统计学

Statistics

专业代码： 071201　　学　制： 4 年

培养目标：

坚持学校培养“品德优秀、基础宽厚、思维创新、能力卓越、专业精深”人才的总目标，培养具有社会主义核心价值观，德智体美劳全面发展，面向国家重大战略需求，适应社会发展和科技进步，掌握含统计学领域扎实基础理论和宽广专业知识，具备数学建模、量化分析、人工智能等学科交叉能力，能胜任高等教育教学、科学技术研究、工程数据建模与优化、金融量化分析等专业技术工作，“三力”（学习力、思想力、行动力）卓越，“三创”（创新、创造、创业）能力突出，具备国际视野和领导意识的行业精英和社会栋梁。毕业以后五年左右：

（1）毕业生能实践社会主义核心价值观，积极应对国家重大战略需求，适应社会发展和科技进步，具备优秀的个人修养与职业道德，并拥有国际视野和领导才能。

（2）毕业生具备扎实的数学基础，掌握统计学的基本思想、基本理论与方法以及相关的计算机技术。

（3）毕业生具有出众的专门领域知识，能够在不同领域中开展基于统计学方法的基础和应用研究，展现出卓越的研究能力。

（4）毕业生能够胜任某一特定领域的专业技术工作，掌握该特定领域相关学科的精深知识，结合统计学学科的思想和方法，创新性地解决领域内的实际问题。

毕业要求：

№1. 品德修养与职业道德：理解并掌握科学的世界观及方法论，具有良好的法律意识、思想品德、职业道德和社会责任感。具有家国情怀和正确的人生观、道德观，能够践行社会主义核心价值观。

№2. 自然科学与人文素养：具备良好的科学文化素养，了解自然科学和社会科学学科的基础知识和前沿知识。

№3. 专业知识与素养：掌握扎实的统计学基础知识和专业领域知识，具有良好的数学思维和统计学素养。

№4. 分析与解决问题：运用统计学专业知识以及计算机技术分析、解决实际问题。

№5. 研究：熟悉高级专业知识，能够基于科学原理并采用科学方法对理论及应用问题进行研究。

№6. 沟通：能够与同行及社会公众进行有效的沟通和交流，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。

№7. 团队合作: 具有较强的团队意识，能够承担团队成员及负责人的角色。

№8. 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。

培养目标 毕业要求	培养目标 1	培养目标 2	培养目标 3	培养目标 4
品德修养与职业道德	●	●	●	●
自然科学与人文素养		●		●
专业知识与素养	●	●		●
分析与解决问题	●	●	●	
研究	●		●	
沟通		●		●
团队合作			●	●
终身学习	●	●	●	

专业简介：

本专业培养具有扎实的数学基本理论、基础知识和基本方法，具备良好的数学思维素质，能综合运用数学知识，数学建模，统计学知识和方法，和计算机技术解决实际问题，并受到科学研究训练的高级专门人才。毕业生能在科技、教育、经济和企业、事业等部门从事研究、教学工作或在生产经营及管理部门从事实际应用、开发研究和管理工作，或能到高等学校或科研机构的应用数学、统计学、计算机科学及其他交叉学科继续攻读研究生学位。

本专业办学条件良好、师资力量雄厚。本专业现有专任教师40人，其中教授16人、副教授18人。有“广东特支计划”百千万工程青年拔尖人才、广东省“南粤优秀教师”、国家海外高层次青年人才等省部级以上人才称号8人。拥有105平方米的图书资料室，共有图书6667册、英文黄皮书1838册。丰富的藏书和网络资源极大地满足了师生的学习工作需要。近年，多次举办国际、国内学术研讨会以及邀请国内外专家400人次来访问讲学，包括菲尔兹奖获得者2人、院士14人。加强国际化交流与合作，推进与加拿大西安大略大学、英国伯明翰大学、英国爱丁堡大学、法国南特大学等大学开展本硕联合培养项目。

专业特色：

本专业着力于培养具有强烈社会责任感、对国家发展建设使命感的高素质人才，注重计算机技术和统计技术的相互融合，培养学生借助统计学知识并运用计算机工具分析数据、解决应用问题的能力，强调统计学人才培养与理、工、农、医、经济管理与人文社会科学等领域，以及由此产生的许多新的交叉学科的相互促进。

授予学位：理学学士学位

核心课程：数学分析、高等代数、解析几何、实变函数、数学模型、概率论、数理统计、回归分析、多元统计分析、时间序列分析、随机过程、Introduction to Statistical Learning and Data Science。

特色课程：

新生研讨课：数学专业导论

专题研讨课：数学模型

双语课程：随机过程、抽象代数

全英课程：Statistics、 Introduction to Statistical Learning and Data Science、The Qualitative Methods and Numerical Simulation for Differential Equations

学科前沿课：微分方程思想方法选讲

跨学科课程：Introduction to Statistical Learning and Data Science

本研共享课：测度论、高等统计

创新实践课：数学模型课程设计（“三个一”课程）

创业教育课：数学模型课程设计（“三个一”课程）

竞教结合课：数学模型、分析与代数选讲

劳动教育课：数学技术实践

一、各类课程学分登记表

1.学分统计表

课程类别	课程要求	学分	学时	备注
公共基础课	必修	39.0	900	
	通识	10.0	160	
专业基础课	必修	70.0	1120	
选修课	选修	21.0	336	
合　计		140.0	2420	
集中实践教学环节	必修	26.0	31 周	
	选修	4.0	4 周	
毕业学分要求	140.0+30.0=170.0 （格式：合计学分+集中实践教学环节学分=毕业学分要求）			

建议每学期修读学分	1	2	3	4	5	6	7	8
	23.5	27	26	24.5	20	21	14	14

备注：学生毕业时须修满专业教学计划规定学分，并取得第二课堂 5 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

学时					学分						
总学时数	其中		其中		总学分数	其中		其中			其中
	必修学时	选修学时	理论教学学时	实验教学学时		必修学分	选修学分	集中实践教学环节学分	理论教学学分	实验教学学分	创新创业教育学分
2420	1924	496	2046	374	170	134	36	30	128.5	11.5	11

注：1.通识课计入选修一项中；

2.实验教学包括“专业教学计划表”中的实验、实习和其它；

3.创新创业教育学分：培养计划中的课程，由各院系教学指导委员会认定，包括竞教结合课程、创新实践课程、创业教育课程等学分；

4.必修学时＋选修学时=总学时数；理论教学学时＋实验教学学时=总学时数；必修学分＋选修学分=总学分数；集中实践教学环节学分＋理论教学学分＋实验教学学分=总学分数。

二、课程设置表

类别	课程代码	课程名称		是否必修	学时数					学分数	开课学期
					总学时	理论	实验	实习	其它		
公共基础课	031101661	思想道德与法治		必修课	40	36			4	2.5	1
	031101761	习近平新时代中国特色社会主义思想概论			48	36			12	3.0	2
	031101371	中国近现代史纲要			40	36			4	2.5	4
	031101424	毛泽东思想和中国特色社会主义理论体系概论			40	36			4	2.5	3
	031101522	马克思主义基本原理			40	36			4	2.5	3
	031101331	形势与政策			64	64				2.0	1-8
	044101382	学术英语（一）	英语 A 班修读		48	48				3.0	1
	044102453	学术英语（二）			48	48				3.0	2
	044103681	大学英语（一）	英语 B、C 班修读		48	48				3.0	1
	044103691	大学英语（二）			48	48				3.0	2
	045101643	大学计算机基础			32	0			32	0.0	1
	052100332	体育（一）			36	0			36	1.0	1
	052100012	体育（二）			36	0			36	1.0	2
	052100842	体育（三）			36	0			36	1.0	3
	052100062	体育（四）			36	0			36	1.0	4
	006100112	军事理论			36	18			18	2.0	2
	045100211	C++程序设计			64	56			8	4.0	2
	041100582	大学物理Ⅰ（一）			48	48				3.0	2
	041101391	大学物理Ⅰ（二）			48	48				3.0	3
	041100671	大学物理实验（一）			32	0	32			1.0	3
	041101051	大学物理实验（二）			32	0	32			1.0	4
		人文科学、社会科学领域		通识课	128	128				8.0	
		科学技术领域			32	32				2.0	
	合　计				1060	766	64		230	49.0	

备注：学时中其它可以为上机和实践学时。

二、课程设置表（续）

类别	课程代码	课程名称	是否必修	学时数					学分数	开课学期
				总学时	理论	实验	实习	其它		
专业基础课	040101591	解析几何	必	48	48				3.0	1
	040100111	高等代数（上）	必	80	80				5.0	1
	040102661	数学专业导论	必	32	32				2.0	1
	040100931	高等代数（下）	必	80	80				5.0	2
	040100282	数学分析（一）	必	80	80				5.0	1
	040100352	数学分析（二）	必	96	96				6.0	2
	040101311	数学分析（三）	必	96	96				6.0	3
	040100081	数据结构	必	64	64				4.0	3
	040100492	概率论	必	64	64				4.0	3
	040100162	数学模型	必	48	48				3.0	4
	040100801	数理统计	必	64	64				4.0	4
	040102712	Introduction to Statistical Learning and Data Science	必	64	64				4.0	4
	040101053	实变函数	必	80	80				5.0	5
	040102481	回归分析	必	48	48				3.0	5
	040100671	多元统计分析	必	64	64				4.0	5
	040102021	时间序列分析	必	48	48				3.0	6
	040101071	随机过程	必	64	64				4.0	6
	合计		必	1120	1120				70.0	
选修课	课程代码	课程名称	是否必修	学时数					学分数	开课学期
				总学时	理论	实验	实习	其它		
	限定选修课程									
	040100131	常微分方程	选	64	64				4.0	3
	040100061	复变函数	选	64	64				4.0	4
	040101131	运筹学	选	64	64				4.0	4
	040100871	数学软件与数学实验	选	48	16			32	2.0	4
	040101061	算法分析与设计	选	64	64				4.0	4
	040101011	数值分析	选	64	64				4.0	4
	040102322	数值优化算法	选	64	64				4.0	5
	040102271	大数据应用	选	32	32				2.0	5
	040102761	投资组合与风险分析	选	48	48				3.0	5
	040101181	泛函分析	选	64	64				4.0	6
	040100442	数理金融	选	48	48				3.0	6
	040100981	计算智能	选	64	64				4.0	6
	合计		选	专业模块选修课修读最低要求 17 分						
	任意选修课程									

	040102671	面向对象程序设计	选	56	40			16	3.0	3
	040100482	离散数学	选	48	48				3.0	3
	040102691	分析与代数选讲	选	32	32				2.0	3
	040101572	Statistics	选	48	48				3.0	4
	040102241	矩阵计算	选	48	48				3.0	4
	040102361	数据库系统	选	64	64				4.0	4
	040101471	组合与图论	选	64	64				4.0	4
	040100121	微分几何	选	64	64				4.0	4
	040102561	贝叶斯统计与知识推理	选	48	48				3.0	5
	040102451	量子信息与量子计算	选	64	64				4.0	5
	040101642	微观经济学	选	64	64				4.0	5
	040100181	微分方程数值解	选	48	48				3.0	5
	040102701	抽象代数	选	80	80				5.0	5
	040102681	拓扑学	选	80	80				5.0	5
	040102282	The Qualitative Methods and Numerical Simulation for Differential Equations	选	64	64				4.0	5
	040101721	初等数论	选	64	64				4.0	5
	040102091	非参数统计	选	32	32				2.0	6
	040102461	蒙特卡罗方法及其应用	选	48	48				3.0	6
	040101032	宏观经济学	选	32	32				2.0	6
	040102751	有限元方法与计算	选	48	48				3.0	6
	040101331	计算机图形学	选	48	48				3.0	6
	040100301	数学物理方程	选	64	64				4.0	6
	040101531	代数学基础	选	64	64				4.0	6
	040102731	计算流体力学	选	48	48				3.0	6
	040102771	非光滑凸优化算法	选	32	32				2.0	6
	040102501	寿险精算	选	48	48				3.0	7
	040102471	微分方程思想方法选讲	选	48	48				3.0	7
	040102741	黎曼曲面与黎曼几何	选	64	64				4.0	7
	040101581	计算机网络	选	48	48				3.0	8
	020100051	创新研究训练	选	32				32	2.0	7
	020100041	创新研究实践 I	选	32				32	2.0	7
	020100031	创新研究实践 II	选	32				32	2.0	7
	020100061	创业实践	选	32				32	2.0	7
	合 计		选	选修课修读最低要求 21 分（含限定选修和任意选修）						

备注：学时中其它可以为上机和实践学时。

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。

三、集中实践教学环节

课 程 代 码	课 程 名 称	是否必修	学 时 数		学分数	开课学期
			实践	授课		
006100151	军事技能	必	2 周		2.0	1
031101551	马克思主义理论与实践	必	2 周		2.0	3
040101521	数据结构课程设计	必	2 周		2.0	3-4
040100841	数学模型课程设计	必	2 周		2.0	4-5
040102581	数学技术实践	必	2 周		2.0	5-6
040102511	回归分析课程设计	必	2 周		2.0	5-6
040100361	面向对象程序设计课程设计	选	2 周		2.0	3-4
040101462	数值分析课程设计	选	3 周		3.0	4-5
040102352	数据库系统课程设计	选	2 周		2.0	4-5
040102711	统计学习与数据科学课程设计	选	3 周		3.0	4-5
040100292	微分方程数值解课程设计	选	2 周		2.0	5-6
040102331	大数据应用课程设计	选	2 周		2.0	5-6
040100973	毕业实习	必	4 周		4.0	8
040100263	毕业设计（论文）	必	15 周		10.0	8
合 计		必	31 周		26.0	
		选	选修课修读最低要求 4.0 学分			

四、课程体系与毕业要求关系矩阵

序号	课程名	专业毕业要求							
		1.	2.	3.	4.	5.	6.	7.	8.
1	思想道德与法治	●	●				●		●
2	习近平新时代中国特色社会主义思想	●	●				●		●
3	中国近现代史纲要	●	●				●		●
4	毛泽东思想和中国特色社会主义理论体系概论	●	●				●		●
5	马克思主义基本原理	●	●				●		●
6	形势与政策	●	●				●		●
7	学术英语（一）						●		●
8	学术英语（二）						●		●
9	大学英语（一）						●		●
10	大学英语（二）						●		●

序号	课程名	专业毕业要求							
		1.	2.	3.	4.	5.	6.	7.	8.
11	大学计算机基础	●			●				●
12	体育（一）	●					●	●	●
13	体育（二）	●					●	●	●
14	体育（三）	●					●	●	●
15	体育（四）	●					●	●	●
16	军事理论	●							●
17	C++程序设计		●	●	●			●	●
18	数据结构			●	●	●			●
19	大学物理I（一）		●						●
20	大学物理I（二）		●						●
21	大学物理实验（一）		●				●	●	●
22	大学物理实验（二）		●				●	●	●
23	数学分析（一）			●		●			●
24	数学分析（二）			●		●			●
25	数学分析（三）			●		●			●
26	解析几何			●		●			●
27	高等代数（上）			●		●			●
28	数学专业导论	●	●			●			●
29	高等代数（下）			●		●			●

序号	课程名	专业毕业要求							
		1.	2.	3.	4.	5.	6.	7.	8.
30	概率论			●		●			●
31	数学模型			●	●				●
32	数理统计			●	●				●
33	Introduction to Statistical Learning and Data Science			●	●				●
34	实变函数			●		●			●
35	回归分析			●	●				●
36	多元统计分析			●	●				●
37	时间序列分析			●	●				●
38	随机过程			●	●				●
39	常微分方程			●		●			●
40	复变函数			●		●			●
41	运筹学			●		●			●
42	数学软件与数学实验				●				●
43	算法分析与设计				●				●
44	数值分析			●	●				●
45	数值优化算法			●	●				●
46	大数据应用			●	●				●
47	泛函分析			●		●			●
48	数理金融			●		●			●
49	计算智能			●	●				●
50	面向对象程序设计			●	●				●
51	离散数学			●		●			●
52	分析与代数选讲			●		●			●
53	Statistics			●	●				●
54	矩阵计算			●	●				●

序号	课程名	专业毕业要求							
		1.	2.	3.	4.	5.	6.	7.	8.
55	数据库系统			●		●			●
56	组合与图论			●		●			●
57	微分几何			●		●			●
58	贝叶斯统计与知识推理			●		●			●
59	量子信息与量子计算			●		●			●
60	微分方程数值解			●	●				●
61	抽象代数			●		●			●
62	拓扑学			●		●			●
63	The Qualitative Methods and Numerical Simulation for Differential Equations			●	●				●
64	初等数论			●		●			●
65	微观经济学		●			●			●
66	非参数统计			●		●			●
67	蒙特卡罗方法及其应用			●		●			●
68	有限元方法与计算			●	●				●
69	计算机图形学			●		●			●
70	数学物理方程			●		●			●
71	宏观经济学		●			●			●
72	代数学基础			●	●				●
73	计算流体力学			●		●			●
74	寿险精算			●	●				●
75	微分方程思想方法选讲			●		●			●
76	黎曼曲面与黎曼几何			●		●			●
77	计算机网络			●		●			●
78	非光滑凸优化算法			●		●			●

序号	课程名	专业毕业要求							
		1.	2.	3.	4.	5.	6.	7.	8.
79	创新研究训练	●	●			●		●	●
80	创新研究实践 I	●	●			●		●	●
81	创新研究实践 II	●	●			●		●	●
82	创业实践	●	●			●		●	●
83	投资组合与风险分析			●		●			●

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 5 个学分。其中，大学体育教学团队开设课外体育课程，高年级本科生必修，72 学时，1 学分，纳入第二课堂人文素质教育学分。大学生心理健康教育，2 学分，虚拟第三学期开设，纳入第二课堂人文素质教育学分。

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、广东省创新创业训练计划、SRP（学生研究计划）、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。

英文版

Statistics

Program Code: 071201　　Duration：4 years

Educational Objectives:

The overall goal is to cultivate talents with excellent moral character, broad and solid foundation, innovative thinking, outstanding abilities, and professional expertise, who possess the core socialist values, all-round development in morality, intelligence, physical fitness, aesthetics, and labor, and who are oriented towards the major strategic needs of the country, adaptable to social development and technological progress, and who have a solid theoretical foundation and broad professional knowledge in the field of statistics, with interdisciplinary abilities in mathematical modeling, quantitative analysis, artificial intelligence, etc., and who are capable of undertaking professional technical work such as higher education teaching, scientific and technological research, engineering data modeling and optimization, financial quantitative analysis, etc. They have outstanding learning, thinking, and action abilities, outstanding innovation, creation, and entrepreneurship abilities, and are industry elites and social pillars with international vision and leadership consciousness. After graduation, for about five years:

（1）Graduates are able to practice the core socialist values, actively respond to the major strategic needs of the country, adapt to social development and technological progress, possess excellent personal cultivation and professional ethics, and have international vision and leadership skills.

（2）Graduates have a solid foundation in mathematics and are proficient in the basic concepts, theories, and methods of statistics, as well as related computer technologies.

（3）Graduates possess outstanding specialized knowledge and are able to conduct fundamental and applied research based on statistics methods in different fields, demonstrating excellent research abilities.

（4）Graduates are able to perform professional technical work in a specific field, master profound knowledge of the relevant disciplines in that field, and creatively solve practical problems in the field by combining the ideas and methods of statistics.

Student Outcomes:

№1. Moral cultivation and professional ethics: Understand and master the scientific worldview and methodology, have a good legal awareness, ideological and moral character, professional ethics, and social responsibility. Have a sense of patriotism and correct views on life and morality, and be able to practice the core socialist values.

№2. Accomplishments in natural science and Humanities: Having good accomplishments in science and cultural literacy. Understand the basic and cutting-edge knowledge of natural science and social science disciplines.

№3. Professional knowledge and accomplishment: Mastering the solid knowledge of mathematics and professional knowledge. Having good mathematical thought and mathematical literacy.

№4. Analysis and problem-solving: An ability to analyze and solve practical problems by using mathematics and professional knowledge and computer technology.

№5. Research: Familiar with the advanced professional knowledge. An ability to conduct investigations of theory and application problems based on scientific theories and adopting scientific methods.

№6. Communication: An ability to communicate effectively with the peers and with society at large, and communicate in cross-cultural contexts with international perspective.

№7. Teamwork: Sense of teamwork and ability to function effectively as a member or leader.

№8. Lifelong Learning: Awareness in independent learning and lifelong learning. Ability to learn and adapt to the development.

Educational Objectives Student Outcomes	**Educational Objectives 1**	**Educational Objectives 2**	**Educational Objectives 3**	**Educational Objectives 4**
Moral cultivation and professional ethics	●	●	●	●
Accomplishments in natural science and Humanities		●		●
Professional knowledge and accomplishment	●	●		●
Analysis and problem-solving	●	●	●	
Research	●		●	
Communication		●		●
Teamwork			●	●
Lifelong Learning	●	●	●	

Program Profile：

This specialty is the National characteristic one and the Guangdong provincial key one. It began to enroll when the Department of Engineering Mathematics was set by South China University of Technology in 1958. It aims at training creative elite personnel who are well developed morally, intellectually and physically, possessing solid academic foundation with high quality and flexible adaptation to new changes

and profound potential capacity, understanding the development trend of the mathematical sciences, using mathematical knowledge (including some statistical methods) and mathematical modeling methods to analyze and solve problems, using computer in problem solving.

Most graduate students will have research training by highly qualified specialists and pursue their future careers in science and technology, education, economic and corporate, business and other departments for research and teaching in research institutes, or in the production and operation and management engaged in practical applications, research and development and management. It also paves way for further study in a mathematical-related professional. It has further engaged in high level scientific research in all areas of mathematics, applied mathematics and cross subjects.

This specialty has good conditions for running schools and a strong faculty. There are 40 full-time teachers, including 16 professors, 18 associate professors and 6 lecturers. There are 8 talents at or above the provincial and ministerial level, such as the “Guangdong Special Support Program” Hundred, Thousand, Ten Thousand Talents Project young talents, the outstanding teachers of Guangdong Nanyue, and the Global and National High-level Talents. There are totally 16 teachers owning provincial and ministerial titles and 13 doctoral supervisors. It has a library of 105 square meters and 6667 books, including 1834 copies of English Yellow Book. Rich collection of books and network resources greatly meet the needs of teachers and students to study and work.

Last five years, we have held many international or domestic academic seminars. We also have invited more than 400 domestic and foreign experts to visit our school, including two Fields prize winners and 14 academicians. We also strengthen the international exchanges and cooperation, including carrying out the joint training program with University of Western Ontario, University of Birmingham, and University of Edinburgh and so on.

Program Features:

The program focuses on the training goal of innovative high-level talents, emphasizes the computer technology and statistical technology, and cultivates students' ability to analyze data and solve application problems with statistical knowledge and using computer tools. It also emphasizes on the mutual promotion of mathematics talent training and local social economy.

Degree Conferred: Bachelor of Natural Science

Core Courses:

Mathematical Analysis、Advanced Algebra、Analytic Geometry、Real Variable Function、Mathematical

Models、Probability Theory、Mathematical Statistics、Regression Analysis、Multivariate Statistical Analysis、Time Series Analysis、 Stochastic Processes、 Introduction to Statistical Learning and Data Science

Featured Courses:

Freshmen Seminars: Introduction to the Mathematics Speciality

Special Topics: Mathematical Models

Bilingual Courses: Stochastic Processes、 Abstract Algebra

Courses Taught in English: Statistics、Introduction to Statistical Learning and Data Science、The Qualitative Methods and Numerical Simulations of Differential Equations

Subject Frontiers Courses: The Qualitative Methods and Numerical Simulation for Differential Equations

Interdisciplinary Courses: Introduction to Statistical Learning and Data Science

Baccalaureate-Master's Sharing Courses: Measure theory、 Advanced Mathematical Statistics

Innovation Practice: Mathematical Models (Course Design)

Entrepreneurship Courses: Mathematical Models (Course Design)

Special Designs: Mathematical Models、 Selected Topics on Analysis and Algebra

Education on The Hard-Working Spirit: Mathematical Technology Practice

1. Registration Form of Curriculum Credits

1.1 Credits Registration Form

Course Category	Requirement	Credits	Academic Hours	Remarks
General Basic Courses	Compulsory	39.0	900	
	General Education	10.0	160	
Specialty Basic Courses	Compulsory	70.0	1120	
Elective Courses	Elective	21.0	336	
Total		140.0	2420	
Practice Training	Compulsory	26.0	31 weeks	
	Elective	4.0	4 weeks	
Credits Required for Graduation	140.0+30.0=170.0			

Suggested Credits for Each Semester	1	2	3	4	5	6	7	8
	23.5	27	26	24.5	20	21	14	14

1.2 Category Registration Form

Academic Hours					Credits						
Total	Include		Include		Total	Include		Include			Include
	Compulsory	Elective	Theory Course	Lab		Compulsory	Elective	Practice-concentrated Training	Theory Course Credits	Lab	Innovation and Entrepreneurship Education
2420	1924	496	2046	374	170	134	36	30	128.5	11.5	11

Remark.

(1) General education courses are included as an elective.

(2) Experimental teaching includes experiments, internships, and others in the "Professional Teaching Plan".

(3) Innovation and entrepreneurship education credits: courses in the training plan are recognized by the teaching guidance committee of each department, including credit courses such as

competition-oriented courses, innovative practice courses, and entrepreneurship education courses.

(4) Required hours + elective hours = total hours; theoretical teaching hours + experimental teaching hours = total hours; required credits + elective credits = total credit hours; concentrated practical teaching credits + theoretical teaching credits + experimental teaching credits = total credit hours.

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
General Basic Courses	031101661	Ethics and Rule of Law	C	40	36			4	2.5	1
	031101761	The Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era		48	36			12	3.0	2
	031101371	Skeleton of Chinese Modern History		40	36			4	2.5	4
	031101424	Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics		40	36			4	2.5	3
	031101522	Fundamentals of Marxism Principle		40	36			4	2.5	3
	031101331	Analysis of the Situation & Policy		64	64				2.0	1-8
	044101382	English for Academic Purposes (1)	for English Class A	48	48				3.0	1
	044102453	English for Academic Purposes (2)		48	48				3.0	2
	044103681	College English (1)	for English Class B、C	48	48				3.0	1
	044103691	College English (2)		48	48				3.0	2
	045101643	Foundations of Computer		32	0			32	0	1
	052100332	Physical Education (1)		36	0			36	1.0	1
	052100012	Physical Education (2)		36	0			36	1.0	2
	052100842	Physical Education (3)		36	0			36	1.0	3
	052100062	Physical Education (4)		36	0			36	1.0	4
	006100112	Military Principle		36	18			18	2.0	2
	045100211	Programming in C++		64	56			8	4.0	2
	041100582	General Physics (1)		48	48				3.0	2
	041101391	General Physics (2)		48	48				3.0	3
	041100671	Physics Experiment (1)		32	0	32			1.0	3
	041101051	Physics Experiment (2)		32	0	32			1.0	4
		Humanities, Social Science	E	128	128				8.0	
		Science and Technology		32	32				2.0	
	Total			1060	766	64		230	49.0	

2. Courses Schedule

Course Category	Course No.	Course Title	C/E	Total Curriculum Hours					Credits	Semester
				Class Hours	Theoretical class hours	Lab Hours	Practice Hours	Other Hours		
Specialty Basic Courses	040101591	Analytic Geometry	C	48	48				3.0	1
	040100111	Advanced Algebra （I）	C	80	80				5.0	1
	040102661	Introduction to Mathematics Speciality	C	32	32				2.0	1
	040100931	Advanced Algebra （II）	C	80	80				5.0	2
	040100282	Mathematical Analysis (1)	C	80	80				5.0	1
	040100352	Mathematical Analysis (2)	C	96	96				6.0	2
	040101311	Mathematical Analysis (3)	C	96	96				6.0	3
	040100081	Data Structure	C	64	64				4.0	3
	040100492	Probability Theory	C	64	64				4.0	3
	040100162	Mathematical Models	C	48	48				3.0	4
	040100801	Mathematical Statistics	C	64	64				4.0	4
	040102712	Introduction to Statistical Learning and Data Science	C	64	64				4.0	4
	040101053	Real Variable Function	C	80	80				5.0	5
	040102481	Regression Analysis	C	48	48				3.0	5

	040100671	Multivariate Statistical Analysis	C	64	64				4.0	5
	040102021	Time Series Analysis	C	48	48				3.0	6
	040101071	Stochastic Processes	C	64	64				4.0	6
	Total		C	1120	1120				70.0	
	Specialty elective courses									
	040100131	Ordinary Differential Equations	E	64	64				4.0	3
	040100061	Functions of a Complex Variable	E	64	64				4.0	4
	040101131	Operational Research	E	64	64				4.0	4
	040100871	Mathematics Software and Mathematics Experiments	E	48	16			32	2.0	4
	040101061	Algorithm Analysis and Design	E	64	64				4.0	4
	040101011	Numerical Analysis	E	64	64				4.0	4
	040102322	Numerical Optimization Algorithms	E	64	64				4.0	5
	040102271	Big Data Application	E	32	32				2.0	5
	040102761	Portfolio and Risk Analysis	E	48	48				3.0	5
	040101181	Functional Analysis	E	64	64				4.0	6
	040100442	Mathematical Finance	E	48	48				3.0	6
	040100981	Computational Intelligence	E	64	64				4.0	6
	Total		E	Minimum specialty elective course credits required:17						
	Arbitrary elective courses									
	040102671	Object-oriented Programming	E	56	40			16	3.0	3
	040100482	Discrete Mathematics	E	48	48				3.0	3
	040102691	Selected Topics on Analysis and Algebra	E	32	32				2.0	3
	040101572	Statistics	E	48	48				3.0	4
	040102241	Matrix Computations	E	48	48				3.0	4
	040102361	Database Systems	E	64	64				4.0	4
	040101471	Combinatorics and Graph Theory	E	64	64				4.0	4
	040100121	Differential Geometry	E	64	64				4.0	4
	040102561	Bayesian Statistics and Knowledge Inference	E	48	48				3.0	5
	040102451	Quantum Information and Quantum Computation	E	64	64				4.0	5
	040101642	Microeconomics	E	64	64				4.0	5
	040100181	Numerical Methods of Differential Equation	E	48	48				3.0	5
	040102701	Abstract Algebra	E	80	80				5.0	5
	040102681	Topology	E	80	80				5.0	5
	040102282	The Qualitative Methods and Numerical Simulation for Differential Equations	E	64	64				4.0	5
	040101721	Elementary Number Theory	E	64	64				4.0	5
	040102091	Nonparametric Statistics	E	32	32				2.0	6

	040102461	Monte Carlo Methods with some Applications	E	48	48				3.0	6
	040101032	Macroeconomics	E	32	32				2.0	6
	040102751	Finite Element Method and Computation	E	48	48				3.0	6
	040101331	Computer Graphics	E	48	48				3.0	6
	040100301	Equations of Mathematical Physics	E	64	64				4.0	6
	040101531	Foundations of Algebra	E	64	64				4.0	6
	040102731	Computational Fluid Dynamics	E	48	48				3.0	6
	040102771	Nonsmooth Convex Optimization Algorithms	E	32	32				2.0	6
	040102501	Actuary of Life Insurance	E	48	48				3.0	7
	040102471	Thoughts and Methods in Differential Equations	E	48	48				3.0	7
	040102741	Riemann Surface and Riemann Geometry	E	64	64				4.0	7
	040101581	Computer Networks	E	48	48				3.0	8
	020100051	Innovation Research Training	E	32					2.0	7
	020100041	Innovation Research Practice I	E	32					2.0	7
	020100031	Innovation Research Practice II	E	32					2.0	7
	020100061	Entrepreneurial Practice	E	32					2.0	7
	Total		E	Minimum total elective course credits required: 21 (including both specialty and arbitrary electives)						

3. Practice-concentrated Training

Course No	Course Title	C/E	Total Curriculum Hours		Credits	Semester
			Practice weeks	Lecture Hours		
006100151	Military Training	C	2 weeks		2.0	1
031101551	Marxism Theory and Practice	C	2 weeks		2.0	3
040101521	Data Structures（Course Design）	C	2 weeks		2.0	3-4
040100841	Mathematical Models （Course Design）	C	2 weeks		2.0	4-5
040102581	Mathematical Technology Practice	C	2 weeks		2.0	5-6
040102511	Regression Analysis（Course Design）	C	2 weeks		2.0	5-6
040100361	Object-oriented Programming（Course Design）	E	2 weeks		2.0	3-4
040101462	Numerical Analysis （Course Design）	E	3 weeks		3.0	4-5
040102352	Application of Database （Course Design）	E	2 weeks		2.0	4-5
040102711	Introduction to Statistical Learning and Data Science（Course Design）	E	3 weeks		3.0	4-5
040100292	Numerical Methods of Differential Equation (Course Project)	E	2 weeks		2.0	5-6
040102331	Big Data Applications (Course Project)	E	2 weeks		2.0	5-6
040100973	Graduation Practice	C	4 weeks		4.0	8
040100263	Graduation Project	C	15 weeks		10.0	8
Total		C	31 weeks		26.0	
		E	Minimum elective course credits required: 4.0			

4.Relation Matrix between Curriculum System and Student Outcomes

Serial No.	Course Title	Major Student Outcomes							
		1.	2.	3.	4.	5.	6.	7.	8.
1	Ethics and Rule of Law	•	•				•		•
2	The Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	•	•				•		•
3	Skeleton of Chinese Modern History	•	•				•		•
4	Thought of Mao ZeDong and Theory of Socialism with Chinese Characteristics	•	•				•		•
5	Fundamentals of Marxism Principle	•	•				•		•
6	Analysis of the Situation & Policy	•	•				•		•
7	English for Academic Purposes (1)						•		•
8	English for Academic Purposes (2)						•		•
9	College English (1)						•		•
10	College English (2)						•		•
11	Foundations of Computer	•			•				•
12	Physical Education (1)	•					•	•	•

13	Physical Education (2)	•					•	•	•
14	Physical Education (3)	•					•	•	•
15	Physical Education (4)	•					•	•	•
16	Military Principle	•							•
17	Programming in C++		•	•	•			•	•
18	Data Structure			•	•	•			•
19	General Physics (1)		•						•
20	General Physics (2)		•						•
21	Physics Experiment (1)		•				•	•	•
22	Physics Experiment (2)		•				•	•	•
23	Mathematical Analysis (1)			•		•			•
24	Mathematical Analysis (2)			•		•			•
25	Mathematical Analysis (3)			•		•			•
26	Analytic Geometry			•		•			•
27	Advanced Algebra （I）			•		•			•
28	Introduction to Mathematics Speciality	•	•			•			•
29	Advanced Algebra （II）			•		•			•
30	Probability Theory			•		•			•
31	Mathematical Models			•	•				•
32	Mathematical Statistics			•	•				•
33	Introduction to Statistical Learning and Data Science			•	•				•
34	Real Variable Function			•		•			•

35	Regression Analysis			•	•				•
36	Multivariate Statistical Analysis			•	•				•
37	Time Series Analysis			•	•				•
38	Stochastic Processes			•	•				•
39	Ordinary Differential Equations			•		•			•
40	Functions of a Complex Variable			•		•			•
41	Operational Research			•		•			•
42	Mathematics Software and Mathematics Experiments				•				•
43	Algorithm Analysis and Design				•				•
44	Numerical Analysis			•	•				•
45	Numerical Optimization Algorithms			•	•				•
46	Big Data Application			•	•				•
47	Functional Analysis			•		•			•
48	Mathematical Finance			•		•			•
49	Computational Intelligence			•	•				•
50	Object-oriented Programming			•	•				•
51	Discrete Mathematics			•		•			•
52	Selected Topics on Analysis and Algebra			•		•			•
53	Statistics			•	•				•
54	Matrix Computations			•	•				•
55	Database Systems			•		•			•
56	Combinatorics and Graph Theory			•		•			•
57	Differential Geometry			•		•			•
58	Bayesian Statistics and Knowledge Inference			•		•			•
59	Quantum Information and Quantum Computation			•		•			•
60	Numerical Methods of Differential Equation			•	•				•

61	Abstract Algebra			•		•			•
62	Topology			•		•			•
63	The Qualitative Methods and Numerical Simulation for Differential Equations			•	•				•
64	Elementary Number Theory			•		•			•
65	Microeconomics		•			•			•
66	Nonparametric Statistics			•		•			•
67	Monte Carlo Methods with some Applications			•		•			•
68	Finite Element Method and Computation			•	•				•
69	Computer Graphics			•		•			•
70	Equations of Mathematical Physics			•		•			•
71	Macroeconomics		•			•			•
72	Foundations of Algebra			•	•				•
73	Computational Fluid Dynamics			•		•			•
74	Actuary of Life Insurance			•	•				•
75	Thoughts and Methods in Differential Equations			•		•			•
76	Riemann Surface and Riemann Geometry			•		•			•
77	Computer Networks			•		•			•
78	Nonsmooth Convex Optimization Algorithms			•		•			•
79	Innovation Research Training	•	•			•		•	•
80	Innovation Research Practice I	•	•			•		•	•
81	Innovation Research Practice II	•	•			•		•	•
82	Entrepreneurial Practice	•	•			•		•	•
83	Portfolio and Risk Analysis			•		•			•

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 five credits. The advanced undergraduates must complete one of courses of Humanities Quality Education which has seventy-two class hours (it's equivalent to one credit which belongs to Humanities Quality Education Credit of Extracurricular Class) offered by the College Physical Education Teaching Group. Mental Health Education for College Students (2 credits) is opened in virtual third semester which belongs to Humanities Quality Education Credit of Extracurricular Class.

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.