

机械工程专业 2017 版本本科培养方案

Undergraduate Education Plan for Specialty in Mechanical Engineering (2017)

专业名称	机械工程	主干学科	机械工程
Major	Mechanical Engineering	Major Disciplines	Mechanical Engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Mechanical Engineering
所属大类	机械类（机电）	大类培养年限	1 年
Disciplinary	Mechanical(Electromechanical)	Mechanical	1 year
		Duration	

最低毕业学分规定

Graduation Credit Criteria

课程分类 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践教学环节 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	65	/	31	/	170
选修课 Elective Courses	9	20	6	/	10	

一、培养目标与毕业要求

I Educational Objectives & Requirement

(一) 培养目标

本专业培养掌握机械工程专业领域的基础理论与专业知识，能在机械设计、机械制造和机电控制等领域从事设计制造、研究开发、应用与管理等工作的高级专业技术人才。学生毕业 5 年后能够达到：

- (1) 具有科学精神与创新意识、国际化交流与竞争意识、人文科学素养、职业道德和社会责任感；
- (2) 具备机械工程领域内设计制造的基础理论和专门知识，能从事机械工程领域内的设计制造、科研开发、应用研究和运行管理等工作；
- (3) 具备知识应用、工程实践、组织管理、团队合作以及自主学习和适应发展的能力；
- (4) 具备较强的工程实践能力与持续学习能力；
- (5) 能通过继续教育和自我发展，成为所从事工作领域中的骨干或领导者。

This major aims at training high-ranking specialists, which would have the basic theoretical and specialized knowledge. They would specialize on the design, manufacturing, research, development, application and management in the realms of mechanical design, mechanical manufacturing and electromechanical control. 5 years after graduation, they would achieve the following knowledge and abilities:

- (1) The graduates should have the sense of innovation, international cooperation, humanistic quality, professional ethics and responsibility for society;
- (2) The graduates should master the fundamental theories about the design and manufacture of mechanical engineering and some specialized knowledge, and should be qualified in

designing and manufacture, scientific and technological development, research for application and operational management.

- (3) The graduates should have the capabilities to apply theory, practice in projects, organize and manage and the abilities to self-study and get adapt to new development ;
- (4) The graduates should have strong engineering practice ability and continuous learning ability
- (5) The graduates should be able to grow to senior engineering and technical personnel or senior management personnel through continuing education and self-development.

(二) 毕业要求

- (1) 工程知识：能够将数学和自然科学，以及机械工程基础理论和专业知识，用于解决机械工程领域的复杂工程问题。
 - (2) 问题分析：能够应用数学、自然科学和机械工程科学的基本原理，识别、表达、并通过文献研究分析机械工程领域的复杂工程问题，以获得有效结论。
 - (3) 设计/开发解决方案：能够设计针对机械工程领域复杂工程问题的解决方案，设计满足特定需求的机械/控制系统或工艺流程，并能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：能够基于科学原理和机械工程专业知识，采用科学方法对机械工程领域复杂工程问题中的机械、控制、电气、液压、制造工艺等进行研究，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：能够针对机械工程领域的复杂工程问题，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，包括对复杂工程问题进行建模、数值模拟和分析，并能够理解其局限性。
 - (6) 工程与社会：能够基于工程相关背景知识进行合理分析，评价专业工程实践和复杂工程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工程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：能够就机械工程领域的复杂工程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，能采取有效的项目行动，持续改善工程实践，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。
- (1) Engineering Knowledge: The graduates should apply the mathematical and physical sciences, natural science and basic theory and professional knowledge of mechanical engineering, to solve the complicated engineering problem of mechanical engineering;
 - (2) Problem Analysis: The graduates should analyze and establish the mathematical physics model which can be applied to the complicated engineering problem of mechanical engineering.
 - (3) Developing Solution: The graduates should apply the basic theories and methods of the complicated engineering problem of mechanical engineering, design mechanical systems and manufacturing processes to meet specific needs, develop solutions, and reflect the

- sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors;
- (4) Study: The graduates should have preliminary ability of design, analysis and research of the complex mechanical engineering machinery, control, electrical, hydraulic, manufacturing process, and can give the effective analysis and evaluation;
 - (5) Using Modern Tools: The graduates should have the ability to use modern tools, to obtain, understand and identify all kinds of information, and to solve the complicated engineering problem of mechanical engineering;
 - (6) Engineering and Society: The graduates should have the ability to access and use the related policy, policies, laws and regulations ability of mechanical engineering, with considering the society, health, safety, law and culture influence under complex engineering problem analysis ability;
 - (7) Environmental Protection and Sustainable Development: The graduates should understand and aware the relationship between mechanical engineering professional and social development, environment protection and social sustainable development, and have the ability to analyze the impaction between environmental and social of the complicated engineering problem of mechanical engineering;
 - (8) Professional Norms: The graduates should have good quality of humanities and social sciences, strong sense of responsibility for society and proper engineering profession ethics;
 - (9) Individuals and Teams: The graduates should be able to do their own role in the team, to communicate effectively with other members of the team, to listen to opinions or suggestions and to make a reasonable response;
 - (10) Communication: The graduates should have the ability to describe complex engineering problems in the field of mechanical engineering, with the ability to communicate effectively with the community and the public, and to cross cultural communication and exchange;
 - (11) Project Management: The graduates should have the basic project management skills, and be able to take effective project action, continuous improvement of engineering practice;
 - (12) Lifelong Learning: The graduates should be able to adapt to social development and can study in a lifelong term.

附：培养目标实现矩阵

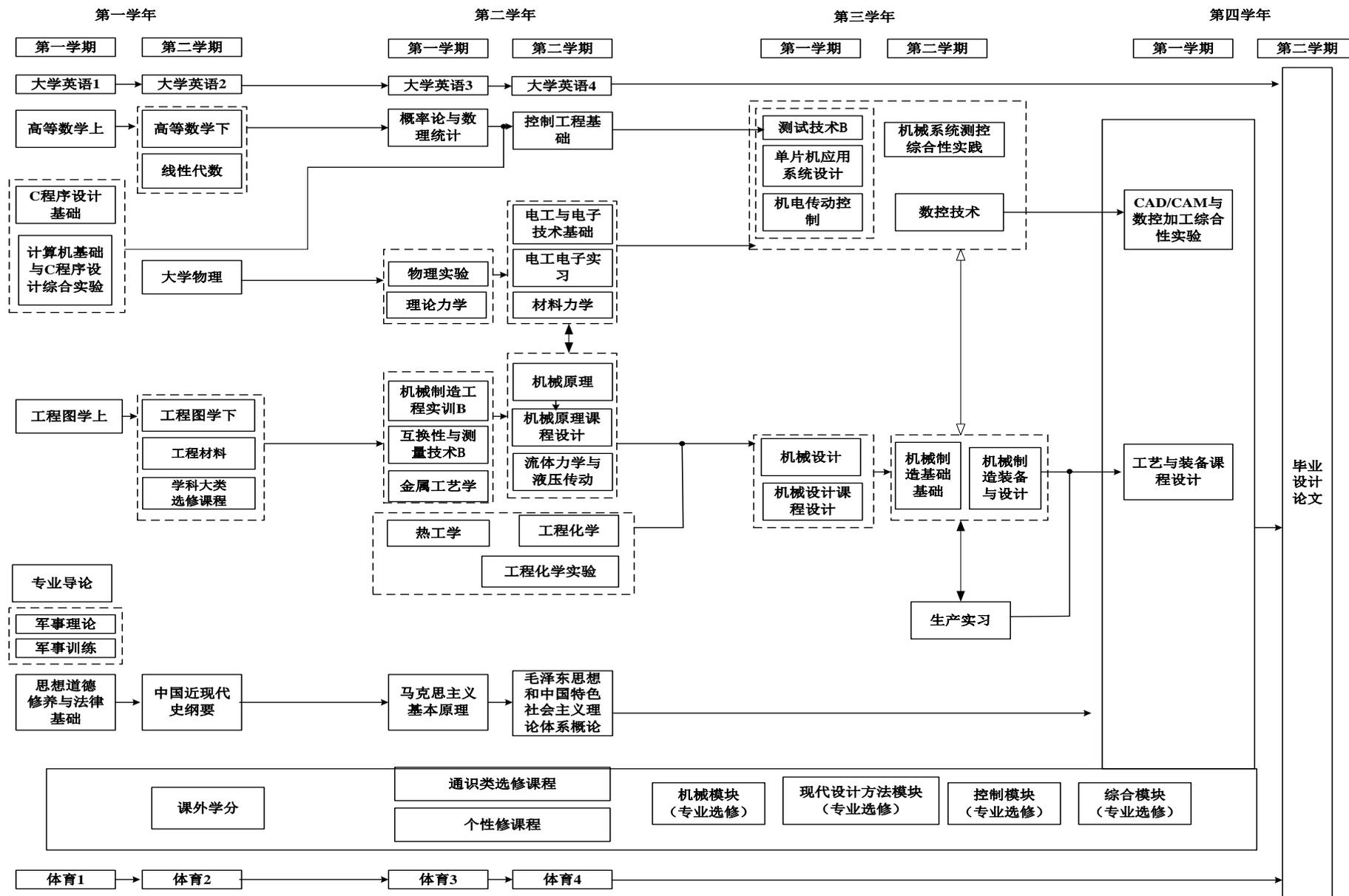
	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
毕业要求 1		√		√	√
毕业要求 2		√		√	√
毕业要求 3	√			√	√
毕业要求 4		√		√	√
毕业要求 5		√			√
毕业要求 6	√	√	√		
毕业要求 7	√	√		√	
毕业要求 8	√		√		√
毕业要求 9			√		√
毕业要求 10	√		√	√	
毕业要求 11			√		√

核心课程	专业特色课程	课程名称	机械工程专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		物理实验 B	√											
		普通化学	√											
		普通化学实验	√											
		工程图学 A (上、下)	√	√			√							
		工程材料	√			√							√	
		互换性与测量技术	√	√		√								
		机械制造工程实训 B	√		√			√		√	√			√
		电工与电子技术基础 B	√											
		电工电子实习 B					√							
		理论力学 A	√											
		金属工艺学 B	√											√
		机械原理	√	√										
		机械原理课程设计			√							√		
√		流体力学与液压传动		√		√								
		材料力学 C	√											
√		机械设计	√	√			√							
		机械设计课程设计			√			√						
		热工基础	√	√										
√		控制工程基础 A	√	√			√							
	√	单片机应用系统设计				√	√							√
	√	机电系统测控综合性实践			√	√	√				√		√	
√		机械制造技术基础 A	√	√		√	√							
	√	工艺与装备课程设计	√	√	√		√		√			√	√	
√		机电传动控制 B		√		√								
√		测试技术 B				√	√							

核心 课程	专业 特色 课程	课程名称	机械工程专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		生产实习						√	√	√	√	√		√
√		数控技术 B				√	√							√
	√	CAD/CAM 及数控加工技术综合 实践					√	√	√		√		√	√
	√	机械制造装备与设计	√	√		√								
		毕业设计（论文）			√	√	√	√	√	√		√	√	√

三、课程教学进程图

III Teaching Process Map



四、理论教学建议进程表

IV Theory Course Schedule

课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					2	
4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		4	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		3	
1060003130	军事理论 Military Theory	1	32				16	1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 C Language Programming	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Foundations of Computer and C Language Programming Experiments	1	32	32				1	
小 计 Subtotal		29	640	32	0	48	64		

课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses			要求至少取得 9 个学分，在每个模块中均须至少选择一门，其中艺术体育类课程中的艺术类相关课程要求取得至少 2 个学分。 All students are required to obtain at least 9 credits, which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from every category.						
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
(三) 专业教育必修课程 Basic Disciplinary Required Courses									
4050229110	线性代数 Linear Algebra	2.5	40					1	
4050063110	高等数学 A 上 Advanced Mathematics 1	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics 2	5	80					2	
4080371170	工程图学 A 上 Engineering Graphics I	3	56				8	1	
4080372170	工程图学 A 下 Engineering Graphics II	2.5	56				16	2	
4080034110	工程材料 A Engineering Material	2.5	40	4				2	
4050463130	大学物理 B Physics	5	80					2	
4050224110	物理实验 B Physics Lab.	1	32	32				3	
4080367170	金属工艺学 B Engineering Material	2	32	2				3	
4080054110	互换性与测量技术 B Interchangeability and Measurement	2	32	4				3	
4050129110	理论力学 A Theoretical Mechanics	4.5	72					3	
4090330170	热工学 A Heat and Thermodynamics	2	32					3	
4050058110	概率论与数理统计 B Probability and Mathematics Statistic	3	48					3	

课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4200375170	工程化学实验 Engineering Chemistry Experiment	0.5	16	16				4	
4100012110	电工与电子技术基础 C Fundamentals of electrical and electronic technology	4	64	10				4	
4050018110	材料力学 C Mechanics of Materials	4	64	4				4	
4080062110	机械原理 Principle of Mechanics	3.5	56	4				4	
4080423170	控制工程基础 A Basis of Control Engineering	2	32	4				4	
4080424170	流体力学与液压传动 B Fluid Mechanics and Hydraulic	2	32	4				4	
4080338140	单片机应用系统设计 B Micro-Controller Unit Application System Design	3	48	6				5	
4080064110	机械制造技术基础 A Fundamentals of Mechanical Manufacturing Technology	4	64	6				6	
4080425170	数控技术 B Numerical Control Technique	2	32	2				6	
小 计 Subtotal		65	1088	98	0	0	24		
(四) 专业教育选修课程 Specialized Elective Courses									
机械模块 《机械设计》、《机械制造装备设计》为必选课程，其他课程三选一									
4080390170	机械设计 Mechanical Designing	3.5	56	4				5	
4080426170	机械制造装备设计 Machine Equipment Design	2	32					6	
4080202120	工业机器人 Industry Robot	2	32					5	
4080088110	模具设计与制造 B Mould Design and Manufacture	2	32					7	
4080080110	精密加工与特种加工 Technology of Special Machining and Precision Machining	2	32					7	
控制模块 《机电传动控制》为必选课程，其他课程三选一									
4080198110	机电传动控制 B Transmission and Control of Electric Machine	2	32	4				5	

课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4080427170	传感器原理及应用 A Fundamentals & Application of Sensors	2	32	4				5	
4120067110	物联网工程概论 Internet of Things	2	32					7	
4080083110	可编程控制器原理及应用 B Fundamentals & Application of Programmable Logic Controller B	2	32	4				7	
现代方法应用模块 《测试技术》为必选课程，其他课程三选一									
4080428170	测试技术 C Measuring & Testing Technology	2	32	4				5	
4080429170	计算机仿真 B Computer Simulation	2	32		4			5	
4080110110	现代设计技术 Modern Design Technology	2	32					5	
4080058110	机械 CAD/CAM Machinery CAD/CAM	2	32		6			7	
综合模块 《机械工程专业创新创业导论》、《工程化学》为必选课程，其他课程三选一									
4080430170	机械工程专业创新创业导论 Introduction of Innovation and Entrepreneurship of Mechanical Engineering	1	16					3	
4200374170	工程化学 Engineering Chemistry	1.5	24					4	
4080057110	机电一体化系统设计 B Mechatronics System Design	2	32					7	
4080048110	工艺过程自动化 Process Automation	2	32					7	
4170075110	技术经济及企业管理 A Economic Theory and Enterprise Management	2	32					7	
小 计 Subtotal		26.5	424	16	10	0	0		
修读说明：要求至少选修 20 学分。 NOTE: Minimum subtotal credits:20.									
(五) 个性课程 Personalized Elective Courses									
4080284130	振动与噪声基础 Fundamentals of Vibration and Noise	2	32			16		6	
4080431170	现代制造技术 Advanced Manufacturing Technology	2	32	10				6	

课程编号 Course Number	课程名称 Course Title	学分 CrS	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur		
4080432170	先进制造工艺技术及其装备 AMT and its Equipment	2	32					6	
4080433170	制造企业数字化管理技术及应用 Digital Management and its Application of Manufacturing Enterprise	2	32					6	
小 计 Subtotal		8	128	10	0	16	0		

修读说明：1) 个性课程累计修学不少于 6 学分；2) 从以上推荐课程仅可选修 2 学分；3) 从学校发布的其它个性课程目录中选课至少 4 个学分；
NOTE:1) Minimum subtotal credits 6; 2) Students can select courses from above and get 2 credits; 3) students can select courses from the other personalized courses in catalog, and are required to obtain at least 4 credits.

五、集中性实践教学环节

V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 CrS	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4080150110	机械制造工程实训 B Machinery Manufacturing Engineering Practice	4	4	3
4100069110	电工电子实习 B Practice in Electrical Engineering & Electronics	1	1	4
4080149110	机械原理课程设计 Curricula Design of Mechanical Principles	1.5	1.5	4
4080147110	机械设计课程设计 Course Practice of Machinery Design	3	3	5
4080434170	机械工程专业生产实习 Production Practice	2	2	6
4080435170	机电系统测控综合性实践 Practice of Mechanical and Electronic System	3	3	6
4080436170	工艺与装备课程设计 Course Practice of processing and equipment	3	3	7
4080122110	CAD/CAM 及数控加工技术综合实践 A Practice of CAD/CAM and NC Machining	2	2	7
4080437170	毕业设计 Graduation Design	10	17	8
小 计 Subtotal		31	39.5	

六、其它要求

VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：胡 剑
专业培养方案责任人：李益兵