

# 医学影像学

## Medical Imaging

专业代码: 100203TK

学制: 5 年

Program Code:100203TK

Duration: 5 years

### 培养目标:

培养具有热爱祖国、热爱人民的高尚品德和为民族振兴、国家富强而奋斗的责任感;具有开拓创新、积极探索的科研精神和爱岗敬业、团结协作的良好作风;具有健全的心理和健康的体魄,掌握本专业基础知识、基本理论、基本技能;掌握疾病的病因、基本病变和临床诊断的基本理论和技能;熟练掌握医学影像检查及介入操作的基本技能,并能运用医学影像诊断技术对常见病多发病做出影像诊断;能独立获取知识、提出问题、分析问题和解决问题;具有医工结合特色和一定科研发展潜力并能适应国家社会发展需要的医学影像诊断本科人才。

### Educational Objectives:

This major intends to train professionals in medical imaging, who have the noble character of loving their country and the people, the sense of responsibility of struggling for national revitalization and prosperity, the spirit of innovation and exploration in scientific research, good behavior with passion for their work and teamwork spirit, a healthy mind and a strong build; who have a good command of the basic knowledge, basic theories and basic skills of this major, as well as the basic theories and related skills of etiology, basic pathological changes and diagnosis of human diseases; who have the ability to master the basic skills of imaging diagnostic and interventional operation with a good proficiency, and make an imaging diagnosis undergraduates of the common diseases with the use of medical imaging diagnostic techniques; who can acquire knowledge, put forward, analyze and solve problems independently; and who have the double-disciplinary background of medicine and engineering, with certain developmental potential of scientific research and the ability to meet the need of social and economic development of the country.

### 毕业要求:

№1.掌握与医学影像学相关的数学、物理学、信息技术、生命科学、行为科学和社会科学等基础知识和科学方法;

№2、掌握生物医学和临床医学的知识和技能,熟悉临床常见病和多发病的病因、发病机理、临床表现、诊断及防治原则;

№3.了解医学影像设备相关的理工科知识;

№4.掌握现代医学影像检查技术的成像原理和图像特点;掌握医学影像分析方法及诊断原则,各系统正常影像学表现,常见疾病的影像解剖、影像病理、影像诊断与鉴别,以及介入治疗等;

№5.熟悉文献和资料检索查询,具有一定的撰写科学论文的能力;

- №6.具有较强的外语应用能力;
- №7.具有较好的人文社科知识和人文素质;
- №8.具有一定的创新精神、创新能力和创业潜能;
- №9.具有终身学习的能力。

### **Student Outcomes:**

- №1.Mastering the basic knowledge and scientific methods of mathematics, physics, information technology, life science, behavioral science and social science related to medical imaging;
- №2.Acquiring the knowledge of biomedicine and clinical medicine, understanding the etiologies, pathological mechanisms, clinical manifestations, diagnosis, preventive and therapeutic principles of common diseases and frequently-occurring diseases;
- №3.Understanding the required knowledge of engineering relevant to medical imaging equipments;
- №4.Familiarity with the imaging principles of modern medical imaging technology, medical image characteristics, methods of imaging observation and analysis as well as diagnostic principles, normal imaging findings of every system, imaging anatomy, imaging pathology, imaging diagnosis and differentiation, intervention and radiation therapy of common diseases, etc;
- №5.The ability of literature and information retrieval as well as scientific papers writing;
- №6.Strong ability of foreign language application;
- №7.Good knowledge in humanities and social science, and perfect humanistic quality;
- №8.Strong innovation spirit, innovation ability and entrepreneurial potential;
- №9. Lifelong learning ability.

### **专业简介:**

医学影像学专业属于医学临床学科门类,旨在培养高层次医学影像诊断人才。本专业由2015年设立并招生,坚持医学精英教育,以高层次培养为办学宗旨,致力于建设成为国内一流、国际知名的特色专业。学院前期投资建设一系列基础医学教学实验室以及大学生创新实验平台,并在基础性、综合性和设计创新性三个层次为该专业学生开展较高水平的实验教学,为学生进入临床实践、培养创新精神、提升综合素质及实践与创业能力提供有力支持。学院目前共设有三家三级甲等附属医院,融合华南理工大学综合性大学门类齐全的学科优势和高水平附属医院临床资源的优势,加强医学与工科的交叉,兼顾基础和临床的融合,培养多类型和国际一流的拔尖创新医学影像学专业人才。

### **Introduction of this major:**

Medical imaging belongs to clinical medical disciplines which aim at training high-level medical imaging diagnosis talents. This major set up in 2015 and has begun its enrollment. This major focused on talents recruitment, and recognized symbolic achievements as evaluation indexes, aiming to found a featured

specialty both as first-class at home and well-known abroad ,The school has invest in a series of basic-medical teaching laboratory and students' innovative experiment platform. Within three levels of basic, comprehensive and innovative design for the students to carry out the higher level of experimental teaching asto provide a strong support of the clinical practice, train innovation spirit and comprehensive quality, practical ability and entrepreneurial ability.The school currently has three 3-A Tertiary affiliated hospitals, Combine withall kinds of disciplines of South China University of Technology University and high level of affiliated hospitals' clinical resource advantages,Strengthen the intersection of engineering and medicine, integrated both basic and clinical education, in order to cultivatemulti-type, international top creative medical imaging professionals.

### **专业特色：**

以培养高层次医学影像诊断人才为目标，突出医工结合特色，坚持精英教育路线，实行高进、优教、严出。理论和基础课程教学主讲教师均为本领域内有较高造诣的国内知名专家，依托大学理工科优势，在课程设置中加入一定的理工科理论和实践课程；临床实践教学依托附属医院，实行学生驻院培养以及基础课教师和临床医生“双导师”培养制。

### **Program Features:**

Aiming at training high-level medical professionals, highlighting the specialty of combination with medicine and engineering, adhering to the route of elite education, and implementing the policy of high entry, high quality education and strict exit. The lecturers of theoretical and basic courses are all professors with high attainment who specialize in these fields .Clinical practice teaching and students training rely on the affiliated comprehensive teaching hospital, and implement "double tutors" system (i.e. the theoretical teachers combined with clinical tutors).

**授予学位：**医学学士学位

**Degree Conferred:** Bachelor of medicine

### **主干课程：**

医学影像物理学、系统解剖学、组织学与胚胎学、生物化学、医学微生物学、医学免疫学、人体寄生虫学、断层解剖学、病理生理学、诊断学、医学影像诊断学、超声诊断学、核医学、介入放射学、临床技能学、临床学课（含内科学、外科学、妇科学、儿科学和神经科学等）。

### **Core Courses:**

Physics of Medical Imaging, systematic anatomy, Histology and Embryology, Biochemistry, Medical Immunology, Human Parasitology, Sectional Anatomy, Pathology, Pathological physiology, Diagnostics, Imaging anatomy, Diagnostics of medical imaging, Ultrasonic Diagnostics, Nuclear Medicine, Interventional Radiology, Clinical Skills, clinical course（including Internal Medicine, Surgery,

Gynaecology, Pediatrics, etc)

### 特色课程:

MOOC: 组织学与胚胎学

医工结合特色课程: 数据库原理与应用、计算机程序设计及在医学图像处理中的应用、Matlab 在数字图像处理中的应用

创新研究实践课程: 机能实验学(三)(课外)

### Featured courses:

MOOC: Histology and Embryology

Combination with medicine and engineering courses: Database principle, Computer program design and application in medical image processing, Matlab application in digital image processing.

Innovation researchpractice:Function Experiment III

### 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 习	综 合 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	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	A	A	B	B	18	2																20					
二	3	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
	4	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
三	5	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
	6	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
四	7	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
	8	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L																	20+8	20					
五	9	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L																	20	20						
	10	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	18	2																20					
		合 计 (周)																			140	15	1	3																		48	199

### 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	33.0	460	
	通识 General Education	10.0	160	
学科基础课	必修	12.5	226	

Disciplinary Basic Courses	Compulsory			
	选修 Elective	7.5	128	
专业领域课 Specialty- related Courses	必修 Compulsory	132.0	2540	
	选修 Elective	2.0	32	
合计 Total		197.0	3546	
集中实践教学环节(周) Practice Training (Weeks)	必修 Compulsory	53.0	53 周	
毕业学分要求 Credits Required for Graduation	197.0+53.0=250.0			

备注：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。

## 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 Compulsory	选修学时 Elective	理论教学学时 Theory Course	实验教学学时 Lab		必修学分 Compulsory	选修学分 Elective	集中实践教学环节学分 Practice-concentrated 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 Entrepreneurship Education
3546	3226	320	2548	998	250	230	20	53	166	31	6

## 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 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 Practical Hours			
General Basic Courses 公共基础课	143091	中国近现代史纲要 Skeleton of Chinese Modern History	必修 C	(32) 24				2.0	1	№7
	143093	思想道德修养与法律基础 Cultivation of Thought and Morals & Fundamental of Law		(40) (36)				2.5	2	№7
	143090	马克思主义基本原理 Fundamentals of Marxism Principle		(40) 36				2.5	3	№7

	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	4	No7
	143094	形势与政策 Analysis of the Situation & Policy		(128)				2.0	2	No7
	144001	大学英语（一） College English(1)		64				4.0	1	No6
	144002	大学英语（二） College English(2)		64				4.0	2	No6
	152001	体育（一） Physical Education (1)		32		32		1.0	1	No8
	152002	体育（二） Physical Education (2)		32		32		1.0	2	No8
	152003	体育（三） Physical Education (3)		32		32		1.0	3	No8
	152004	体育（四） Physical Education (4)		32		32		1.0	4	No8
	106001	军事理论 Military Theories		(16)				1.0	2	No7
	140197	线性代数与解析几何 Linear Algebra and Analytical Geometry		48				3.0	1	No1
	140019	概率论与数理统计 Probability Theory & Mathematical Statistics		48				3.0	10	No1
		人文科学领域 (艺术、音乐、文学等) Humanities (art, music, literature etc.)	通识课 E	96				6.0	2	No8
		社会科学领域 (心理等) Social Science (Psychology etc.)		64				4.0	3	No8
	<b>合 计</b> <b>Total</b>			620			128	43.0		

### 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	实践 Practice			
学科基础 Disciplinary Basic Course	140213	医用高等数学 Medical Advanced Mathematics	必 C	64				4.0	1	No1
	158021	医用物理学 Medical Physics	必 C	44		12		2.5	1	No1
	147115	医学基础化学 Medical Basic Chemistry	必 C	48		16		2.5	1	No1
	147020	有机化学 I Organic Chemistry I	必 C	36				2.0	2	No1

	147007	有机化学实验 I Organic Chemistry Experiment I	必 C	16		16		0.5	2	№1
	158026	医学伦理学 Medical Ethics	必 C	18				1.0	4	№2
	158031	计算机程序设计基础 Programming Fundamentals	选 E	48	16			2.5	2	№3
	158024	数据库原理与应用 Database Principles and Applications	选 E	64	16			3.5	3	№3
	158032	Matlab 在数字图像处理中的应用 Matlab Application in Digital Image Processing	选 E	48	24			2.5	4	№3
	158027	医学科学论文检索与写作 Medical Scientific Paper Searching and Writing	选 E	28		4		1.5	4	№5
	158033	医学专业英语 Medical Professional English	选 E	32				2.0	6	№6
	<b>合 计 Total</b>			必 C	226		44		12.5	
			选 E	选修课修读最低要求 7.5 学分 minimum elective course credits required:7.5						
专业领域课 Specialty-related Courses	158003	临床医学导论 Introduction to Clinical Medicine	必 C	36		4		2.0	1	№2
	158009	医学细胞生物学 Medical Cell biology	必 C	64		24		3.5	2	№2
	158015	系统解剖学 Systematic Anatomy	必 C	140		68		6.5	2	№2
	158008	组织学与胚胎学 Histology and Embryology	必 C	88		44		4.0	3	№2
	158006	生物化学与分子生物学 Biochemistry and Molecular Biology	必 C	92		36		4.5	3	№1
	158007	生理学 Physiology	必 C	64				4.0	3	№2
	158022	机能实验学(一) Function Experiment I	必 C	40		40		1.0	3	№2
	158011	医学微生物学 Medical Microbiology	必 C	48		12		2.5	4	№2
	158010	人体寄生虫学 Human Parasitology	必 C	32		12		1.5	4	№2
	158013	医学免疫学 Medical Immunology	必 C	68		12		4.0	4	№2
	158012	医学遗传学 Medical Genetics	必 C	48				3.0	4	№2
	158002	医学影像物理学 Medical Imaging Physics	必 C	60		28		3.0	4	№4

158016	病理学 Pathology	必 C	112		56		5.5	5	№2
158017	病理生理学 Pathological Physiology	必 C	56				3.5	5	№2
158020	药理学 Pharmacology	必 C	64				4.0	5	№2
158018	医学影像检查技术 Medical Imaging Technology	必 C	60		12		3.5	5	№4
158023	机能实验学(二) Function Experiment II	必 C	56		56		2.0	5	№2
158025	诊断学 Diagnostics	必 C	100		54		4.0	5	№4
158019	断层解剖学 Sectional Anatomy	必 C	56		20		2.5	5	№2
158028	预防医学 Preventive Medicine	必 C	32				2.0	6	№2
158029	医学心理学 Medical Psychology	必 C	32				2.0	6	№2
158034	临床技能学 Clinical Skills	必 C	80		64		3.0	6	№4
158030	神经病学 Neurology	必 C	56		20		2.5	6	№2
158035	内科学 Internal Medicine	必 C	142		48		7.5	6	№2
158036	外科学 Surgery	必 C	124		44		6.5	6	№2
158037	儿科学 Pediatrics	必 C	70		16		3.5	7	№2
158038	妇产科学 Obstetrics and Gynecology	必 C	68		16		3.5	7	№2
158039	医学影像诊断学 Diagnostics of Medical Imaging	必 C	176		32		10.0	7	№4
158040	超声诊断学 Ultrasonic Diagnostics	必 C	80		24		4.5	7	№4
158041	核医学 Nuclear Medicine	必 C	60		16		3.0	7	№4
158042	介入放射学 Interventional Radiology	必 C	60		20		3.0	7	№4
158043	耳鼻喉-头颈外科学 Otorhinolaryngology - Head and Neck Surgery	必 C	30		8		1.5	10	№2
158044	口腔科学 Stomatology	必 C	32				2.0	10	№2



158045	传染病学 Infectious Diseases	必 C	34		2		2.0	10	№2
158046	眼科学 Ophthalmology	必 C	32		2		2.0	10	№2
158047	精神病学 Psychiatry	必 C	26		4		1.5	10	№2
158048	医生患沟通 Doctor-patient Communication	必 C	24				1.5	10	№2
158049	卫生法规 Sanitary Legislation	必 C	18				1.0	10	№2
158050	循证医学与临床研究方法学 Evidence-Based Medicine and Clinical Research Methodology	必 C	40				2.5	10	№2
158051	医用纳米材料 Medical Nanomaterials	必 C	40				2.5	10	№3
120003	创新研究训练 Innovation Research Training	选 E	32				2.0	10	№8, №9
120004	创新研究实践 I Innovation Research Practice I	选 E	32				2.0	10	№8, №9
120005	创新研究实践 II Innovation Research Practice II	选 E	32				2.0	10	№8, №9
120006	创业实践 Entrepreneurial Practice	选 E	32				2.0	10	№8, №9
<b>合 计</b> <b>Total</b>		必 C	2540		794		132.0		
		选 E	选修课修读最低要求 2.0 学分 minimum elective course credits required:2						

备注：所有学生需参与一定的课外科研，并按要求申请 2 个学分专业课。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。

#### 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		学分数 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	3 周		3.0	1	№9
143197	马克思主义理论与实践 Marxism Theory and Practice	必 C	2 周		2.0	假期	№8
158052	临床专业实习 Clinical Internship	必	48 周		48.0	8、9	№4
<b>合 计</b> <b>Total</b>		必 C	53 周		53.0		

备注：临床专业实习为通科实习 48 周，（内科(含神经内科)10 周；外科(含麻醉科)10 周)；放射科 12 周，超声科 4 周；核医学科 2 周；介入科 4 周；选科实习 6 周。

Clinical Internship, among which internship in general departments for 48 weeks [the department of internal medicine(including the department of neurology ) for 10weeks;the department of surgery(including the department of anesthesia) for 10 weeks; the department of radiology for 12

weeks, the department of ultrasound for 4 weeks; the department of nuclear medicine for 2 weeks; the department of intervention for 4 weeks; self-choosing department for 6 weeks ]

## **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 comprise of two parts, Humanities Quality Education and Innovative Ability Cultivation.

### **1.Basic Requirements for Humanities Quality Education**

Besides gaining course credits listed in one’s academic teaching plan, 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 for Innovative Ability Cultivation**

Besides gaining course credits listed in one’s academic teaching plan, a student is required to participate in any 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.