

机械电子工程（留学生）专业培养方案

International Undergraduate Program of Mechatronic

Engineering(International students)

(门类: 工学; 专业类: 机械工程; 专业代码: 080204)

(Category:Engineering; Specialty-category:Mechanical Engineering; Specialty-Code: 080204)

一、专业培养目标 Major Training Objectives

机械电子工程专业涉及机械、电子和控制领域多学科交叉，本专业的培养目标是通过通识教育、专业教学、工程科学教学和工程实践等多个环节，培养机械电子工程领域的高级工程技术人员、优秀研究人员和学者。通过在山东科技大学机械电子工程学院的学习，使学生具有坚实的跨学科工程背景、创新能力以及较强的工程应用能力，培养学生在机械、电子和控制领域的自学、创新、生产组织和管理能力，以支持未来职业发展的需要。

Combined with general education, professional teaching, engineering science education and industrial practice training, the main objectives of Mechatronic Engineering, which is a multidisciplinary undergraduate program (mainly covering the fields of machinery, electronics and control) , aim to cultivate the students' abilities of self-study, innovation, production organization and management so as to support their future career development(e.g., becoming senior engineers and technicians, outstanding researchers and scholars, etc.) due to the solid and interdisciplinary engineering background, the creative inspiration and ability, as well as the strong ability for actual engineering applications.

二、毕业要求 Graduation Requirements

除了一般要求（例如遵守中国政府和山东科技大学相关规定/条例，尊重教师和中国传统/习俗，健康状况等）以外，外国留学生必须具有机械工程、电子控制技术、机电一体化控制技术、计算机技术和信号处理技术领域的知识。在此基础上，还将获得机电一体化产品设计制造，机电一体化设备的监测与控制、企业管理的知识和潜在能力。毕业生应具备以下知识和能力：

1.掌握机械原理、机械设计、机械工程材料、电子技术、机电一体化系统、机电传动控制、液压传动与控制的必要知识，具有绘图、设计、计算、测试和设备操作的基本技能，同时要了解技术标准，相关行业标准和本专业领域的技术发展趋势。

2.具有创新意识，学生应该具有利用所学知识和技术来分析和解决实际工程问题的能力，能够胜任机电产品的设计、开发和生产。

3.除了具有创新和合作精神之外，还要具有管理、表达、人际交往、自主学习等方面的能力。

Besides the general requirements (e.g., abide by the relevant rules/regulations from Chinese government and Shandong University of Science and Technology, respect the faculty and Chinese traditions/customs, be in good health condition, etc.), the students are required to have the knowledge in the field of mechanical engineering, electronic control technology, mechatronic system, computer technology and signal processing technology.

On this basis, the potential ability and knowledge of mechatronic product design and manufacturing, controlling and monitoring of mechatronic equipment and enterprise management shall be acquired. Graduates should have the following knowledge and abilities:

1.Master the necessary knowledge of mechanical principle, mechanical design, engineering materials, electronic technology, mechatronic system, mechanical & electronic transmission control, hydraulic transmission and control, and have the basic skills of drawing, design, calculation, test and device operation. They are also required to understand the technical standard, the relevant industry standards and technology trends in this field.

2. With innovation awareness, the students should have the abilities to analyze and solve the actual engineering problems with knowledge and techniques they have acquired so as to be qualified for the design, development and production of mechatronic products.

3.They are required to have the relative abilities of management, expression, interpersonal communication, self-study with innovative inspiration and collaborative spirit.

三、主干学科 Major Disciplines

机械工程、控制科学与工程

Mechanical Engineering, Control Science and Engineering

四、主要课程 Main Courses

高等数学、大学物理、线性代数、概率论与数理统计、计算机程序设计基础（C语言）、制图基础、机械制图应用、理论力学、材料力学、工程流体力学、电路基础、电子技术、机械原理、机械工程材料、几何量公差、传感器与检测技术、单片机原理及应

用、机械工程控制基础、机械制造技术基础、机械设计、计算机数控系统、可编程控制器、机械电子学、工厂供电、系统仿真技术及其应用、有限元方法、机器人学导论、液压传动与控制、机电传动控制。

Advanced Mathematics, College Physics, Linear Algebra, Probability and Statistics, Foundations of Computer Programming(C Language), Fundamentals of Engineering Drawing, Application of Mechanical Engineering Drawing, Theoretical Mechanics, Material Mechanics, Fundamentals of Electric Circuits, Technology of Electronics, Engineering Fluid Mechanics, Microcontroller, Theory of Machines and Mechanism, Mechanical Design, Fundamentals of Mechanical Manufacturing Technology, Geometric Dimensioning and Tolerancing, Mechanical Engineering Material, Control Technology in Mechanical Engineering, Sensor and Monitoring Technology, Computer Numerical Control(CNC), PLC Technology, Mechanics and Control, Introduction to Mechatronics, Power Supply for Factory, System Simulation and Its Application, Finite Element Method, Introduction to Robotics, Hydraulic Transmission and Control, Electrical Machines and Drive.

五、主要实践性教学环节 Main parts of Practical Teaching and Internship

机械原理课程设计、产品建模与仿真、工程实训、单片机原理及应用课程设计、机械设计课程设计、液压传动与控制课程设计、创新实践、生产实习、毕业设计（论文）。

Course Project for Theory of Machines and Mechanism, Practice of Modeling and Simulation of Product Engineering Training, Course Project of Micro-controller, Course Project of Mechanical Design, Course Project of Hydraulic Transmission and Control, Innovation Practice, Engineering Internship, Graduation Project/Thesis.

六、学制 Program Duration

四年 Four Years

七、授予学位 Degree to Be Awarded

工学学士 Bachelor of Engineering

八、毕业最低学分要求 Minimum Credit Requirements for Graduation

毕业所必须达到的总学分为 160 学分。

The total credits required for graduation are 160.

九、课程体系的构成及学时、学分分配

Program Composition and Distribution of Class Hours&Credits

各学期各类课程额定学分分配表

类别 Type		学期 Semester								合计	学分所占比例 (%)
		1-1	1-2	2-1	2-2	3-1	3-2	4-1	4-2		
通识教育课 General Education Courses	必修 Required	7	5	3	3					18	11.25
学科基础课 Discipline basic Courses	必修 Required	7.5	12	12.5	7	3				42	26.25
专业基础课 Specialty Fundamental Courses	必修 Required			3	10	15	10	14		52	32.25
专业核心课 Specialty Core Courses	必修 Required					3	3			6	3.75
专业拓展课 Specialty Courses	选修 Elective					3	5	4		6	3.75
实践环节 Practice					4	2	6	8	16	36	22.5
额定学分合计 Total Credits		14.5	17	18.5	24	26	24	26	16	160	100

十、指导性教学计划进程安排 Guiding Arrangements

(一) 通识教育课进程表 General Education Course Table

课程类别 Classification	课程类型 Course Type	课程代码 Course Code	课程名称 Course Name	学分 Credits	学时 Class Hours					开课学期 Semester	考核方式 Test Mode	开课单位编号 Course-given Unit No.
					总学时 Total Hours	授课 Class Instruction	实验 Experiment	上机 Computer Practical	实践 Practice			
通识教育课 General Education Courses	通识必修课 Required General Education Courses	212311000203	汉语(4-1) Chinese (4-1)	3	48	48				1-1	考试 Exam	gj
		212311000303	汉语(4-2) Chinese (4-2)	3	48	48				1-2	考试 Exam	gj
		212311000403	汉语(4-3) Chinese (4-3)	3	48	48				2-1	考试 Exam	gj
		212311000503	汉语(4-4) Chinese (4-4)	3	48	48				2-2	考试 Exam	gj
		212311000102	中国概况 Survey of China	2	32	32				1-1	考试 Exam	gj
		211911000102	体育与健康 (2-1) Physical Education and Health(2-1)	2	32	32				1-1	考试 Exam	ty
		211911000202	体育与健康 (2-2) Physical Education and Health(2-2)	2	32	32				1-2	考试 Exam	ty

	通识必修课合计 Total	18	288	288						
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(二) 学科基础课进程表 Discipline Basic Course Table

课程类别 Classification	课程代码 Course Code	课程名称 Course Name	学分 Credits	学时 Class Hours					开课学期 Semester	考核方式 Test Mode	开课单位编号 Course-given Unit No.
				总学时 Total Hours	授课 Class Instruction	实验 Experiment	上机 Computer Practical	实践 Practice			
学科基础课 Discipline Basic Courses	210866000105	高等数学(2-1) Advanced Mathematics (2-1)	5	80	80				1-1	考试 Exam	sx
	210866000205	高等数学(2-2) Advanced Mathematics (2-2)	5	80	80				1-2	考试 Exam	sx
	210866000303	线性代数 Linear Algebra	2.5	40	40				2-1	考试 Exam	sx
	210866000403	概率论与数理统计 Probability and Statistics	3	48	48				2-2	考试 Exam	sx
	211166000104	大学物理(2-1) College Physics (2-1)	4	64	64				1-2	考试 Exam	dx
	211166000204	大学物理(2-2) College Physics (2-2)	4	64	64				2-1	考试 Exam	dx
	211411400103	计算机程序设计基础(C语言) Fundamentals of Computer Programming(C Language)	3	48	26		22		2-1	考试 Exam	jt
	211011400103	机械制图(1) Mechanical Engineering Drawing	2.5	40	40				1-1	考试 Exam	zd
	211011400303	机械制图(2) Mechanical Engineering Drawing	3	48	42		6		1-2	考试 Exam	zd
	210111000803	理论力学 Theoretical Mechanics	3	48	48				2-1	考试 Exam	ny
	210111000904	材料力学 Mechanics of Materials	4	64	60	4			2-2	考试 Exam	ny
	210611400603	工程流体力学 Engineering Fluid Mechanics	3	48	44	4			3-1	考试 Exam	jd
	学科基础课合计 Total of Discipline Basic Courses			42	672	638	8	28			

(三) 专业必修课进程表 Required specialty Course Table

课程类别 Classification	课程类型 Course Type	课程代码 Course Code	课程名称 Course Name	学分 Credits	学时 Class Hours					开课学期 Semester	考核方式 Test Mode	开课单位编号 Course-given Unit No.
					总学时 Total Hours	授课 Class Instruction	实验 Experiment	上机 Computer Practical	实践 Practice			
专业必修课 Required specialty Courses	专业基础课 Specialty Basic Courses	210621400703	电路基础 Fundamentals of Electric Circuits	3	48	42	6			2-1	考试 Exam	jd
		210621400804	电子技术 Technology of Electronics	4	64	56	8			2-2	考试 Exam	jd
		210621400904	机械原理 Theory of Machines and Mechanism	4	64	58	6			2-2	考试 Exam	jd
		210621401002	工程材料与热加工工艺 Engineering materials and	2	32	30	2			2-2	考试 Exam	jd

			thermal processing									
		210621401102	几何量公差 Geometric Dimensioning and Tolerancing	2	32	28	4			3-1	考试 Exam	jd
		210621401203	传感器与检测技术 Sensor and Detecting Technology	3	48	42	6			3-1	考试 Exam	jd
		210621401303	单片机原理及应用 Microcontroller	3	48	42	6			3-1	考试 Exam	jd
		210621401403	机械工程控制基础 Control Technology in Mechanical Engineering	3	48	46		2		3-1	考试 Exam	jd
		210621401504	机械制造技术基础 Fundamentals of Mechanical Manufacturing Technology	4	64	60	4			3-1	考试 Exam	jd
		210621401605	机械设计 Mechanical Design	5	80	74	6			3-2	考试 Exam	jd
		210621401703	计算机数控系统 Computer Numerical Control (CNC)	3	48	42		6		3-2	考试 Exam	jd
		210621401802	可编程控制器 PLC Technology	2	32	26	6			3-2	考试 Exam	jd
		210621401903	机械电子学 Introduction to Mechatronics	3	48	42	6			4-1	考试 Exam	jd
		210621402003	工厂供电 Power Supply for Factory	3	48	44	4			4-1	考试 Exam	jd
		210621402103	系统仿真技术及其 应用 System Simulation and Its Application	3	48	44	4			4-1	考试 Exam	jd
		210621402203	有限元方法 Finite Element Method	3	48	32		16		4-1	考试 Exam	jd
		210621402302	机器人学导论 Introduction to Robotics: Mechanics and Control	2	32	32				4-1	考试 Exam	jd
			合计 Total	52	832	740	68	24				
	专业核心课 Specialty Core Courses	210621402403	液压传动与控制 Hydraulic Transmission and Control	3	48	42	6			3-2	考试 Exam	jd
		210621402503	机电传动控制 Electrical Machines and Drive	3	48	44	4			3-1	考试 Exam	jd
			合计 Total	6	96	86	10					
	专业必修课合计 Total of Required specialty Courses			58	928	826	78	24				

(四) 专业拓展 (选修) 课进程表 Specialty Extension (Elective) Course Table

课程代码 Course Code	课程名称 Course Name	学分 Credits	学时 Class Hours					开课学期 Semester	考核方式 Test Mode	开课单位编号 Course-given Unit No.
			总学时 Total Hours	授课 Class Instruction	实验 Experiment	上机 Computer Practical	实践 Practice			
210622402601	MATLAB 基础 Introduction to MATLAB	1	16	8		8		3-1	考试 Exam	jd
210922402702	工程经济学 Engineering Economics	2	32	32				3-1	考试 Exam	jd
210622402803	数字化设计 Digital Design	3	48	48				3-2	考试 Exam	jd
210722402902	设备故障诊断基础 Diagnosis Technology of Equipment	2	32	28	4			3-2	考试 Exam	jd
210622403002	数控自动编程 Automatic CNC Programming	2	32	32				4-1	考查 Test	jd
210622403102	智能设备监控系统 Intelligent Monitoring for Equipment	2	32	16	16			4-1	考查 Test	jd
	专业拓展课合计 Total of Specialty Extension (Elective) Course	12	192	164	20	8				

要求毕业前必须从上表 12 学分的选修课中至少修满 6 学分。

Six of the twelve elective credits shown in the above table are required before graduation.

(五) 实践环节进程表 (不包含非独立课内实验)

Internship and Practical Training Table (Non-independent course experiments are not included)

课程代码 Course Code	课程名称 Course name	学分 Credits	学时 Hours	周数 Weeks	开课学期 Semester	教学形式 Teaching form		开课单位编号 Course-given Unit No.
						集中 Grouped	分散 Individual	
210631403202	机械原理课程设计 Course Project for Theory of Machines and Mechanism	2		2	2-2	集中 Grouped		jd
310531000302	工程实训 (C) Engineering Training	2		2	2-2	集中 Grouped		gc
210631403402	单片机原理及应用课程设计 Course Project of Microcontroller	2		2	3-1	集中 Grouped		jd
210631403501	产品建模与仿真 Practice of Modeling and Simulation of Product	1		1	3-2	集中 Grouped		jd
210631403603	机械设计课程设计 Course Project of Mechanical Design	3		3	3-2	集中 Grouped		jd
210631403702	液压传动与控制课程设计 Course Project of Hydraulic Transmission and Control	2		2	3-2	集中 Grouped		jd
210631403802	创新实践 Innovation Practice (Robot Design)	4		4	4-1		分散 Individual	jd
210631403904	生产实习 Engineering Internship	4		4	4-1	集中 Grouped		jd
210631404016	毕业设计 (论文) Graduation Project/Thesis	16		16	4-2		分散 Individual	jd
合计 Total		36		36				

专业负责人 (签字) :

教学院长 (签字) :

本科培养方案修订工作领导小组组长 (签字) :

年月日