

# 工业工程 (2+2)

## Industrial Engineering (2+2)

专业代码: 120701

学 制: 4 年

Program Code: 120701

Duration: 4years

### 培养目标:

培养德智体全面发展, 适应社会主义经济发展的需求, 具备扎实的工程技术基础, 掌握现代管理知识和系统工程的理论与方法, 具有系统思想和创新精神, 能够综合运用自然科学、社会科学和现代管理科学方法和技术, 对人员、物料、设备、能源和信息组成的集成系统进行规划、设计、分析、评价、控制、改善和创新, 实现系统整体效益提高的懂技术、懂管理的高层次、复合型管理人才。学生毕业后, 可在国家行政管理部门、现代生产企业、社会服务业等从事组织、协调等以技术为基础的系统管理工作或在高校、科研机构从事相应的教学科研工作, 也可继续深造, 攻读硕士和博士。

### Educational Objectives:

Cultivate the comprehensive development, i.e., moral, intellectual and physical, of the students to adapt the needs of social and economic development. The students will be equipped with solid foundation of engineering and technology, possess the modern management knowledge and systems engineering theory and methods, and have the systematic thinking and innovative spirit. They are able to apply the methods and techniques from natural science, social science and modern management science to plan, design, analyze, evaluate, control, improve and innovate the integrated systems of personnel, materials, equipment, energy and information. Finally, deliver the high-level and complex management talents that understand both technology and management. After graduation, students can be capable for the technology-based system management jobs, such as organization and coordination, from national administrative departments, modern production enterprises, social services etc., or can conduct teaching and research work in universities and research institutions. In addition, they can continue to study Master and Doctorate programs.

### 毕业要求:

№1.工程知识: 掌握扎实的工业工程基础知识、专业基本原理、方法和手段, 能够将数学、自然科学、本专业基础知识和专业知识用于解决复杂生产与服务问题, 并接触和掌握生产营运知识, 为解决企业工程实际复杂问题打下知识基础。

№2.问题分析: 能够应用数学、自然科学、本专业基本原理、方法和手段和生产营运知识, 识别、表达、并通过文献研究分析工程中的复杂问题, 以获得有效结论。

№3.设计/开发解决方案: 能够设计针对复杂问题的解决方案, 设计满足特定需求的系统、单元

(部件)或流程,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:能够基于科学原理并采用科学方法对复杂问题进行研究,包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

№5.使用现代工具:能够针对复杂问题,开发、选择与使用恰当的技术、资源、现代工程工具和信息工具,包括对复杂问题的预测与模拟,并能够理解其局限性。

№6.工程与社会:能够基于运作相关背景知识进行合理分析,评价工程实践和复杂问题解决方

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:能够就复杂问题与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。并具备一定的国际视野,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:具有自主学习和终身学习的意识,有不断学习和适应发展的能力。

### **Student Outcomes:**

№1. Engineering Knowledge: the students should possess solid basic knowledge, professional basic principles, and methods and means, and be able to apply mathematics, natural sciences, major-based knowledge to solve complex engineering problems. Touch and understand the production operation knowledge, which can lay the knowledge base for solving the practical engineering problems from the companies.

№2. Problem Analysis: the students can use applied math, natural science, major fundamental methods, literature review, and production operations knowledge to obtain meaningful results.

№ 3. Design/Develop Solution: the students should be able to design solutions to complex problems, such as specific system, component, or procedure. In addition, they should exhibit creativity in the design process and consider society, health, safety, law, culture and environmental factors.

№ 4 Research: the students can investigate complex problems based on scientific principles and methods, including design of experiment, describe and analyze data, and obtain effective conclusion via information fusion.

№5. Application of Modern Tools: for complex problem, the students can develop, select and apply suitable technology, resources, modern engineering and information tools, including complex-problem-based forecasting and simulation, and understand the limitations.

№ 6. Engineering and Society: the students can conduct rational analysis based on operations background knowledge, evaluate the impact of engineering practices and complex problem solutions on society, health, safety, law and culture, and understand the responsibilities that should be borne.

№ 7. Environment and Sustainable Development: the students can understand and evaluate the impact of engineering practices, based on complex issues, on environmental and social sustainability.

№ 8. Professional Regulations: the students should possess humanities and social science literacy and social responsibility, and be able to understand and comply with engineering ethics and norms and fulfill their responsibilities in engineering practice.

№9. Individual and Team: the students can act as individual, team member and principle investigator under multi-subject background.

№10. Communication: the students should be able to communicate with peers and society effectively, including writing reports and design manuscript, presentation, clear express or respond commands, and internationalized scope with different cultures.

№11. Project Management: the students should understand and master the principles of engineering management and economic decision-making methods, and can apply their knowledges in a multi-disciplinary environment.

№ 12. Lifelong Learning: the students should have self-learning and lifelong learning awareness, and have the ability to continue to learn and adapt to the development.

### **专业简介：**

工业工程属于管理科学与工程一级学科下设的二级学科。华南理工大学工业工程专业 2008 年开始招收本科生，采取 2+2 创新培养模式，从校内二年级理工科学生中选拔优秀学生。该专业已拥有博士学位、硕士学位、专业硕士学位（ME）授予权。本专业依托学校和学院卓越的科研与教学平台，已经打造成为在华南地区有优势、在全国有影响的重点学科，未来将力争建设成为在全国有优势的重点学科。本专业教师拥有很强的教学科研能力，与国内外知名科研机构交流频繁，工业工程系与多家大型企业联合创建了实习基地。

### **Program Profile:**

Industrial Engineering is the second level discipline under the first level discipline of Management Science and Engineering. The Industrial Engineering major of South China University of Technology started recruiting undergraduates in 2008 and adopted the 2 +2 innovative training mode. The students are selected from the sophomore students majored in science and engineering with outstanding performance. The major has possessed the eligibility of conferring doctoral degree, master degree, and professional master of engineering (ME) degree. The major is supported by the excellent scientific research and teaching platform from the university and college, and has been built in as an advanced discipline in the southern China as well as an influential key discipline in the country. We aim at building in the nationally advanced discipline

in the future. Currently, the major has 26 faculties, including 8 professors, 12 associate professors, and 6 lecturers. The faculties for Industrial Engineering have strong teaching and research capabilities, and frequently interact with the famous research institutes in the homeland and overseas. In addition, the department of Industrial Engineering and several large enterprises have jointly built up some practice bases.

### **专业特色:**

采取先工科后管理的“2+2”创新培养模式，真正体现本专业管理与工程技术相结合的特色，培养既懂工程又懂管理的科技型管理人才。立足珠三角现实需求，依托教师科研最新成果，注重服务运作管理领域的专业技能培养。

### **Program Features:**

This major adopts the engineering-first-management-later-based "2+2" innovative training mode, which indeed reflects the feature of this major, i.e., combining management and engineering technology to cultivate the complex talents that understand both engineering and management. The mission of this major is to satisfy the actual needs of the Pearl River Delta and pay attention to professional skills training in the field of service and operations management, based on the latest research achievements of the faculties,.

**授予学位:** 管理学学士学位

**Degree Conferred:** Bachelor of Management Sciences

### **主干课程:**

微观经济学、运筹学、基础工业工程、人因工程学、生产计划与控制、设施规划与物流系统分析、质量管理。

### **Core Courses:**

Microeconomics, Operations Research, Foundation of Industrial Engineering, Human Factor Engineering, Production Planning and Control, Facility Planning and Logistics System Analysis, Quality Management.

### **特色课程:**

全英语教学课程：系统仿真、供应链管理

双语教学课程：质量管理、物流管理、产品开发

研究型课程：运筹学，管理统计学

专题研讨课：电子商务

创新实践课程：基础工业工程课程设计、物流管理课程设计、管理统计学课程设计、运筹学课程设计

创业教育课程：电子商务

**Feature Courses:**

Courses taught in English: System Simulation, Supply Chain Management

Bilingual Courses: Quality Management, Logistics Management, Product Development

Research-based Courses: Operations Research, Statistics for Management

Discussion-based Courses: E-Commerce

Innovative Practice Course: Course Design of Basic Industrial Engineering, Course Design of Logistics Management, Course Design of Statistics for Management, Course Design of Operations Research

Entrepreneurship Education Courses: Entrepreneurial Practice, E-Commerce



Practice Training (Weeks)				
毕业学分要求 Credits Required for Graduation	66.5+10.0+60.5+29.0=166.0			

备注：1.本专业毕业生学分要求 166.0 学分，其中集中实践教学环节 29.0 学分，含军训 3.0 学分，工程训练或生产实习 2.0 学分、马克思主义理论与实践 2 学分；第一、二学年学生原专业的专业课堂教学 66.5 学分（不含 10 学分通识教育课程）；第三、四学年工业工程专业课堂教学 60.5 学分。2. 学生在取得专业教学计划规定学分的同时，还必须取得第二课堂 2 个人文素质教育学分和 4 个创新能力培养学分。

Note: The graduates of this major should meet the requirement of 166.0 credits, in which the Centralized Practice Teaching requires 27.0 credits, including 3.0 credits for Military Training, Engineering Training or Production Practice requires 2.0 credits, and Marxist Theory and Practice requires 2 credits; the first and second year students should have 66.5 credits for the in-class teaching from their original majors (excluding 10 credits of General Education courses); the third and four years students should have 70.5 credits for the in-class teaching from Industrial Engineering major.

## 2.类别统计表 (Category Registration Form)

学时 Academic Hours					学分 Credits						
总学时数 Total	其中 Include		其中 Include		总学分数 Total	其中 Include		其中 Include			其中 Include
	必修 学时 C	选修 学时 E	理论 教学 学时 T	实验 教学 学时 L		必修 学分 C	选修 学分 E	集中实 践教学 环节学 分 P	理论教 学学分 T	实验 教学学 分 L	创新创业教 育学分 I
2200	1720	480	2024	176	166	137	29	29	131.5	5.5	12

### 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			
General Basic Courses 公共基础课	143094	形势与政策 Analysis of the Situation & Policy	必 C	(128)				2.0	1-8	No8
		人文科学领域 Humanities	通 识 课 E	64				4.0		No8
		社会科学领域 Social Science		32				2.0		No8
		科学技术领域 Science and Technology		64				4(2)		No8
	合计 Total				160				12.0	

### 三、专业教学计划表 (续) (Teaching Schedule (cont.))

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			
学科基础课 Disciplinary Basic Courses	142004	微观经济学 Microeconomics	必 C	48				3.0	5	No1,2
	142061	管理学原理 Principles of Management	必 C	48				3.0	5	No1,2,3,8,10
	142062	运筹学 Operations Research	必 C	48				3.0	5	No2,3,4,5
	142295	人因工程学 Human Factors Engineering	必 C	48				3.0	5	No2,3,5
	142308	基础工业工程 Foundation of Industrial Engineering	必 C	48				3.0	6	No1,2,3
	142306	生产计划与控制 Production Planning and Control	必 C	48				3.0	6	No1,2,4
	142347	质量管理 Quality Management	必 C	48	16			2.5	7	No2,4,5
	142297	系统仿真 System Simulation	必 C	48	16			2.5	5	No2,3,4,5
	142378	管理统计学 Management Statistics	必 C	48				3.0	6	No2,4,5
	142009	系统工程导论 Introduction to System Engineering	选 E	32				2.0	5	No1,2
	142012	物流管理 Logistics Management	选 E	48				3.0	7	No1,4,5
	142102	计算机网络技术应用 Application of Computer Network Technology	选 E	48	16			2.5	6	No3,5
	142094	数据库原理与应用 Database Principle and Application	选 E	48				3.0	5	No2,3,5



	142296	制造工程基础 Foundation of Manufacturing Engineering	选 E	48				3.0	5	№1,6
	142317	自动控制基础 Foundation of Automation Control	选 E	48				3.0	6	№1,2,3
	<b>合 计 Total</b>		必 C  选 E	432	32			26		
选修课修读最低要求 8.0 学分 minimum elective course credits required:8.0										
专业领域课 Specialty-related Courses	142315	设施规划与物流系统分析 Facility Planning and Logistics System Analysis	必 C	48				3.0	6	№2,4
	142305	产品开发 Product Development	必 C	48				3.0	7	№2,3,5
	142099	管理信息系统 Management Information System	必 C	48	16			2.5	7	№2,3,5
	142203	预测与决策方法 Forecasting and Decision Methods	必 C	48				3.0	6	№2,4,5
	142002	技术经济学 Technical Economics	必 C	32				2.0	6	№11,12
	142013	先进制造技术 Advanced Manufacturing Technology	选 E	32				2.0	6	№1,6
	142017	项目管理 Project Management	选 E	32				2.0	8	№1,2
	142303	成本控制 Cost Control	选 E	32				2.0	8	№2,4,5
	142304	商业智能 Business Intelligence	选 E	32	16			1.5	7	№2,3,5
	142376	服务运作管理 Service Operations Management	选 E	32				2.0	6	№2,5,6
	142052	企业文化 Company Culture	选 E	32				2.0	5	№1,2,3,7,8
	142003	管理会计 Management Accounting	选 E	32				2.0	6	№2
	142312	ERP 原理与应用 Principles and Applications of ERP	选 E	32	16			1.5	7	№2,4,5
	142310	库存管理 Inventory Management	选 E	32				2.0	7	№2,4,5
	142307	供应链管理 Supply Chain Management	选 E	32				2.0	6	№2,3,5,7
	142065	财务管理 Financial Management	选 E	32				2.0	8	№1,8,12
	142214	营销学原理 Principles of Marketing	选 E	32				2.0	8	№1,2,3

142107	电子商务 E-Commerce	选 E	32				2.0	5	№2,3,6
142183	品牌管理 Brand Management	选 E	32				2.0	6	№1,2,3
142116	管理沟通 Management and Communication	选 E	32				2.0	5	№1,2,3,8,10
142404	商业分析与决策 Business Analytics and Decisions	选 E	32	16			1.5	6	№2,4,5
142405	电子表格建模与商业应用 Spreadsheet Modeling and Commercial Applications	选 E	32	16			1.5	7	№2,3,5
142406	收益管理 Revenue Management	选 E	32				2.0	7	№2,4,5
142441	智能制造 Intelligent Manufacturing	选 E	32				2.0	8	№2,3,5
120003	创新研究训练 Innovation Research Training	选 E	32				2.0		
120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0		
120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0		
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0		
<b>合 计 Total</b>		必 C	224	16			13.5		
		选 E	选修课修读最低要求 11.0 学分 minimum elective course credits required:11						

备注：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。

Note: The students can convert their own research training programs, subject competitions, publications, patent and self-employment to a number of major elective credits. (Innovation Research Training, Innovation Research Practice I, Innovation Research Practice II, Entrepreneurial Practice, etc.). Each student cannot apply more than 4 credits accumulatively for the major elective course.

#### 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 I	必 C	2 周 2 weeks		2.0	3	№ 1,3,8
142309	基础工业工程课程设计 Course Design of Basic Industrial Engineering	必 C	2 周 2 weeks		2.0	6	№ 2,4,5

142313	物流管理课程设计 Course Design of Logistics Management	必 C	2 周 2 weeks		2.0	7	№ 2,4,5
142442	管理统计学课程设计	必 C	1 周 1 weeks		1.0	6	№ 2,4,5
142339	运筹学课程设计 Course Design of Operations Research	必 C	1 周 1 weeks		1.0	5	№ 2,4,5
142181	毕业实习 Internship	必 C	4 周 4 weeks		4.0	7	№ 2,3,5,6
142182	毕业论文 Thesis	必 C	12 周 12weeks		12.0	8	№ 2,3,4,5
<b>合 计</b> <b>Total</b>		必 C	29 周 29weeks		29.0		
		选 E	选修课修读最低要求 学分 minimum elective course credits required:				

## 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。

## 5. “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.