作业 Advanced Language Programming Course Design | 必 C | 2周 2 weeks | | 2.0 | 2 | №3,5,9,10,11 |
| 145078 | 数据结构大作业 Data Structure Course Design | 必 C | 1周 1 weeks | | 1.0 | 4 | №3,5,9,10,11 |
| 145081 | 数据库课程设计 Database Course Design | 必 C | 2周 2 weeks | | 2.0 | 5 | №3,5,9,10,11 |
| 145080 | 操作系统课程设计 Operating Systems Course Design | 必 C | 2周 2 weeks | | 2.0 | 6 | №3,5,9,10,11 |
| 145242 | 软件工程课程设计 Software Engineering Course Design | 必 C | 2周 2 weeks | | 2.0 | 6 | №3,5,9,10,11 |
| 145083 | 毕业实习 Graduation Internship | 必 C | 8周 8 weeks | | 8.0 | 7 | №6,8,9,10,11,12 |
| 145084 | 毕业设计 Graduation Project | 必 C | 15周 15 weeks | | 15.0 | 8 | №2,3,8,9,10,11,12 |
| 145283 | 数字系统创意设计 (Google) Creative Design of Digital Systems(Google) | 选 E | 2周 2 weeks | | 2.0 | 1 | №3,5,9,10,11 |
| 145243 | 计算机组成与体系结构课程设计 Computer Organization and Architecture Course Design | 选 E | 2周 2 weeks | | 2.0 | 5 | №3,5,9,10,11 |
| 合计 Total | | 必 C | 41周 | | 41.0 | | |
| | | 选 E | 选修课修读最低要求 2.0 学分 minimum elective course credits required:2 | | | | |

备注：所有学生至少应参加国创、省创、中央高校基本科研业务费-本科生项目、SRP 等项目 1 项；
Remark: all the students should take part in one project at least in terms of National creative project, Province creative project or SRP.

五、第二课堂

第二课堂由人文素质教育和创新能力培养两部分组成。

1.人文素质教育基本要求

学生在取得专业教学计划规定学分的同时，还应结合自己的兴趣适当参加课外人文素质教育活
动，参加活动的学分累计不少于 2 个学分。

2.创新能力培养基本要求

学生在取得本专业教学计划规定学分的同时，还必须参加国家创新创业训练计划或广东省创新
创业训练计划或 SRP（学生研究计划）或百步梯攀登计划或一定时间的各类课外创新能力培养活
动（如学科竞赛、学术讲座等），参加活动的学分累计不少于 4 个学分。

1. “Second Classroom” Activities

“Second Classroom” Activities are comprised of two parts, Humanities Quality Education and Innovative Ability Cultivation.

1)Basic Requirements of Humanities Quality Education

Besides gaining course credits listed in one’s subject teaching curriculum, a student is required to participate in extracurricular activities of Humanities Quality Education based on one’s interest, acquiring no less than two credits.

2)Basic Requirements of Innovative Ability Cultivation

Besides gaining course credits listed in one’s subject teaching curriculum, a student is required to participate in any one of the following activities: National Undergraduate Training Programs for Innovation and Entrepreneurship, Guangdong Undergraduate Training Programs for Innovation and Entrepreneurship, Student Research Program (SRP), One-hundred-steps Innovative Program, or any other extracurricular activities of Innovative Ability Cultivation that last a certain period of time (e.g. subject contests, academic lectures), acquiring no less than four credits.