

武汉理工大学能源与动力工程学院

School of Energy & Power Engineering of  
Wuhan University of Technology

# 2015 版本本科培养方案

Undergraduate Education Plan (2015)

武汉理工大学教务处

Academic Affairs Office of Wuhan University of Technology

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# 【能源与动力工程（船舶）专业】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Energy & Power Engineering (2015)

专业名称	能源与动力工程(船舶)	主干学科	船舶与海洋工程
Major	Energy & Power Engineering	Major Disciplines	Marine and ocean engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	37.5	42.5	\	30	\	190
选修课 Elective Courses	9	6	10	10	\	10	

将“能源与动力工程（船舶）”作为第二专业的学生必须修满 48 学分的课程（表格最右列带\*），外加 20.5 学分的实践性教学环节，共修满 68.5 学分，方可获得学位。

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### （一）培养目标

- （1）具有良好的人文社会科学理论知识和素养，较扎实地掌握自然科学基础理论知识；身心健康，具备良好的敬业精神和、社会责任感和工程职业道德；关注当代全球和社会中的能源危机和环境污染等问题；具有环境保护意识、能源安全意识、质量意识、产品安全和安全生产意识。
- （2）具有从事能源与动力工程领域科学研究、工程设计和技术服务等工作所需的数理知识和其它相关自然科学知识，并能将数学和科学工具运用于解决工程问题。
- （3）具有综合运用能源与动力工程领域的专业理论知识，具备动手操作的工程实践能力，能够解决能源与动力工程（系统）在使用与管理、测试与分析、设计与开发、制造与检测等方面的工程技术问题。
- （4）具有应用各种技术手段查询资料、获取信息的能力；具有应用语言、文字、图形等进行工程技术表达和交流的能力；掌握一门外国语以及计算机应用的基本能力。
- （5）具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### （一）Educational Objectives

- （1）Has the good humanities and social science literacy, basic science theory knowledge, good professional ethics, a good sense of social responsibility and the engineering professional ethics; be healthy in physical and psychological, Pay attention to the energy crisis and environmental pollution, etc.; has the consciousness of environmental protection, energy security, quality, product safety and production safety.

- (2) Has the mathematical and physical science knowledge in energy and power engineering researching, engineering designing, technical services field, can solve the engineering problem by using the tool of Mathematics and science.
- (3) Has the ability of using energy and power engineering field professional theoretical knowledge synthetically, doing engineering practice, solving the project technical issues about energy and power engineering (systems) in the management, testing and analysis, design and development, manufacturing and other testing aspects.
- (4) Possess the basic ability to use a variety of techniques seek information, express and exchange engineering technology by using language, text, graphics ,use a foreign language and basic computer skills.
- (5) Get skills of good oral and written expression and communication, good team spirit and cooperation and lifelong learning.

## **(二) 毕业要求**

- (1) 学生掌握从事本专业领域所需的数学、物理等相关自然科学和管理知识。
- (2) 学生掌握本专业的基本理论知识和工程基础知识，能够利用原理性知识进行自主发现、自主设计和自主解决与能源与动力工程（系统）相关的科学问题和工程问题。
- (3) 学生掌握能源与动力工程领域的设计和开发平台，能理解动力（装置）系统的设计、制造、安装、维修和检验的方法和步骤。
- (4) 学生掌握典型内燃机工作过程的规律与原理、与工程过程相关的性能分析，以及影响性能各因素和参数的优选、匹配原理和方法；能够掌握提高内燃机动力性、经济性、排放性能以及可靠性的方法和途径。
- (5) 学生能够理解内燃机污染物的生成机理，掌握其控制方法与途径；掌握内燃机状态监测、故障诊断与电子控制技术。
- (6) 学生具备有关电子电路、信号处理和自动控制系统的基础应用知识。
- (7) 学生具备有效进行实验和模拟仿真设计与操作的能力，并能够对实验结果进行分析和解释。
- (8) 学生了解本专业的发展动态和前沿，熟悉能源与动力工程领域的最新开发工具种类和发展方向。
- (9) 学生具有良好的思想素质、身体素质、心理素质、文化修养、社会道德和责任担当等人文素养。
- (10) 学生了解当代全球问题和社会问题，在工程设计中综合考虑经济、环境、法律、安全和伦理等制约因素。
- (11) 学生具有逻辑思维和辩证思维的能力，具有批判意识和求真务实的科学思维方法，具有创新意识，掌握基本的创新方法。
- (12) 学生掌握运用现代信息技术跟踪并获取信息的方法，熟练进行文献检索和资料查询。
- (13) 学生具有良好的口头和书面表达和交流能力，至少熟练掌握一门外语进行技术交流沟通和翻译能力。具有良好的团队意识和合作精神。
- (14) 学生能够胜任本专业入门级的职业岗位，具备研究生课程学习所需的认知和基础能力。
- (15) 学生具有进行终身学习的愿望和能力，具有适应能源、动力技术不断发展的能力。

## **(二)Educational Requirement**

- (1) Master in the relevant science and management knowledge in the professional fields of mathematics, physics, etc.
- (2) Be able to discover, design and solve Energy and Power Engineering (Systems) related

scientific problems and engineering problems independently by using the basic theoretical knowledge and professional engineering basics.

- (3) Master the design and development platform, design methods and the power (device) system design, Manufacture, installation, maintenance and inspection steps in the field of energy and power engineering field.
- (4) Master the principles of the internal combustion engine working process, performance analysis about engineering process-related performance analysis, the matching principles of the factors affecting performance, and the method of improving the power, emission performance, and the reliability of engine.
- (5) Understand the formation mechanism of the internal combustion engine pollutants, control methods and approaches, and the internal combustion engine condition monitoring, fault diagnosis and electronic control technology.
- (6) Have basic knowledge about the application of electronic circuits, signal processing and automatic control system.
- (7) Be able to effectively carry out the experiment, simulation design and operation, and analyze the experimental results.
- (8) Can understand the development of dynamic and frontier of the professional, and the latest development of tool types and development direction of energy and power engineering field.
- (9) Have the good thought quality, physical quality, psychological quality, culture, morality and social responsibility and other humanistic literacy.
- (10) Acknowledge global problems and social problems on present, economic, environment, law, security and ethics factors should be considered in the design of engineering.
- (11) Have ability of logical thinking and dialectical thinking, with scientific thinking method of critical consciousness and pragmatic, and also have innovative consciousness, the basic creative way should be mastered.
- (12) Master the use of methods of modern information technology to track and acquire information, skilled document retrieval and data query.
- (13) With good oral and written expression and communication skills, master at least a foreign language for technical communication and translation. Has a good sense of team spirit and cooperation.
- (14) Qualified for the occupation entry level of their own domain, with ability of cognitive and basic course of post graduate study required.
- (15) Have the desire and ability for lifelong learning, has the ability to adapt to the continuous development of the energy and power technology.

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		√	√		

	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 8	√	√	√		
毕业要求 9	√	√	√		√
毕业要求 10	√		√		
毕业要求 11	√		√		
毕业要求 12				√	
毕业要求 13				√	
毕业要求 14					√
毕业要求 15	√				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程 Core Courses:

工程热力学、传热学、自控原理与应用、内燃机学、船舶动力装置原理、船舶机械制造工艺学  
Core Courses: Engineering Thermodynamics, Heat Transfer, Principle and Application of Auto-control, Internal-combustion Engine Theory, Measuring Methodology of Power Machine, Principle & Design of Marine Power Plant., Marine Machinery Manufacture Technology

#### (二) 专业特色课程 Characteristic Courses:

内燃机排放及后处理、船舶辅机、船舶管系与工艺设计、船舶机械修理工艺学、内燃机电子控制技术、船机桨工况配合及特种推进、动力机械工况监测与故障诊断

Characteristic Courses: Internal-combustion Engine Emissions and After-treatment Technology, Marine Auxiliary Machine, Install Technology of Ship Piping System, Marine Machinery Repair Technology, The Electronic Control on IC Engine, Matching Among Vessel-engine-propeller and Special Propeller, Power Machine Condition Monitoring & Fault Diagnoses

附：毕业要求实现矩阵：

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		中国近现代史纲要 Outline of Chinese Contemporary and									√	√					
		思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law										√	√				
		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									√	√	√				
		马克思主义基本原理 Marxism Philosophy										√	√				
		大学英语 A1 College English A1													√		
		大学英语 A2 College English A2													√		
		大学英语 A3 College English A3													√		
		大学英语 A4 College English A4													√		
		体育 1 Physical Education1									√						
		体育 2 Physical Education2									√						

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		体育 3 Physical Education3									√						
		体育 4 Physical Education4									√						
		军事理论 Military Theory									√						
		心理健康教育 Mental Health Education									√						
		大学计算机基础 Foundation of Computer		√													
		计算机程序设计基础(C 语言) Fundamentals of Computer Program		√													
		专业导论 Introduction to Specialty								√							
		高等数学 A1 Advanced Mathematics A I	√														
		高等数学 A2 Advanced Mathematics A II	√														
		工程图学 A1 Engineering Graphics A I		√													
		工程图学 A2 Engineering Graphics A II		√													
		线性代数 Linear Algebra	√														
		大学物理 Physics	√														
		物理实验 B Physics Lab. B	√														
		机械原理 Mechanism and Machine Theory		√													
		电工与电子技术基础 B Electrical Engineering B		√				√									
		概率论与数理统计 B Probability and Mathematical Statistics B	√														
		燃烧学导论 An Introduction to Combustion	√	√						√						√	
		优化技术基础 Foundational of Optimum Technology			√												
		海洋工程装备概论 Introduction to Marine Engineering Equipment			√												
		流体计算技术基础 Fundamental of computational fluid			√				√								
		混合动力导论 Introduction to Hybrid Power								√							
		工程材料 Engineering Materials		√													
		工程力学 B Engineering Mechanics B		√													
		工程力学 B 实验 Mechanics Experiments B		√													
		互换性与测量技术 B Interchange Ability & Measurement B		√													

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		金属工艺学 B Metal Technology B		√													
		流体力学 D Fluid Mechanics D		√													
		机械设计 Mechanical Design		√													
√		工程热力学 A Engineering Thermodynamics A		√	√					√							
√		传热学 Heat Transfer		√	√					√							
√		自控原理与应用 Principle and Application of Auto-control		√				√									
		动力机械测试技术 A Measuring Methodology of Power Machine A		√	√	√	√			√							
√		内燃机学 A Internal Combustion Engine Theory A		√	√	√	√			√							
√		船舶动力装置原理 A Principle & Design of Marine Power Plant A		√	√	√	√			√							
		船舶机械制造工艺学 Marine Machinery Manufacture Technology		√	√	√	√			√							
		动力机械工况监测与故障诊断 Power Machine Condition Monitoring & Fault Diagnoses		√	√	√	√			√							
		船舶机械关键部件设计方法基础 Design MethodsofMaritime Mechanical Key Components			√												
		动力系统专业英语 English of power system													√	√	
		船舶管系与工艺设计 Install Technology of Ship Piping System		√	√					√						√	
		船舶机械修理工艺学 Marine Machinery Repair Technology			√												
		动力机械工程微机应用技术 Computer Application Technology in Power Machinery and Engineering		√	√	√	√	√	√	√							√
		内燃机监测诊断技术 Monitoring and DiagnosisTechnology on IC Engine				√	√			√				√		√	√
		内燃机电子控制技术 The Electronic Control on IC Engine				√	√			√				√		√	√
		内燃机排放及后处理 Internal-combustion Engine Emissions and After-treatment Technology				√	√			√				√		√	√
		内 燃 机 增 压 技 术 Internal combustion engine supercharging technology				√	√			√				√		√	√
		船机桨工况配合及特种推进 MatchingAmong Vessel-engine-propeller and Special Propeller		√	√					√						√	√
		船舶制冷与空调技术 Marine Refrigerating and Air-conditioning		√	√					√						√	√
		船舶动力装置检验 Marine Power Plant Inspection		√	√					√						√	√



专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		船舶推进轴系振动与校中 Ship PropulsionShafting Vibration and Alignment		√	√					√						√	√
		新能源与节能技术 New energy and Energy-saving Technology			√												
		交通运输工程概论 B Panorama of Transportation Equipment B								√							
		船舶企业信息化 ShipbuildingEnterprises Informationization		√	√					√						√	√
		船舶辅机 B Marine Auxiliary Machine B	√		√					√						√	
		船舶原理 C Theoretical Naval Architecture C															
		信号分析与处理 Signal Analysis and Disposal		√	√					√							
		汽车概论 A Structure of Automobile A		√	√					√							
		机械振动分析与应用 Mechanical Vibration Analysis		√	√					√							
		船舶电气设备与电站 Ship Electric Equipment and Power Station						√									
		军事训练 Military Training									√						
		机械制造工程实训 B Machinery Manufacturing Engineering Practice B		√	√					√							
		机械设计基础课程设计 Course Design of Mechanical Design		√	√					√							
		电工电子实习 B Practice in Electrical Engineering & Electronics B		√	√			√									
		热力学和传热学课程设计 Course Design on Thermodynamics and Heat Transfer		√	√					√							
		柴油机结构认知与实操 The Structure Cognition and Operationfor Diesel Engine.		√	√				√	√							
		能源动力系统课程设计 Course Design of Energy & Power System		√	√				√	√							
		生产实习 Specialty Practice		√	√				√	√							
		实验能力综合训练（分散进行） Experiment Ability Combined Training		√	√				√	√							
		毕业设计（论文） Practice and Design for Graduation		√	√				√	√							

### 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

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Cr.s	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
通识课程 Public Basic Courses	必修课 Required Courses	4220002111	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	2	32					1-6			
		4220001111	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220003111	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		1-6			
		4220005111	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		4030002111	大学英语 A1 College English A1	3	64				16	1			
		4030003111	大学英语 A2 College English A2	3	64				16	2	大学英语 A1		
		4030004111	大学英语 A3 College English A3	3	64				16	3	大学英语 A2		
		4030005111	大学英语 A4 College English A4	3	64				16	4	大学英语 A3		
		4210001111	体育 1 Physical Education1	1	32					1			
		4210002111	体育 2 Physical Education2	1	32					2	体育 1		
		4210003111	体育 3 Physical Education3	1	32					3	体育 2		
		4210004111	体育 4 Physical Education4	1	32					4	体育 3		
		1060001111	军事理论 Military Theory	1	32			16		1-4			
		1050001131	心理健康教育 Mental Health Education	1	16					1-2			
		4120017111	大学计算机基础 Foundation of Computer	2	32		12			1			
		4120023111	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C Language)	3	48		12			2			
		小计 Subtotal			35	736		24	64	64			
	选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。  All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology Courses.								
		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											

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
学 科 大 类 课 程	必修课程 Required Courses	4150105111	专业导论 Introduction to Specialty	1	16					1		
		4050063111	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064111	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4180015111	工程图学 A1 Engineering Graphics A I	3.5	56					1		
		4180016111	工程图学 A2 Engineering Graphics A II	2.5	40					2	工程图学 A1	
		4050229111	线性代数 Linear Algebra	2.5	40					3		
		4050463131	大学物理 Physics	5	80					2		
		4050224111	物理实验 B Physics Lab. B	1	32	32				3		
		4180033111	机械原理 Mechanism and Machine Theory	3.5	56	4				4		
		4100011111	电工与电子技术基础 B Electrical Engineering B	5.5	88	20				4		
		4050058111	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4		
		小计 Subtotal		37.5	616	56						
	选修课程 Elective Courses	4150052111	海洋工程装备概论 Introduction to Marine Engineering Equipment	2	32					4		
		4150185131	动力机械工程微机应用技术 Computer Application Technology in Power Machinery and Engineering	2	32	4				5		
		4150168121	流体计算技术基础 Fundamental of computational fluid dynamics software	2	32		8			5		
		4150191131	燃烧学基础 An Introduction to Combustion	2	32	2				6		*
		4150205141	动力系统专业英语 English of power system	2	32					6		*
		4150132121	混合动力基础 Introduction to Hybrid Power	2	32					7		
		4150017111	船舶动力装置检验 Marine Power Plant Inspection	2	32	4				7		
		4150031111	船舶污染控制 Ship Pollution Control	2	32					7		
		小计 Subtotal		16	256							4
		修读说明：要求至少选修 6 学分。 NOTE: Minimum subtotal credits: 6.										

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
专 业 课 程  Specialized Courses	必修 Required Courses	4070072111	工程材料 Engineering Materials	2.5	40	4				2		*
		4140077111	工程力学 B Engineering Mechanics B	4	64					3		
		4140078111	工程力学 B 实验 Mechanics Experiments B	0.5	16	16				3		
		4180023111	互换性与测量技术 B Interchange Ability & Measurement B	2	32	4				3		
		4180045111	金属工艺学 B Metal Technology B	2.5	40	4				4		
		4140129111	流体力学 D Fluid Mechanics D	2	32	6				4		*
		4080030111	机械设计 Mechanical Design	4	64	6				5		
		4150049111	工程热力学 A Engineering Thermodynamics A	3.5	56	4				5		*
		4150005111	传热学 Heat Transfer	3	48	4				5		*
		4150205131	自控原理与应用 Principle and Application of Auto-control	3	48	4				5		
		4150038111	动力机械测试技术 A Measuring Methodology of Power Machine A	3	48	14				5		*
		4150206141	新能源与节能技术 New energy and Energy-saving Technology	2	32	2				6		*
		4150207141	内燃机学 A Internal Combustion Engine Theory A	4.5	72	8				6		*
		4150018111	船舶动力装置原理 A Principle & Design of Marine Power Plant A	3	48	2		4		6		*
		4150026111	船舶机械制造工艺学 Marine Machinery Manufacture Technology	3	48	4				6		*
		小计 Subtotal		42.5	688	82		4				26.5
	选修 Elective Courses	4150039111	动力机械工况监测与故障诊断 Power Machine Condition Monitoring & Fault Diagnoses	2	32	4				5		*
		4150023111	船舶管系与工艺设计 Install Technology of Ship Piping System	3	48					6		
		4150016111	船舶机械关键部件设计方法基础 Design MethodsofMaritime Mechanical Key Components	2	32	2				6		
		4150025111	船舶机械修理工艺学 Marine Machinery Repair Technology	4	64	4				7		*
		4150186131	内燃机监测诊断技术 Monitoring and DiagnosisTechnology on IC Engine	2	32	2				7		
		4150133121	内燃机电子控制技术 The Electronic Control on IC Engine	2	32	4				6		*

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150134121	内燃机排放及后处理 Internal-combustion Engine Emissions and After-treatment Technology	2	32	2				7		
		4150036111	船机桨工况配合及特种推进器 Matching Among Vessel-engine-propeller and Special Propeller	2	32	4				6		
		4150034111	船舶制冷与空调技术 Marine Refrigerating and Air-conditioning	2	32	4				7		
		4150030111	船舶推进轴系振动与校中 Ship Propulsion Shafting Vibration and Alignment	2	32					7		
		小计 Subtotal		23	368	18						
		修读说明：至少选修 10 学分。 Study shows : Subtotal credits at least 10.										
个性化课程 Personalized Course	选修课 Elective Courses	4140114111	交通运输工程概论 B Panorama of Transportation Equipment B	1.5	24					3		
		4150166121	船舶企业信息化 Shipbuilding Enterprises Informationization	2	32					3		
		4150021111	船舶辅机 B Marine Auxiliary Machine B	2	32	4				5		
		4140033111	船舶原理 C Theoretical Naval Architecture C	2	32					5		
		4150081111	信号分析与处理 Signal Analysis and Disposal	2	32					5		
		4150096111	汽车概论 A Structure of Automobile A	2.5	40					6		*
		4150054111	机械振动分析与应用 Mechanical Vibration Analysis	2	32	2				7		*
		4150010111	船舶电气设备及电站 Ship Electric Equipment and Power Station	2	32	4				6		*
		4150008111	船舶电力推进技术 Ship Electric Propulsion Technology	2	32	4				7		
		4150137121	内燃机仿真计算 Simulation of Internal-combustion Engine	2	32	2				7		
		4150188131	内燃机增压技术 Internal Combustion Engine Supercharging Technology	2	32	2				7		
		小计 Subtotal		22	352	18						6.5
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
1060002111	军事训练 Military Training	3	1.5	1	
4180113111	机械制造工程实训 B Machinery Manufacturing Engineering Practice B	4	4	3	
4180109111	机械设计基础课程设计 Course Design of Mechanical Design	2	2	5	
4100069111	电工电子实习 B Practice in Electrical Engineering & Electronics B	1	1	5	
4150193131	热力学和传热学课程设计 Course Design on Thermodynamics and Heat Transfer	1	1	5	
4150200131	柴油机结构认知与实操 The Structure Cognition and Operation for Diesel Engine.	3	3	6	
4150109111	能源动力系统课程设计 Course Design of Energy & Power System	3	3	6	
4150110111	生产实习 Specialty Practice	3	3	7	
4150148121	实验能力综合训练（分散进行） Experiment Ability Combined Training	0.5	0.5	8	
4150142121	毕业设计（论文） Practice and Design for Graduation	17	11	8	6*
小计 Subtotal		37.5	30		10

## 六、修读指导

### VI Recommendations on Course Studies

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7<sup>th</sup> term. The course will be arranged by the University Students' Affairs' Department in each school.

学院教学责任人：钱作勤  
专业培养方案责任人：贺玉海

# 【油气储运工程专业】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Oil and Gas Storage and Transportation Engineering (2015)

专业名称	油气储运工程	主干学科	石油工程、交通运输工程、船舶与海洋工程
Major	Oil and Gas Storage and Transportation Engineering	Major Disciplines	Petroleum engineering, Traffic and transportation engineering, Naval architecture and ocean engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineer

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	47.5	38	\	28.5	\	190
选修课 Elective Courses	9	4	8	10	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 身心健康，具备良好的敬业精神、社会责任感和工程职业道德，关注当代全球和社会问题，具有质量意识、环境意识和安全意识；
  - (2) 具有良好的数理基础和初步的工程实践能力；
  - (3) 较系统地掌握力学、工程热力学和传热学、机械学、电工电子、油气储运工艺、设备与设施等方面的基本理论和基本知识；
  - (4) 具备油气储运系统规划、设计、施工和运行管理的初步能力；
  - (5) 能在国家与省、市的发展计划部门、交通运输规划与设计部门、油气储运管理部门及国防部门等从事油气储运工程的规划、勘察设计、施工项目管理和研究、开发等工作；
  - (6) 具有良好的口头和书面表达和沟通交流能力、良好的团队意识和合作精神。
- 
- (1) Have the physical and mental health, the good professional spirit, the sense of social responsibility and engineering occupation morality; pay attention to contemporary global and social issues, with the quality consciousness, environmental awareness and safety awareness;
  - (2) Have a good mathematical foundation and preliminary engineering practice ability;



- (3) Systematically master the basic theory and basic knowledge of mechanics, thermodynamics and heat transfer engineering, mechanics, electronics, oil and gas storage and transportation technology, equipment and facilities, etc;
- (4) Have the preliminary ability of oil and gas storage and transportation system planning, design, construction and operation management;
- (5) Can be engaged in planning, surveying, designing, constructing, in the project, and management & studying of equipment, management of construction & production, in the development planning section, planning & design section of traffic & transportation, Management section / industry of Oil & gas storage and transportation, and Defense department etc;
- (6) Have good oral and written expression and communication skills, good team spirit and cooperation.

## (二) 毕业要求

### 1.具备良好的思想道德素养

- 1) 具有良好的社会公德，自觉遵守社会行为规范；
- 2) 自觉遵守法律法规；
- 3) 为人正直、诚实守信；
- 4) 具有良好的职业道德规范，自觉遵守所属职业体系的职业行为准则。

### 2.具备较好的文化素质

- 1) 具有勤奋学习、艰苦奋斗、实干创新的精神；
- 2) 掌握一定的社会人文科学知识；
- 3) 具有较好的文化素质修养和健康的心理素质。

### 3.具有较强的科学素质

- 1) 掌握一定的科学思维方法、科学研究方法；
- 2) 有良好的职业道德和行为习惯；
- 3) 知识、能力、素质的全面发展。

### 4.具有良好的身心素质

- 1) 具有热爱事业、遵纪守法、自律谦让、团结共事的品质；
- 2) 了解体育运动的基本知识，初步掌握锻炼身体的基本技能、养成科学锻炼身体的好习惯，身心健康，达到大学生体育锻炼合格标准；
- 3) 具有较强的团队意识，具备与他人合作、沟通的基本品质；
- 4) 了解国防知识、具有国防观念。

### 5.掌握扎实的工具性知识

- 1) 掌握一门外国语；
- 2) 掌握机械制图、管线布置图、管线安装图绘制方法；
- 3) 能够运用 CAD 等软件进行绘图；
- 4) 掌握机械设计基本原理及机械零部件设计计算方法；
- 5) 能运用检索工具查阅文献。

## **6.具有人文社会科学素养**

- 1) 具有较强的汉语言阅读理解与表达能力;
- 2) 掌握常用应用文体、科技说明文体写作;
- 3) 具有认识自然美、和谐美、艺术美的能力,对文学、艺术、历史学、哲学有一定的兴趣;
- 4) 具有积极健康的审美情趣,具有环保与节能意识,具备一定的思想道德、法学、心理学等方面的知识。

## **7.掌握本专业的基本理论知识**

- 1) 掌握本专业所必须的高等数学的基本理论和分析方法;
- 2) 具有运用数学手段熟练掌握本专业技术问题的能力;
- 3) 掌握工程力学、大学物理、普通化学的基本原理和分析方法。

## **8.掌握本专业的工程基础知识**

- 1) 掌握工程流体力学的基本理论及计算方法、石油炼制的基本操作技能;
- 2) 掌握输油管线及输油泵站基本设计计算方法,具备输油管线技术管理初步能力;
- 3) 掌握油库工艺设计基本方法,具有油库技术管理初步能力;
- 4) 掌握油罐及管道工程的施工技术、质量标准及验收方法,了解施工组织设计和概预算编制方法以及常用材料的性能及应用;
- 5) 掌握油科学的基本理论及常规的油气质量、性能检测分析方法;
- 6) 掌握储运系统所用仪表及自动化控制技术,并具有初步选用能力;
- 7) 掌握油气集输基本工艺及初步设计方法;
- 8) 掌握石油储运工程技术经济分析基本思想,并能结合实际解决一般技术经济问题,树立科学决策和经济分析的基本思想;
- 9) 掌握储运工程安全和节能与环保技术。

**9. 具备从事该专业工作所需的身体及心理素质,具备语言与文字表达能力,以及计算与分析能力、协作与组织管理能力。**

**10. 具备应用所学知识,在油气储运现场从事技术或管理工作的能力,以及自学新知识以满足工作需要的能力。**

**11.具备通过敏锐的观察与创造性的想象,通过创新思维解决新问题的能力。**

## **1. Have good ideological and moral accomplishment.**

- 1) Have a good social morality, consciously abide by the norms of social behavior;
- 2) Consciously abide by the laws and regulations;
- 3) Integrity, honesty and trustworthiness;
- 4) Have good occupation ethics, consciously abide by the occupation behavior standards occupation system.

## **2. Have good cultural quality.**

- 1) Study hard, work hard and perseveringly, and has pragmatic and innovative spirit;
- 2) Master certain social science and Humanities knowledge;

3) Have a good cultural qualities and healthy psychological quality.

**3. Have strong scientific quality.**

- 1) Master scientific thinking methods, some scientific research methods;
- 2) Have good occupation morality and behavior habit;
- 3) The comprehensive development of knowledge, ability, quality.

**4. Have good physical and mental quality.**

- 1) Have the quality of law-abiding, self-discipline of humility and solidarity work;
- 2) Learn the basics of sports, exercise preliminary master basic skills, develop a good habit of exercise science to meet the college Physical Training Standards;
- 3) Have a strong sense of teamwork, have the basic quality of cooperation, communication with others;
- 4) Understand the national defense knowledge, has the sense of national defense.

**5. Solid grasp of instrumental knowledge.**

- 1) Master a foreign language;
- 2) Master mechanical drawing, piping layout, pipeline installation drawing methods;
- 3) Be able to use CAD software, such as drawing;
- 4) Master the basic principles and calculation methods of mechanical component design mechanical design;
- 5) Be able to use search tool literature.

**6. Have humanities and social science literacy.**

- 1) Have a strong Chinese language and reading comprehension skills;
- 2) Master the common application style, technology description style of writing;
- 3) Have knowledge of natural beauty, harmony and beauty, artistic beauty of ability, literature, art, history, philosophy has a certain interest;
- 4) Have a positive and healthy aesthetic taste, with environmental protection and energy-saving awareness, with a certain moral knowledge, law, psychology and other aspects.

**7. Master the basic theoretical knowledge.**

- 1) Master the basic theory and methods of analysis of the professional higher mathematics necessary;
- 2) Have the ability to use mathematical tools to master the professional technical problems;
- 3) The master of engineering mechanics, physics, general chemistry of the basic principles and methods of analysis.

**8. Master basic knowledge of the professional engineering.**

- 1) Master the basic theory and methods of computation fluid dynamics engineering, petroleum refining basic skills;
- 2) Master the basic design calculation methods of pipeline and oil pumping station, with an initial capacity of pipeline technology management;
- 3) Process Design oil depots master the the basic method, with an initial capacity of oil depots

technology management;

4) Master the construction technology, quality standards and inspection methods oil tanks and pipeline project, to understand the performance and application design and construction organization shall budgeting methods and commonly used materials;

5) Learn to master the basic theory of oil and conventional oil and gas quality, performance testing methods;

6) Master the storage system used instrumentation and automation control technology, and have the ability to have a preliminary selection;

7) Master the the basic technology of oil and gas gathering and preliminary design methods;

8) Have the basic idea of economic analysis of the oil storage and transportation engineering, can be combined with practical solutions to general technical and economic issues, establish the basic idea of scientific decision-making and economic analysis;

9) Master the storage engineering safety and energy-saving and environmentally friendly technologies.

9. Have engaged in professional work required of the physical and mental qualities, with language and writing skills, as well as calculation and analysis capabilities, collaboration and organizational management capabilities.

10. Have application of knowledge, the ability to engage in the field of oil and gas storage and transportation technology or management, as well as self-learning of new knowledge to meet the needs of working ability.

11. Have the ability through keen observation and creative imagination, solve new problems through innovative thinking.

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	培养目标 6
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		√	√	√	√	√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程：

工程力学、流体力学、工程热力学及传热学、泵和压缩机、输油管道设计与管理、

油气集输、油库设计与管理、油气储运工程最优化、燃气输配工程、油气运输船舶、油气储运安全系统工程等。

Core Courses : Engineering Mechanics, Fluid Mechanics, Thermodynamics for Engineering and Heat,Pumps and Compressors, Design and Management of Oil Pipelines, Oil and Gas Gathering and Transportation, Oil Depot Design and Management, Oil & Gas Storage and Transportation Optimization Engineering, Fuel Gas Transportation and Distribution Engineering, Oil & Gas Transport Tanker, Oil & Gas Storage and Transportation Safety System Engineering.

## (二) 专业特色课程:

海洋石油工程设计、油气集输、油库设计与管理、燃气输配工程、输油管道设计与管理、油气运输船舶等。

Characteristic Courses: Offshore Oil Engineering Design, Oil and Gas Gathering and Transportation, Oil Depot Design and Management, Fuel Gas Transportation and Distribution Engineering, Design and Management of Oil Pipelines, Oil & Gas Transport Tanker.

附：毕业要求实现矩阵：

专业 核心 课程	专业 特色 课程	课程名称	油气储运工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		思想道德修养与法律基础	√	√		√		√					
		马克思主义基本原理	√	√		√		√					
		中国近现代史纲要	√	√		√		√					
		毛泽东思想和中国特色社会主义理论体系概论	√	√		√		√					
		军事理论				√							
		心理健康教育				√							
		体育 1				√							
		体育 2				√							
		体育 3				√							
		体育 4				√							
		大学英语 A1					√						
		大学英语 A2					√						
		大学英语 A3					√						
		大学英语 A4					√						
		大学计算机基础											

专业 核心 课程	专业 特色 课程	课程名称	油气储运工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		计算机程序设计基础 (C 语言)					√		√		√		
		计算机程序设计基础 (VB 语言)					√		√		√		
		创新创业类											√
		人文社科类						√					
		经济管理类		√									
		科学技术类			√								
		艺术体育类			√	√							
		专业导论							√	√			
		普通化学							√				
		高等数学 A1							√				
		高等数学 A2							√				
		线性代数							√				
		工程图学 B					√						
		大学物理 A1 Physics A I							√				
		大学物理 A2							√				
		物理实验 A1							√				
		物理实验 A2							√				
		工程材料							√				
		金属工艺学 B							√				
		电工与电子技术基础 B					√						
		概率论与数理统计 B							√				
√		工程热力学与传热学 A							√				
		交通运输工程概论 B							√				
		油气储运工程经济与法规							√				
		石油天然气市场营销学							√				

专业 核心 课程	专业 特色 课程	课程名称	油气储运工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		液压技术								√			
√		油气储运工程最优化								√		√	
		工程概预算 A								√			
√		工程力学 B							√				
√		工程力学 B 实验							√				
√		流体力学 A							√				
		机械设计基础					√						
		测试技术 A							√				
		储运油科学								√			
√	√	输油管道设计与管理								√		√	
√		泵和压缩机								√		√	
		油罐及管道强度设计								√		√	
√	√	油库设计与管理								√		√	
√	√	燃气输配工程								√		√	
√		油气储运安全系统工程								√		√	
		油气储运设施腐蚀与防腐								√		√	
√	√	油气集输								√		√	
		水上油运管理								√		√	
		油气储运工程基础								√		√	
		工程测量 C							√			√	
		动力机械工况监测与故障诊断							√				
		燃气轮机与燃气蒸汽联合装置							√				
		防污染技术							√			√	
		天然气集输工程								√		√	
		无损检测技术 B								√		√	

专业 核心 课程	专业 特色 课程	课程名称	油气储运工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		油气储运测量仪表与应用								√		√	
√	√	油气运输船舶								√		√	
		油气储运设备								√		√	
		油气储运工程施工								√		√	
		油气储运系统控制及自动化								√		√	
		液化天然气技术								√		√	
	√	海洋石油工程设计								√		√	
		燃气计量								√		√	
		军事训练				√							
		机械制造工程实训 B					√						√
		机械设计基础课程设计					√						√
		电工电子实习 B					√						√
		输油管道设计与管理课程设计								√			√
		油库设计与管理课程设计								√			√
		油气集输课程设计								√			√
		生产实习								√			√
		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

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
通 识 课 程  Public Basic Courses	必修课程 Required Courses	4220001111	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220005111	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		4220002111	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	2	32					1-6			
		4220003111	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		1-6			
		1060003111	军事理论 Military Theory	1	32			16		1-4			
		1050001131	心理健康教育 Mental Health Education	1	16					1-2			
		4210001111	体育 1 Physical Education I	1	32					1			
		4210002111	体育 2 Physical Education II	1	32					2	体育 1		
		4210003111	体育 3 Physical Education III	1	32					3	体育 2		
		4210004111	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002111	大学英语 A1 College English A 1	3	64				16	1			
		4030003111	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004111	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005111	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017111	大学计算机基础 Foundation of Computer	2	32		12			1			
		程序设计语言课程组(3 学分，二选一)											
		4120023111	计算机程序设计基础（C 语言） Fundamentals of Computer Program Design (C Language)	3	48			12			2	大学计算机基础	
		4120025111	计算机程序设计基础(VB 语言) Fundamentals of Computer Program Design (VB Language)	3	48			12			2	大学计算机基础	
		小 计 Subtotal				35	720	0	24	64	64		
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 学分，建议在每个类别中分别至少全校学生要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope-ration	实践 Prac-tice	课外 Extra-cur					
		科学技术类 Science and Technology Courses			All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology Courses.							
艺术体育类 Art and Physical Education Courses												
学 科 大 类 课 程 Basic Disciplinary Courses	必修课程 Required Courses	4150094111	专业导论 Introduction to Speciality	1	16					1		
		4050144111	普通化学 General Chemistry	3	48	18				1		
		4050063111	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064111	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4050229111	线性代数 Linear Algebra	2.5	40					2		
		4180017111	工程图学 B Engineering Graphics B	4	64		4			2		
		4050021111	大学物理 A1 Physics A I	3.5	56					2		
		4050022111	大学物理 A2 Physics A II	3.5	56					3	大学物理 A1	
		4050466111	物理实验 A1 Physics Lab. A I	1	32	32				3	大学物理 A1	
		4050467111	物理实验 A2 Physics Lab. A II	1	32	32				4	物理实验 A1	
		4070072111	工程材料 Engineering Materials	2.5	40	4				3		
		4180045111	金属工艺学 B Metal Technology B	2.5	40	4				3	工程材料	
		4100011111	电工与电子技术基础 B Fundamentals of Electrical Engineering & Electric Technology B	5.5	88	20				4		
		4050058111	概率论与数理统计 B Probability and Mathematics Statistic B	3.0	48					4		
		4150050111	工程热力学与传热学 A Thermodynamics for Engineering and Heat	4.5	72	12				5		
		小 计 Subtotal			47.5	800	122	4				
	选修课程 Elective Courses	4140114111	交通运输工程概论 B Communications and Transportation Equipment introduction B	1.5	24					2		
		4150089111	油气储运工程经济与法规 Economics and Law of Oil & Gas Storage and Transportation Engineering	2	32					2		
		4150074111	石油天然气市场营销学 Oil and Natural Gas Marketing	2	32					3		
		4150083111	液压技术 Hydraulic Technology	2	32					4		
		4150091111	油气储运工程最优化 Oil & Gas Storage and Transportation Optimization Engineering	2	32		4			4	线性代数	*

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150047111	工程概预算 A Budget Estimate of Engineering A	2	32					4		*
		小 计 Subtotal		11.5	184		4					
		修读说明: 要求至少选修 4 学分 NOTE: Minimum subtotal class credits:4										
专 业 课 程 Specialized	必修课程 Required Courses	4140077111	工程力学 B Engineering Mechanics B	4	64					3		
		4140078111	工程力学 B 实验 Mechanics Experiments B	0.5	16	16				3		
		4140128111	流体力学 A Fluid Mechanics A	4	64	6				4		*
		4180031111	机械设计基础 Base of Mechanical Design	3.5	56	6				4		
		4150003111	测试技术 A Testing Technology A	3	48	4				5		*
		4150004111	储运油料学 Storage and Transportation of Oil Material	2	32	4				5	普通化学	*
		4150075111	输油管道设计与管理 Design and Management of Oil Pipelines	2.5	40	4	2			5	流体力学 A	*
		4150002111	泵和压缩机 Pumps and Compressors	2.5	40	4				5		*
		4150085111	油罐及管道强度设计 Strength Design of Tank and Pipeline	2	32					6	工程力学 B	*
		4150086111	油库设计与管理 Oil Depot Design and Management	3	48	4				6		*
		4150072111	燃气输配工程 Fuel Gas Transportation and Distribution Engineering	4	64	6	2			6	流体力学 A	*
		4150087111	油气储运安全系统工程 Oil & Gas Storage and Transportation Safety System Engineering	2	32					6		*
		4150160121	油气储运设施腐蚀与防腐 Corrosion and Anti-corrosion of Oil & Gas Storage and Transportation Facilities	2	32	4				7		*
		4150204131	油气集输 A Oil and Gas Gathering and Transportation	3.0	48	4				7	流体力学 A	*
		小 计 Subtotal		38	616	62	4					
	选修课程 Elective Courses	4150076111	水上油运管理 Oil and Natural Gas Shipping Management	2	32					5		
		4150088111	油气储运工程基础 Basic of Oil & Gas Storage and Transportation	1.5	24					5		
		4140064111	工程测量 C Engineering Survey C	2	32	8				5		*
		4150039111	动力机械工况监测与故障诊断 Condition Monitoring and Fault Diagnosis of Power Machine	2	32	4				6		
		4150194131	燃气轮机与燃气蒸汽联合装置 Gas turbines and gas - steam combined unit	2	32					6		
		4150045111	防污染技术 Antipollution Technology	2	32					7		*

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150078111	天然气集输工程 Natural Gas Gathering Engineering	2	32					7		
		4150079111	无损检测技术 B Non-destructive Testing Technique B	2	32	8				7		
		4150161121	油气储运测量仪表与应用 Applied Measurement Equipments for Oil & Gas Storage and Transportation	2	32					7		
		小 计 Subtotal		17.5	280	20						
		修读说明：要求至少选修 8 学分 NOTE: Minimum subtotal class credits:8										
个性化课程 Personalized Course	选修课 Elective Courses	4150093111	油气运输船舶 Oil & Gas Transport Tanker	2	32					5		*
		4150012111	油气储运设备 Oil & Gas Storage and Transportation Equipment	2	32					5	泵和压缩机	*
		4150090111	油气储运工程施工 Construction of Oil & Gas Storage and Transportation Engineering	2	32					6	工程测量 C	*
		4180048111	油气储运系统控制及自动化 Control and Automatization of Oil & Gas Storage and Transportation System	2.5	40	4				6		
		4150195131	液化天然气技术 Liquefied natural gas (LNG) technology	2	32					6		
		4150162121	海洋石油工程设计 Offshore Oil Engineering Design	2	32					7	工程力学 B	*
		4150163121	燃气计量 Measurement of Gas	2	32					7	燃气输配工程	
		小 计 Subtotal		14.5	232	4						
		修读说明：学生可跨专业自主选择修读全校其他专业的课程，建议修读以上课程。要求至少选修 10 学分。 NOTE: Students can choose any courses from the other specialties, and are especially suggested to choose the courses above. Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002111	军事训练 Military Training	3	1.5	1	
4180113111	机械制造工程实训 B Machinery Manufacturing Engineering Practice B	4	4	3	
4180109111	机械设计基础课程设计 Mechanism Design	2	2	4	
4100069111	电工电子实习 B Practice in Electrical Engineering & Electronics B	1	1	5	
4150118111	输油管道设计与管理课程设计 Design and Management of Oil Transmission Pipelines	2	2	5	*
4150114111	油库设计与管理课程设计 Design and Management of Oil Bank	2	2	6	*

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
4150115111	油气集输课程设计 Oil and Gas Gathering and Transportation	2	2	7	*
4150111111	生产实习 Specialty Practice	3	3	7	
4150143121	毕业设计（论文） Design for Graduation (Thesis)	17	11	8	6*
小 计 Subtotal		36	28.5		

## 六、修读指导

### VI Recommendations on Course Studies

1. 在进行油气管道设计与管理、油气集输、油库设计与管理、油气储运工程最优化、燃气输配工程、油气运输船舶等课程学习前，应先修工程流体力学、工程热力学及传热学、泵和压缩机；

2. 双学位者必须修满 50 学分以上。

3. 《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

1.Fluid Mechanics, Engineering Thermodynamics and Heat Transfer, Pumps and Compressors should firstly be studied, then Design and Management of Oil & Gas Pipelines, Oil & Gas Gathering and Transportation, Oil Depot Design and Management, Oil & Gas Storage and transportation Engineering Optimization, Fuel Gas Transportation and Distribution Engineering, Oil & Gas Transport Tanker etc. are studied.

2. The Dual-degree students need to obtain more than 50 credits.

3.Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7th term . The course will be arranged by the University Students' Affairs' Department in each school.

学院教学责任人：钱作勤  
专业培养方案责任人：刘爱华

# 【轮机工程专业】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Marine Engineering (2015)

专业名称	轮机工程	主干学科	船舶与海洋工程
Major	Marine Engineering	Major Disciplines	Marine and ocean engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	38	32.5	46.5	\	39	\	190
选修课 Elective Courses	9	5	10	\	\	10	

将“轮机工程”作为第二专业的学生必须修满 48 学分的课程（表格最右列带\*），外加 20.5 学分的实践性教学环节，共修满 68.5 学分，方可获得学位。

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### （一）培养目标

- （1）树立正确的专业思想和适应国防性的要求。
- （2）掌握船舶动力和轮机系统的专业知识。
- （3）满足国际海员培训、发证和值班标准公约(STCW78 / 95)马尼拉修正案和我国海船船员适任标准的要求，具备远洋船舶轮机员任职资格（三管），并在未来具有担任更高级别轮机员的能力。
- （4）能在船舶运输及海洋工程各企事业单位从事轮机操纵、维修和船舶监修、监造工作、海事管理、船舶检验等高级技术人才。

##### （一）Educational Objectives

- （1）Establish correct professional thoughts and adapt to the requirements of national defense.
- （2）Master professional knowledge of marine power and turbine system.
- （3）To meet marine engineers who have all professional knowledge of marine engineering, conform with the demands of the provisions of Manila amendments to the international convention on Standards of Training, Certification and Watchkeeping for seafarers, 1998 (STCW78/95) and of Seafarer Training, Examination and Certification in China, be qualified for marine engineer of Ocean Ship (fourth engineer), and have the ability to serve as a higher level of engineers in the future .
- （4）The student can also be engaged in marine engineering maneuvering, maintaining and supervising ship repairing and building work, Maritime management, vessel inspection, etc. in any shipping and ocean engineering enterprises or institution.

##### （二）毕业要求

- (1) 具有良好的道德。
- (2) 强烈的责任感和事业心。
- (3) 海上国防性的要求。
- (4) 具有较强的表达和沟通能力。
- (5) 具有完备的心理素质和团队合作精神。
- (6) 具有较强的获取知识、终身学习的能力。
- (7) 具有从事轮机工程工作所需的工程科学技术知识以及一定的人文和社会科学知识。
- (8) 掌握扎实的轮机工程基础知识和本专业的基本理论知识，了解本专业的发展现状和趋势。
- (9) 熟悉机械设备的拆装及维护管理。
- (10) 具有操纵和维修船舶动力装置和对船舶监修、监造的初步能力。
- (11) 参与监督及机场设备管理的能力。
- (12) 熟悉海船运输安全和保护海洋环境方面的公约和法律法规。

## (二) Educational Requirement

- (1) Have good moral.
- (2) Strong sense of responsibility and dedication.
- (3) Requirements of sea defence.
- (4) Have strong expression and communication skills.
- (5) Have complete psychological quality and team spirit.
- (6) Have strong ability of acquiring knowledge and lifelong learning.
- (7) Have Engineering Science knowledge in the marine engineering working and technology .  
Have humanities and social science knowledge
- (8) Master the basic knowledge of marine engineering and the professional basic theory knowledge, understand the development status and trend of the professional.
- (9) Familiarize mechanical equipment installation and maintenance management.
- (10) Have the preliminary ability of not only controlling and repairing of ship power plant but also ship repair supervisor and supervision.
- (11) The ability to participate in the supervision and management of the airport equipment.

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
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				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses



(一) 专业核心课程:

船舶柴油机, 船舶辅机, 船舶电气设备与系统, 轮机自动化, 轮机维护与修理, 船舶管理, 轮机工程英语。

Core Courses: Marine Diesel Engine, Marine Auxiliary Machinery, Marine Electric Equipment and System, Marine Machinery Automation, Marine Machinery Maintenance and Repair, Ship Management, English of Marine Engineering.

(二) 专业特色课程:

船舶油处理及防污染, 轮机自动化系统微机应用, 船舶电站自动控制系统与管理, 轮机工程测试技术。

Characteristic Courses: Marine Oily Handling and Pollution Prevention, Application of Microcomputer in Marine Engineering, Auto-control System and Management of Marine Power Station, Experimental Technique of Marine Engineering.

附: 毕业要求实现矩阵:

专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		思想道德修养与法律基础	√	√					√				
		中国近现代史纲要	√						√				
		毛泽东思想和中国特色社会主义理论体系概论	√						√				
		军事理论			√								
		心理健康教育					√						√
		马克思主义基本原理							√				
		体育			√		√						
		大学英语 A				√			√				
		大学计算机基础								√			
		英语听力与口语 A				√						√	√
		计算机程序设计基础(C 语言)							√	√			
		专业导论		√						√			
		高等数学 A							√	√			
		工程图学 B							√	√			
		线性代数							√	√			
		大学物理 B							√	√			

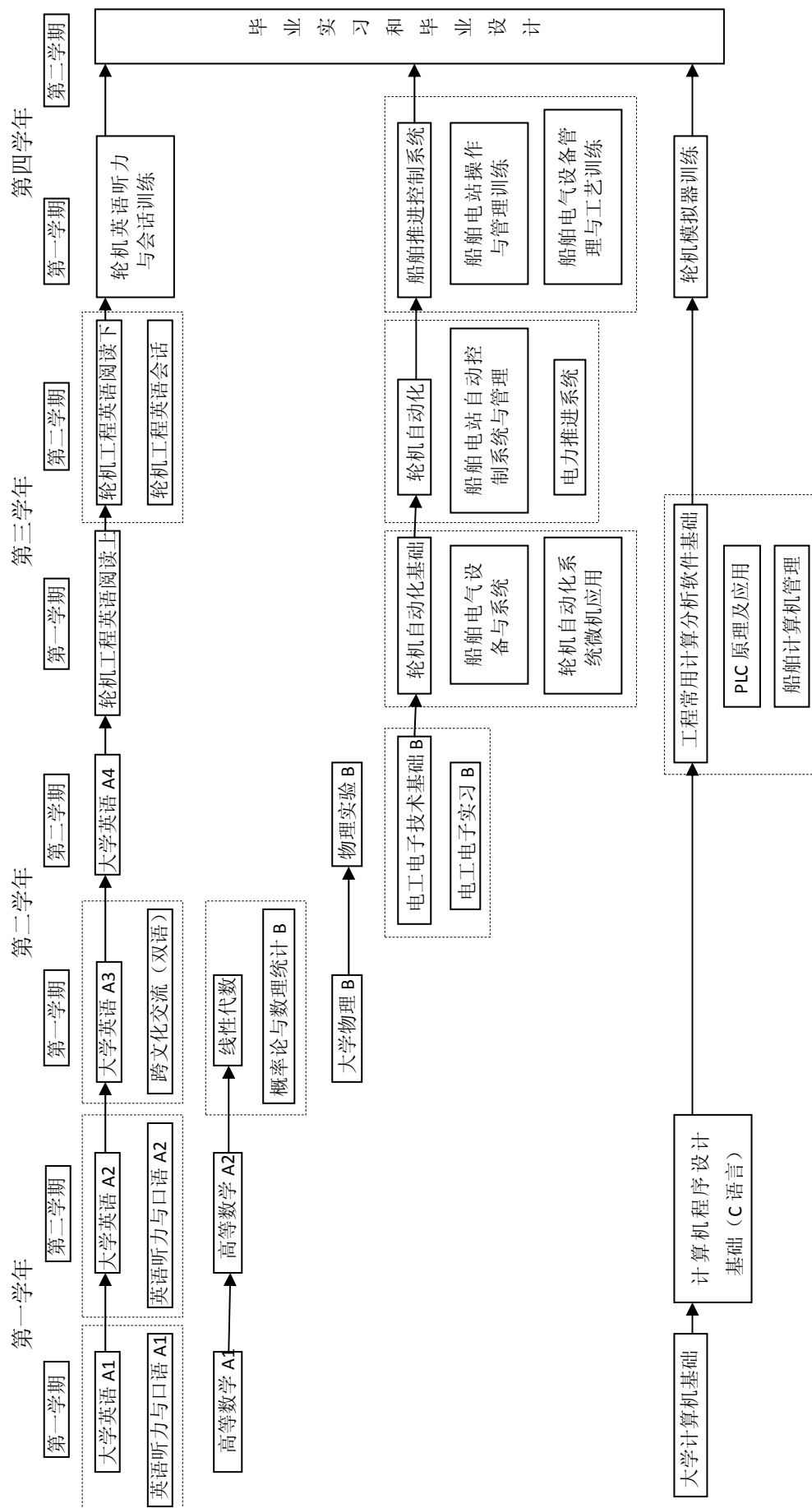
专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		物理实验 B							√	√			
		机械设计基础							√	√			
		电工与电子技术基础 B							√	√			
		交通运输工程概论 B								√		√	
		轮机化学							√	√			
		船舶原理 D								√		√	
		概率论与数理统计 B							√	√			
		跨文化交流				√							
		能源概论						√				√	
		船机检验										√	√
		工程材料							√	√			
		金属工艺学 B							√	√			
		流体力学 D							√	√			
		工程力学 B							√	√			
		工程力学 B 实验							√	√			
		互换性与测量技术 B							√	√		√	√
		工程热力学与传热学 A							√	√			
		轮机自动化基础							√	√			
√		船舶柴油机									√	√	√
√		船舶辅机									√	√	√
√		船舶电气设备与系统									√	√	√
√		轮机工程英语阅读				√			√			√	√
√		轮机自动化							√	√		√	√
√		轮机维护与修理									√	√	√
√		船舶管理									√		√

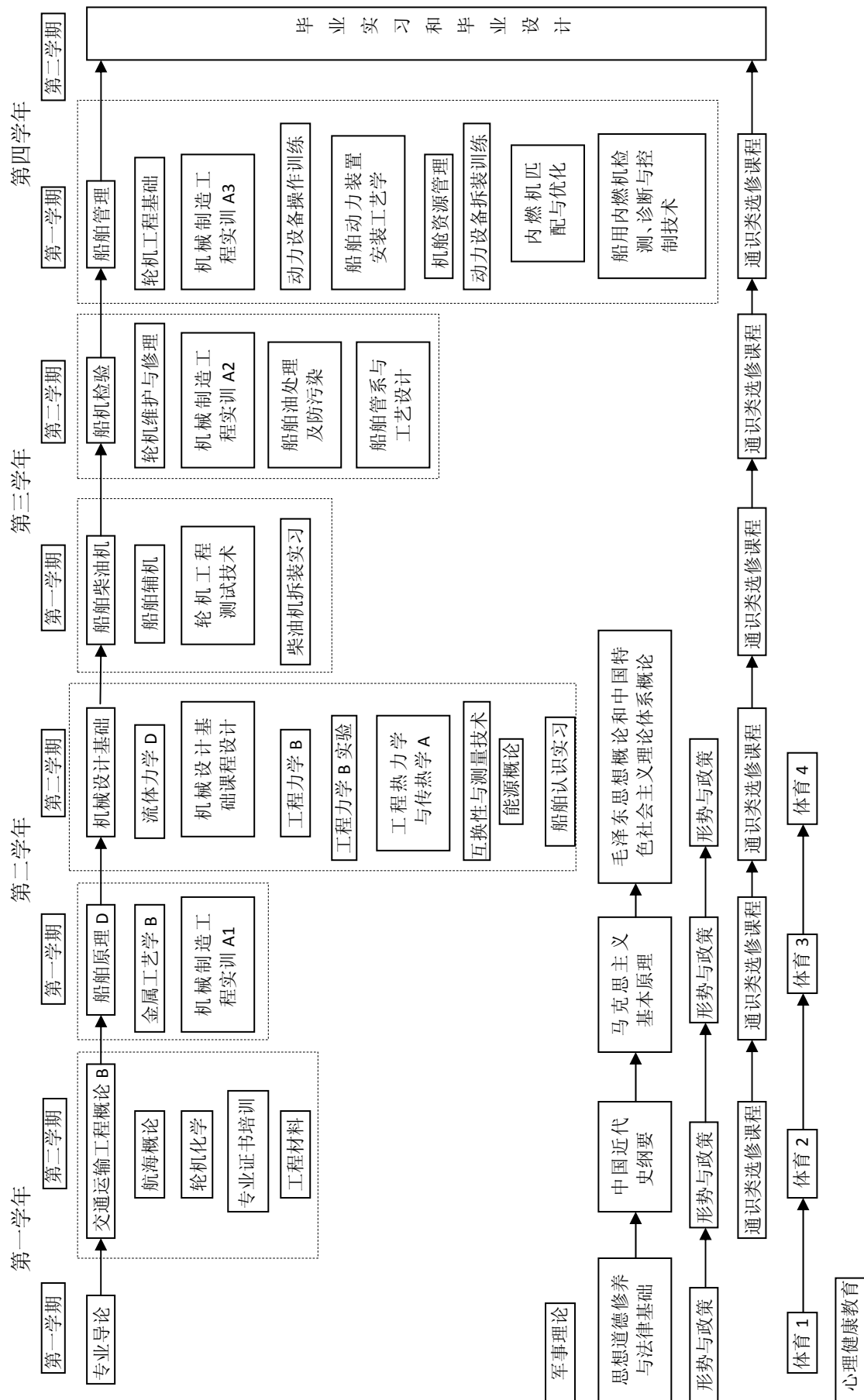
专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		航海概论		√					√				
	√	轮机自动化系统微机应用						√	√	√			
	√	轮机工程测试技术										√	√
		工程常用计算分析软件基础								√			
		PLC 原理及应用								√			
		船舶计算机管理								√			
	√	船舶油处理及防污染		√									√
		轮机工程英语会话				√						√	√
	√	船舶电站自动控制系统与管理							√	√			
		电力推进系统							√	√			
		船舶管系与工艺设计										√	√
		船舶 LNG 燃料动力概论						√		√			
		船舶推进控制系统							√	√			
		内燃机排放及后处理						√	√				
		内燃机匹配与优化						√	√				
		船用内燃机检测、诊断与控制技术						√	√				
		轮机工程基础							√	√			
		船舶动力装置安装工艺学										√	√
		军事训练	√	√	√		√						
		专业证书培训	√	√	√		√						√
		电工电子实习 B								√		√	
		机械设计基础课程设计							√	√			
		柴油机拆装实习									√	√	√
		船舶认识实习	√		√	√	√						
		机械制造工程实训 A					√		√	√			√

专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		动力设备操作训练									√	√	√
		动力设备拆装训练									√	√	√
		船舶电站操作与管理训练							√			√	√
		船舶电气设备管理与工艺训练							√			√	√
		机舱资源管理训练	√	√	√	√	√					√	√
		轮机英语听力与会话训练				√		√					√
		轮机模拟器训练					√						√
		毕业实习和毕业设计	√	√		√	√	√	√	√	√	√	√

### 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

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur				
通 识 课 程  Public Basic Courses	必修课程 Required Courses	4220001111	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220002111	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	2	32					1-6			
		4220003111	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		1-6			
		1060001111	军事理论 Military Theory	1	32			16		1-4			
		1050001131	心理健康教育 Mental Health Education	1	16					1-2			
		4220005111	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		4210001110	体育 1 Physical Education I	1	32					1			
		4210002110	体育 2 Physical Education II	1	32					2	体育 1		
		4210003110	体育 3 Physical Education III	1	32					3	体育 2		
		4210004110	体育 4 Physical Education IV	1	32					4	体育 3		
		4030002110	大学英语 A1 College English A 1	3	64				16	1			
		4030003110	大学英语 A2 College English A II	3	64				16	2	大学英语 A1		
		4030004110	大学英语 A3 College English A III	3	64				16	3	大学英语 A2		
		4030005110	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3		
		4120017110	大学计算机基础 Foundation of Computer	2	32		12			1			
		4030121111	英语听力与口语 A1 English Listening and Speaking A	1.0	24					1			
		4030122111	英语听力与口语 A2 English Listening and Speaking A	2.0	24					2	英语听力与口语 A1		
		4120023110	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design (C Language)	3	48		12			2			
		小 计 Subtotal				38	784		24	64	64		
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程,取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程,其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students								
		人文社科类 Arts and Social Science Courses											
		经济管理类 Economy and Management Courses											

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur			
		科学技术类 Science and Technology Courses			should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology Courses.							
艺术体育类 Art and Physical Education Courses												
学 科 大 类 课 程	必修课程 Required Courses	4150094111	专业导论 Introduction of Marine Engineering Specialty	1	16					1		
		4050063110	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064110	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4180017111	工程图学 B Engineering Graphics B	4	64		4			2		
		4050229111	线性代数 Linear Algebra	2.5	40					3		
		4050463131	大学物理 B Physics B	5	80					3		
		4050461131	物理实验 B Physics Testing B	1	32	32				4		
		4180031111	机械设计基础 Foundational of Mechanical Design	3.5	56	6				4		
		4100011111	电工与电子技术基础 B Fundamentals of Electrical Engineering & Electric Technology B	5.5	88	20				4		
		小 计 Subtotal			32.5	536	58	4				
	选修课程 Elective Courses	4140114111	交通运输工程概论 B Panorama of Transportation Equipment B	1.5	24					2		*
		4050334111	轮机化学 Marine Engineering Chemistry	1.5	24					2		
		4140034111	船舶原理 D Principle of Naval Architecture D	1.5	24					3		
		4050058111	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4150055111	跨文化交流 Intercultural Communication	1.5	24					3		
		4150184131	能源概论 Introduction to Energy	2	32					4		
		4150035111	船机检验 Marine Equipment Survey	2	32	4				6		
		小 计 Subtotal			13	208	4					
修读说明：要求至少选修 5 学分。 NOTE: Minimum subtotal credits: 5.												



课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
专 业 课 程	必修课程 Required Courses	4070072111	工程材料 Engineering Materials	2.5	40	4				2		*
		4180045111	金属工艺学 B Metal Technology B	2.5	40	4				3		*
		4140129111	流体力学 D Fluid Mechanics D	2	32	6				4		*
		4140077111	工程力学 B Engineering Mechanics B	4	64					4		
		4140078111	工程力学 B 实验 Mechanics Experiments B	0.5	16	16				4		
		4180023111	互换性与测量技术 B Interchange Ability & Measurement B	2	32	4				4		
		4150050111	工程热力学与传热学 A Thermodynamics for Engineering and Heat Transfer A	4.5	72	12				4		*
		4150065111	轮机自动化基础 Foundation of Marine Automatic Control	2	32	4				5		
		4150006111	船舶柴油机 Marine Diesel Engine	4	64	4				5		*
		4150196131	船舶辅机 Marine Auxiliary Machinery	5	80	10				5		*
		4150011111	船舶电气设备与系统 Marine Electric Equipment and System	4	64	8				5		*
		4150059111	轮机工程英语阅读上 English of Marine Engineering	2	32					5		*
		4150059111	轮机工程英语阅读下 English of Marine Engineering	2.5	40					6	轮机工程英语阅读上	*
		4150064111	轮机自动化 Marine Machinery Automation	3.5	56	6				6		*
		4150062111	轮机维护与修理 Marine Machinery Maintenance and Repair	2	32	6				6		*
		4150198131	船舶管理 Ship Management	3.5	56					7		*
		小 计 Subtotal		46.5	752	84						39
	选修课程 Elective Courses	4160035111	航海概论 Navigation Outline	1.5	24					2		
		4150066111	轮机自动化系统微机应用 Application of Microcomputer in Marine Engineering System	2	32	4				5		*
		4150057111	轮机工程测试技术 Experimental Technique of Marine Engineering	1.5	24	4				5		
		4150046111	工程常用计算分析软件基础 The Basic of Common Calculating and Analyzing Software in Engineering	2	32					5		
		4150001111	PLC 原理及应用 Principle & Application of PLC	2	32	4				5		
		4150027111	船舶计算机管理 Shipboard Computer Application	1.5	24		12			5		

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150033111	船舶油处理及防污染（限选） Marine Oily Handling and Pollution Prevention	2	32	4				6		*
		4150058111	轮机工程英语会话（限选） Oral English of Marine Engineering	1.5	24					6		*
		4150013111	船舶电站自动控制系统与管理 Auto-control System and Management of Marine Power Station	2	32					6		
		4150037111	电力推进系统 Electric Propulsion System	1.5	24					6		
		4150023111	船舶管系与工艺设计 Install Technology of Ship Piping System	3	48					6		
		4150199131	船舶 LNG 燃料动力概论 Introduction to the LNG Marine Power	2	32					7		
		4150186131	内燃机监测诊断技术 Monitoring and Diagnosis Technology on IC	2	32	2				7		
		4150134121	内燃机排放及后处理 Internal-combustion Engine Emissions and After-treatment Technology	2	32	4				7		
		4150267111	轮机工程基础（限选） Marine Engineering Foundation	2	32					7		
		4150015111	船舶动力装置安装工艺学 Marine Power Plant Installation Technology	3	48	2				7		
												*
		小 计 Subtotal		31.5	504	24						
		修读说明：要求至少选修 10 学分。 NOTE: Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4160096111	专业证书培训（含保安共计六个合格证） Training for Certificates	6	6	2(暑假)	*
4100069111	电工电子实习 B Practice in Electrical Engineering & Electronics B	1	1	4	
4180109111	机械设计基础课程设计 Course Design of Mechanical Design	2	2	4	
4150101111	柴油机拆装实习 Diesel Engine Dismantling Practice	2	2	5	
4150102111	船舶认识实习 Vessel Recognized Practice	3	3	5	

课程编号 Course Number	实践环节名称 Practice Courses Name	周数 Weeks	学分 Crts	建议修读学期 Suggested Term	第二专业 Second Major
4180112111	机械制造工程实训 A1 Machinery Manufacturing Engineering Practice	2	2	3	
4180135111	机械制造工程实训 A2 Machinery Manufacturing Engineering Practice	3	3	6	
4180139111	机械制造工程实训 A3 Machinery Manufacturing Engineering Practice	1	1	7	
4150151121	动力设备操作训练 Auxiliary Machinery General Training	1	1	7	*
4150152121	动力设备拆装训练 Auxiliary Machinery Dismantling Training	1	1	7	*
4150153121	船舶电站操作与管理训练 Operating and Management of Marine Power Station	1	1	7	*
4150154121	船舶电气设备管理与工艺训练 Management and Techniques of Marine Electrical Equipment	1	1	7	*
4150150121	机舱资源管理训练 Engine Room Resource Management	0.5	0.5	7	*
4150155121	轮机英语听力与会话训练 Training for Marine Engineering	1	1	7	*
4150107111	轮机模拟器训练 Marine Engineering Simulator	1	1	7	*
4150098111	毕业实习和毕业设计 Practice or Design for Graduation	17	11	8	*
小 计 Subtotal		46.5	39		20.5

## 六、修读指导

### VI Recommendations on Course Studies

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7<sup>th</sup> term. The course will be arranged by the University Students' Affairs' Department in each school.

学院教学责任人：钱作勤  
专业培养方案责任人：毛小兵

# 【能源与动力工程（船舶）专业（卓越工程师班）】2015 版 本科培养方案

## Undergraduate Education Plan for Specialty in Energy & Power Engineering (Excellent Engineer Class) (2015)

专业名称	能源与动力工程(船舶)	主干学科	船舶与海洋工程
Major	Energy & Power Engineering	Major Disciplines	Marine and ocean engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	35	37.5	34.5	\	46	\	190
选修课 Elective Courses	9	6	13	\	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

- (1) 具有良好的人文社会科学理论知识和素养，较扎实地掌握自然科学基础理论知识；身心健康，具备良好的敬业精神、社会责任感和工程职业道德；关注当代全球和社会中的能源危机和环境污染等问题；具有环境保护意识、能源安全意识、质量意识、产品安全和安全生产意识。
- (2) 具有从事能源与动力工程领域科学研究、工程设计和技术服务等工作所需的数理知识和其它相关自然科学知识，并能将数学和科学工具运用于解决工程问题。
- (3) 具有综合运用能源与动力工程领域的专业理论知识，具备动手操作的工程实践能力，能够解决能源与动力工程（系统）在使用与管理、测试与分析、设计与开发、制造与检测等方面的工程技术问题。
- (4) 具有应用各种技术手段查询资料、获取信息的能力；具有应用语言、文字、图形等进行工程技术表达和交流的能力；掌握一门外国语以及计算机应用的基本能力。
- (5) 具有良好的口头和书面表达和交流沟通能力、良好的团队意识和合作精神，具有终身学习的能力。

##### (一) Educational Objectives

- (1) Has the good humanities and social science literacy, basic science theory knowledge, good professional ethics, a good sense of social responsibility and the engineering professional ethics; be healthy in physical and psychological, Pay attention to the energy crisis and environmental pollution, etc.; has the consciousness of environmental protection, energy security, quality, product safety and production safety.

- (2) Has the mathematical and physical science knowledge in energy and power engineering researching, engineering designing, technical services field, can solve the engineering problem by using the tool of Mathematics and science.
- (3) Has the ability of using energy and power engineering field professional theoretical knowledge synthetically, doing engineering practice, solving the project technical issues about energy and power engineering (systems) in the management, testing and analysis, design and development, manufacturing and other testing aspects.
- (4) Possess the basic ability to use a variety of techniques seek information, express and exchange engineering technology by using language, text, graphics ,use a foreign language and basic computer skills.
- (5) Get skills of good oral and written expression and communication, good team spirit and cooperation and lifelong learning.

## **(二) 毕业要求**

- (1) 学生掌握从事本专业领域所需的数学、物理等相关自然科学和管理知识。
- (2) 学生掌握本专业的基本理论知识和工程基础知识，能够利用原理性知识进行自主发现、自主设计和自主解决与能源与动力工程（系统）相关的科学问题和工程问题。
- (3) 学生掌握能源与动力工程领域的设计和开发平台，能理解动力（装置）系统的设计方法和步骤。
- (4) 学生掌握典型内燃机工作过程的规律与原理、与工程过程相关的性能分析，以及影响性能各因素和参数的优选、匹配原理和方法；能够掌握提高内燃机动力性、经济性、排放性能以及可靠性的方法和途径。
- (5) 学生能够理解内燃机污染物的生成机理，掌握其控制方法与途径；掌握内燃机状态监测、故障诊断与电子控制技术。
- (6) 学生具备有关电子电路、信号处理和自动控制系统的基础应用知识。
- (7) 学生具备有效进行实验和模拟仿真设计与操作的能力，并能够对实验结果进行分析和解释。
- (8) 学生了解本专业的发展动态和前沿，熟悉能源与动力工程领域的最新开发工具种类和发展方向。
- (9) 学生具有良好的思想素质、身体素质、心理素质、文化修养、社会道德和责任担当等人文素养。
- (10) 学生了解当代全球问题和社会问题，在工程设计中综合考虑经济、环境、法律、安全和伦理等制约因素。
- (11) 学生具有逻辑思维和辩证思维的能力，具有批判意识和求真务实的科学思维方法，具有创新意识，掌握基本的创新方法。
- (12) 学生掌握运用现代信息技术跟踪并获取信息的方法，熟练进行文献检索和资料查询。
- (13) 学生具有良好的口头和书面表达和交流能力，至少熟练掌握一门外语进行技术交流沟通和翻译能力。具有良好的团队意识和合作精神。
- (14) 学生能够胜任本专业入门级的职业岗位，具备研究生课程学习所需的认知和基础能力。
- (15) 学生具有进行终身学习的愿望和能力，具有适应能源、动力技术不断发展的能力。

## **(二)Educational Requirement**

- (1) Master in the relevant science and management knowledge in the professional fields of mathematics, physics, etc.

- (2) Be able to discover, design and solve Energy and Power Engineering (Systems) related scientific problems and engineering problems independently by using the basic theoretical knowledge and professional engineering basics.
- (3) Master the design and development platform, design methods and the power (device) system design steps in the field of energy and power engineering field.
- (4) Master the principles of the internal combustion engine working process, performance analysis about engineering process-related performance analysis, the matching principles of the factors affecting performance, and the method of improving the power, emission performance, and the reliability of engine.
- (5) Understand the formation mechanism of the internal combustion engine pollutants, control methods and approaches, and the internal combustion engine condition monitoring, fault diagnosis and electronic control technology.
- (6) Have basic knowledge about the application of electronic circuits, signal processing and automatic control system.
- (7) Be able to effectively carry out the experiment, simulation design and operation, and analyze the experimental results.
- (8) Can understand the development of dynamic and frontier of the professional, and the latest development of tool types and development direction of energy and power engineering field.
- (9) Have the good thought quality, physical quality, psychological quality, culture, morality and social responsibility and other humanistic literacy.
- (10) Acknowledge global problems and social problems on present, economic, environment, law, security and ethics factors should be considered in the design of engineering.
- (11) Have ability of logical thinking and dialectical thinking, with scientific thinking method of critical consciousness and pragmatic, and also have innovative consciousness, the basic creative way should be mastered.
- (12) Master the use of methods of modern information technology to track and acquire information, skilled document retrieval and data query.
- (13) With good oral and written expression and communication skills, master at least a foreign language for technical communication and translation. Has a good sense of team spirit and cooperation.
- (14) Qualified for the occupation entry level of their own domain, with ability of cognitive and basic course of post graduate study required.
- (15) Have the desire and ability for lifelong learning, has the ability to adapt to the continuous development of the energy and power technology.

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		√	√		

	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 8	√	√	√		
毕业要求 9	√	√	√		√
毕业要求 10	√		√		
毕业要求 11	√		√		
毕业要求 12				√	
毕业要求 13				√	
毕业要求 14					√
毕业要求 15	√				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程 Core Courses:

工程热力学、传热学、内燃机学、自控原理与应用

Core Courses: Engineering Thermodynamics, Heat Transfer, Internal-combustion Engine Theory, Measuring Methodology of Power Machine, Automation of Power System.

#### (二) 专业特色课程 Characteristic Courses:

专业特色课程: 内燃机排放及后处理、内燃机匹配与优化、船舶辅机 B

Characteristic Courses: Internal-combustion Engine Emissions and After-treatment Technology, Internal-combustion Engine, Monitoring and Diagnosis Technology on IC Engine.

附: 毕业要求实现矩阵:

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程(船舶)专业(卓越工程师班)毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		中国近现代史纲要 Outline of Chinese Contemporary and									√	√					
		思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law										√	√				
		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									√	√	√				
		马克思主义基本原理 Marxism Philosophy										√	√				
		大学英语 A1 College English A1													√		
		大学英语 A2 College English A2													√		
		大学英语 A3 College English A3													√		
		大学英语 A4 College English A4													√		
		体育 1 Physical Education1									√						
		体育 2 Physical Education2									√						

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业（卓越工程师班）毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		体育 3 Physical Education3									√						
		体育 4 Physical Education4									√						
		军事理论 Military Theory									√						
		心理健康教育 Mental Health Education									√						
		大学计算机基础 Foundation of Computer		√													
		计算机程序设计基础(C 语言) Fundamentals of Computer Program Design(C Language)		√													
		专业导论 Introduction to Specialty								√							
		高等数学 A1 Advanced Mathematics A I	√														
		高等数学 A2 Advanced Mathematics A II	√														
		工程图学 A1 Engineering Graphics A I		√													
		工程图学 A2 Engineering Graphics A II		√													
		线性代数 Linear Algebra	√														
		大学物理 Physics	√														
		物理实验 B Physics Lab. B	√														
		机械原理 Mechanism and Machine Theory		√													
		电工与电子技术基础 B Electrical Engineering B		√				√									
		概率论与数理统计 B Probability and Mathematical Statistics B	√														
		能源概论 Introduction to Energy								√							
		流体计算软件应用基础 Fundamental of computational fluid dynamics software			√				√								
		混合动力导论 Introduction to Hybrid Power								√							
		工程材料 Engineering Materials		√													
		工程力学 B Engineering Mechanics B		√													
		工程力学 B 实验 Mechanics Experiments B		√													
		互换性与测量技术 B Interchange Ability & Measurement B		√													



专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业（卓越工程师班）毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		金属工艺学 B Metal Technology B		√													
		流体力学 D Fluid Mechanics D		√													
		机械设计 Mechanical Design		√													
√		工程热力学 A Engineering Thermodynamics A		√	√					√							
√		传热学 Heat Transfer		√	√					√							
√		自控原理与应用 Principle and Application of Auto-control		√				√									
		动力机械测试技术 A Measuring Methodology of Power Machine		√	√	√	√			√							
		动力系统自动化 Automation of Power System		√	√	√	√	√	√	√							
√		内燃机学 A Internal Combustion Engine Theory A		√	√	√	√			√							
		动力机械工程微机应用技术 Computer Application Technology in Power Machinery and Engineering		√	√	√	√	√	√	√							√
		内燃机专业英语 English of Internal-combustion Engine				√	√			√				√	√	√	√
		内燃机燃烧学 Combustion Theory of IC Engine				√	√			√							√
		内燃机监测诊断技术 Monitoring and Diagnosis Technology on IC Engine				√	√			√				√		√	√
		内燃机仿真计算 Simulation of Internal-combustion Engine				√	√			√				√		√	√
		内燃机电子控制技术 The Electronic Control on IC Engine				√	√			√				√		√	√
	√	内燃机排放及后处理 Internal-combustion Engine Emissions and After-treatment Technology				√	√			√				√		√	√
	√	内燃机匹配与优化 Internal-combustion Engine				√	√			√				√		√	√
		气体发动机 Gas engine				√	√			√				√		√	√
		内燃机增压技术 Internal combustion engine supercharging technology				√	√			√				√		√	√
	√	船舶辅机 B Marine Auxiliary Machine B		√	√					√							
		船舶原理 C Theoretical Naval Architecture C		√	√					√							
		信号分析与处理 Signal Analysis and Disposal		√	√					√							
		汽车概论 A Structure of Automobile A		√	√					√							

专业 核心 课程	专业 特色 课程	课程名称	能源与动力工程（船舶）专业（卓越工程师班）毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		机械振动分析与应用 Mechanical Vibration Analysis		√	√					√							
		军事训练 Military Training															
		船舶认知实验 The Ships Cognition Tests(Dispersing)		√	√												
		机械制造工程实训 B Machinery Manufacturing Engineering Practice B		√	√					√							
		机械设计基础课程设计 Course Design of Mechanical Design		√	√					√							
		电工电子实习 B Practice in Electrical Engineering & Electronics B		√	√			√									
		热力学和传热学课程设计 Course Design on Thermodynamics and Heat Transfer		√	√					√							
		柴油机结构认知与实操 The Structure Cognition and Operationfor Diesel Engine.		√	√				√	√							
		能源动力系统课程设计 Course Design of Energy & Power System		√	√				√	√							
		生产实习 Specialty Practice		√	√				√	√							
		实验能力综合训练（分散进行） Experiment Ability Combined Training		√	√				√	√							
		毕业设计（论文） Practice and Design for Graduation		√	√				√	√							

### 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

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major	
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur				
通识课程 Public Basic Courses	必修课 Required Courses	4220002111	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	2	32					1-6			
		4220001111	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1-6			
		4220003111	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		1-6			
		4220005111	马克思主义基本原理 Marxism Philosophy	3	48			8		1-6			
		1060001111	军事理论 Military Theory	1	32			16		1-4			
		4030002111	大学英语 A1 College English A1	3	64				16	1			
		4030003111	大学英语 A2 College English A2	3	64				16	2	大学英语 A1		
		4030004111	大学英语 A3 College English A3	3	64				16	3	大学英语 A2		
		4030005111	大学英语 A4 College English A4	3	64				16	4	大学英语 A3		
		4210001111	体育 1 Physical Education1	1	32					1			
		4210002111	体育 2 Physical Education2	1	32					2	体育 1		
		4210003111	体育 3 Physical Education3	1	32					3	体育 2		
		4210004111	体育 4 Physical Education4	1	32					4	体育 3		
		4120017111	大学计算机基础 Foundation of Computer	2	32		12			1			
		4120023111	计算机程序设计基础（C 语言） Fundamentals ofComputer Program Design (C Language)	3	48		12			2			
		1050001131	心理健康教育 Mental Health Education	1	16					1-2			
		小计 Subtotal				35	736		24	64	64		
	选修课 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分，且必须选修艺术体育类课程中的艺术类相关课程，取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程，其他专业学生至少选修一门科学技术类课程。  All students are required to obtain at least 9 credits, and must select art courses from <i>Art and Physical Education Courses</i> to obtain at least 2 credits. Science and engineering students should select at least one course from <i>Arts and Social Science Courses</i> or <i>Economy and Management Courses</i> , and other students should select at least one course from <i>Science and Technology Courses</i> .								
		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											

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
学 科 大 类 课 程	必修课程 Required Courses	4150094111	专业导论 Introduction to Specialty	1	16					1		
		4050063111	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064111	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4180015111	工程图学 A1 Engineering Graphics A I	3.5	56					1		
		4180016111	工程图学 A2 Engineering Graphics A II	2.5	40					2	工程图学 A1	
		4050463130	大学物理 Physics	5	80					2		
		4050224111	物理实验 B Physics Lab. B	1	32	32				3		
		4050229111	线性代数 Linear Algebra	2.5	40					3		
		4180033111	机械原理 Mechanism and Machine Theory	3.5	56	4				4		
		4100011111	电工与电子技术基础 B Electrical Engineering B	5.5	88	20				4		
		4050058111	概率论与数理统计 B Probability and Mathematical Statistics B	3	48					4		
		小计 Subtotal			37.5	616	56					
	选修课程 Elective Courses	4150184131	能源概论 Introduction to Energy	2	32					4		
		4140033111	船舶原理 C Theoretical Naval Architecture C	2	32					4		
		4150021111	船舶辅机 B Marine Auxiliary Machine B	2	32	4				4		
		4150081111	信号分析与处理 Signal Analysis and Disposal5	2	32					5		
		4150168121	流体计算软件应用基础 Fundamental of computational fluid dynamics	2	32		8			5		
		4150054111	机械振动分析与应用 Mechanical Vibration Analysis	2	32	2				6		
		小计 Subtotal			12	192	6	8				
	修读说明：要求至少选修 6 学分 NOTE: Minimum subtotal credits : 6											
专 业 课 程 Specialized Courses	必修课程 Required Courses	4070072111	工程材料 Engineering Materials	2.5	40	4				2		
		4140077111	工程力学 B Engineering Mechanics B	4	64					3		
		4180023111	互换性与测量技术 B Interchange Ability & Measurement B	2	32	4				3		
		4140129111	流体力学 D Fluid Mechanics D	2	32	6				4		
		4180045111	金属工艺学 B Metal Technology B	2.5	40	4				4		

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课程名称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150120111	动力机械测试技术 B Measurement of Heat Energy & Power Machinery B	2	32	10				4		
		4150157121	自控原理与应用 Principle and Application of Auto-control	2	32	4				4		
		4080060110	机械设计 Mechanical Design	4	64	6				5		
		4150049111	工程热力学 A Engineering Thermodynamics A	3.5	56	4				5		
		4150005111	传热学 B Heat Transfer	4	48	4				5		
		4150041111	动力系统自动化 Automation of Power System	2	32	4				5		
		4150206141	内燃机学 B Internal Combustion Engine Theory B	4	64					6		
		小计 Subtotal		34.5	536	56						
	选修课 Elective Courses	4150185131	动力机械工程微机应用技术 Computer Application Technology in Power	2	32	4				5		
		4150156121	内燃机燃烧学 Combustion Theory of IC Engine	2	32					5		
		4150137121	内燃机仿真计算 Simulation of Internal-combustion Engine	2	32			10		6		
		4150140121	内燃机专业英语 English of Internal-combustion Engine	2	32					6		
		4150133121	内燃机电子控制技术 The Electronic Control on IC Engine	2	32	4				6		
		4150134121	内燃机排放及后处理 Internal-combustion Engine Emissions and After-treatment Technology	2	32	2				6		
		4150186131	内燃机监测诊断技术 Monitoring and Diagnosis Technology on IC Engine	2	32	2				6		
		4150124111	内燃机匹配与优化 Internal-combustion Engine	2	32					6		
		4150187131	气体发动机 Gas engine	2	32	2				6		
		4150188131	内燃机增压技术 Internal combustion engine supercharging technology	2	32	2				6		
		4150132121	混合动力导论 Introduction to Hybrid Power	2	32					6		
		4150096111	汽车概论 B Structure of Automobile A	2	32					6		
		小计 Subtotal		24	384	16		10				
		修读说明：要求至少选修 13 学分 NOTE: Minimum subtotal credits: 13										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002111	军事训练 Military Training	3	1.5	1	
4180113111	机械制造工程实训 B Machinery Manufacturing Engineering Practice B	4	4	3	
4150103111	船舶认知实验 The Ships Cognition Tests(Dispersing)	1	1	4(分散)	
4100069111	电工电子实习 B Practice in Electrical Engineering & Electronics B	1	1	5	
4180109111	机械设计基础课程设计 Course Design of Mechanical Design	2	2	5	
4150193131	热力学和传热学课程设计 Course Design on Thermodynamics and Heat	1	1	5	
4150200131	柴油机结构认知与实操 The Structure Cognition and Operationfor Diesel Engine.	2	2	6	
4150129111	生产实习 Specialty Practice	16	16	7	
4150130111	能源动力系统设计实践 Design Practice of Energy & Power System	5	5	7	
4150148121	实验能力综合训练 Experiment Ability Combined Training	0.5	0.5	8（分散）	
4150144121	毕业实习 Graduation Practice	2	2	8	
4150145121	毕业设计（论文） Design for Graduation（Thesis）	15	10	8	
小计 Subtotal		52.5	46		

## 六、修读指导

### VI Recommendations on Course Studies

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2 个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7<sup>th</sup> term. The course will be arranged by the University Students' Affairs' Department in each school.

学院教学责任人：钱作勤  
专业培养方案责任人：贺玉海

# 【轮机工程（卓越工程师班）】2015 版本本科培养方案

## Undergraduate Education Plan for Specialty in Marine Engineering (Excellent Engineer Class) (2015)

专业名称	轮机工程	主干学科	船舶与海洋工程
Major	Marine Engineering	Major Disciplines	Marine and ocean engineering
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类 Course Classification 课程性质 Course Nature	通识课程 Public Basic Courses	学科大类课程 Basic Disciplinary Courses	专业课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	38	32.5	40	\	45.5	\	190
选修课 Elective Courses	9	5	10	\	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### （一）培养目标

- 树立正确的专业思想和适应国防性的要求。
- 掌握船舶动力和轮机系统的专业知识。
- 满足国际海员培训、发证和值班标准公约(STCW78 / 95)马尼拉修正案和我国海船船员适任标准的要求，具备远洋船舶轮机员任职资格（三管），并在未来具有担任更高级别轮机员的能力。
- 能在船舶运输及海洋工程各企事业单位从事轮机操纵、维修和船舶监修、监造工作、海事管理、船舶检验等高级技术人才。

##### （一）Educational Objectives

- Establish correct professional thoughts and adapt to the requirements of national defense.
- Master professional knowledge of marine power and turbine system.
- To meet marine engineers who have all professional knowledge of marine engineering, conform with the demands of the provisions of Manila amendments to the international convention on Standards of Training, Certification and Watchkeeping for seafarers, 1998 (STCW78/95) and of Seafarer Training, Examination and Certification in China, be qualified for marine engineer of Ocean Ship (fourth engineer), and have the ability to serve as a higher level of engineers in the future .
- The student can also be engaged in marine engineering maneuvering, maintaining and supervising ship repairing and building work, Maritime management, vessel inspection, etc. in any shipping and ocean engineering enterprises or institution.

##### （二）毕业要求

- 具有良好的道德。
- 强烈的责任感和事业心。



- (3) 海上国防性的要求。
- (4) 具有较强的表达和沟通能力。
- (5) 具有完备的心理素质和团队合作精神。
- (6) 具有较强的获取知识、终身学习的能力。
- (7) 具有从事轮机工程工作所需的工程科学技术知识以及一定的人文和社会科学知识。
- (8) 掌握扎实的轮机工程基础知识和本专业的基本理论知识，了解本专业的发展现状和趋势。
- (9) 熟悉机械设备的拆装及维护管理。
- (10) 具有操纵和维修船舶动力装置和对船舶监修、监造的初步能力。
- (11) 参与监督及机场设备管理的能力。

## (二) Educational Requirement

- (1) Have good moral.
- (2) Strong sense of responsibility and dedication.
- (3) Requirements of sea defence.
- (4) Have strong expression and communication skills.
- (5) Have complete psychological quality and team spirit.
- (6) Have strong ability of acquiring knowledge and lifelong learning.
- (7) Have Engineering Science knowledge in the marine engineering working and technology .  
Have humanities and social science knowledge
- (8) Master the basic knowledge of marine engineering and the professional basic theory knowledge, understand the development status and trend of the professional.
- (9) Familiarize mechanical equipment installation and maintenance management.
- (10) Have the preliminary ability of not only controlling and repairing of ship power plant but also ship repair supervisor and supervision.
- (11) The ability to participate in the supervision and management of the airport equipment.

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
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				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程：

船舶柴油机，船舶辅机，船舶电气设备与系统，轮机自动化，轮机维护与修理，船舶管理，轮机工程英语。

Core Courses: Marine Diesel Engine, Marine Auxiliary Machinery, Marine Electric Equipment and System, Marine Machinery Automation, Marine Machinery Maintenance and Repair, Ship Management, English of Marine Engineering.

(二) 专业特色课程:

船舶油处理及防污染, 轮机自动化系统微机应用, 船舶电站自动控制系统与管理, 轮机工程测试技术。

Characteristic Courses: Marine Oily Handling and Pollution Prevention, Application of Microcomputer in Marine Engineering, Auto-control System and Management of Marine Power Station, Experimental Technique of Marine Engineering.

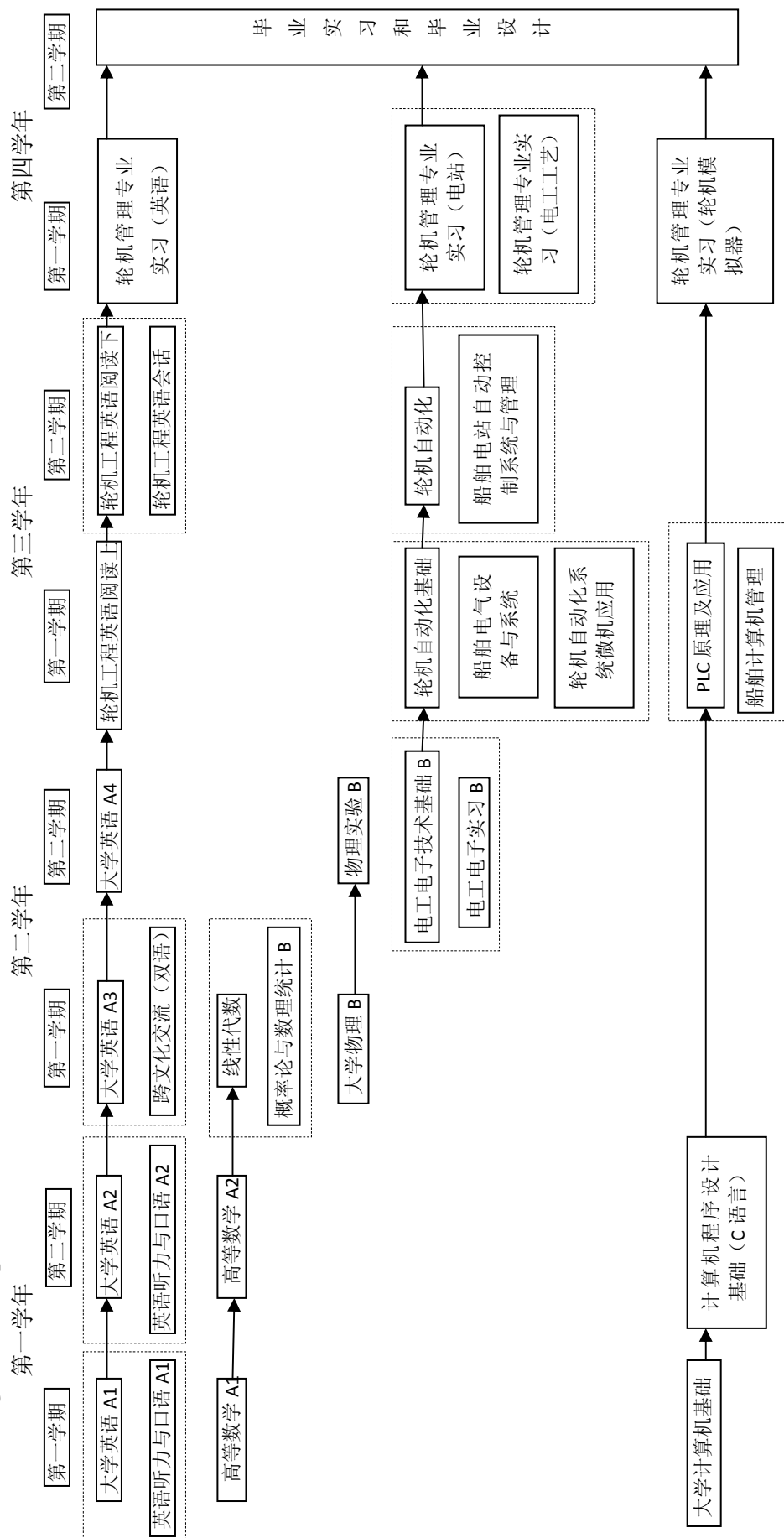
附: 毕业要求实现矩阵:

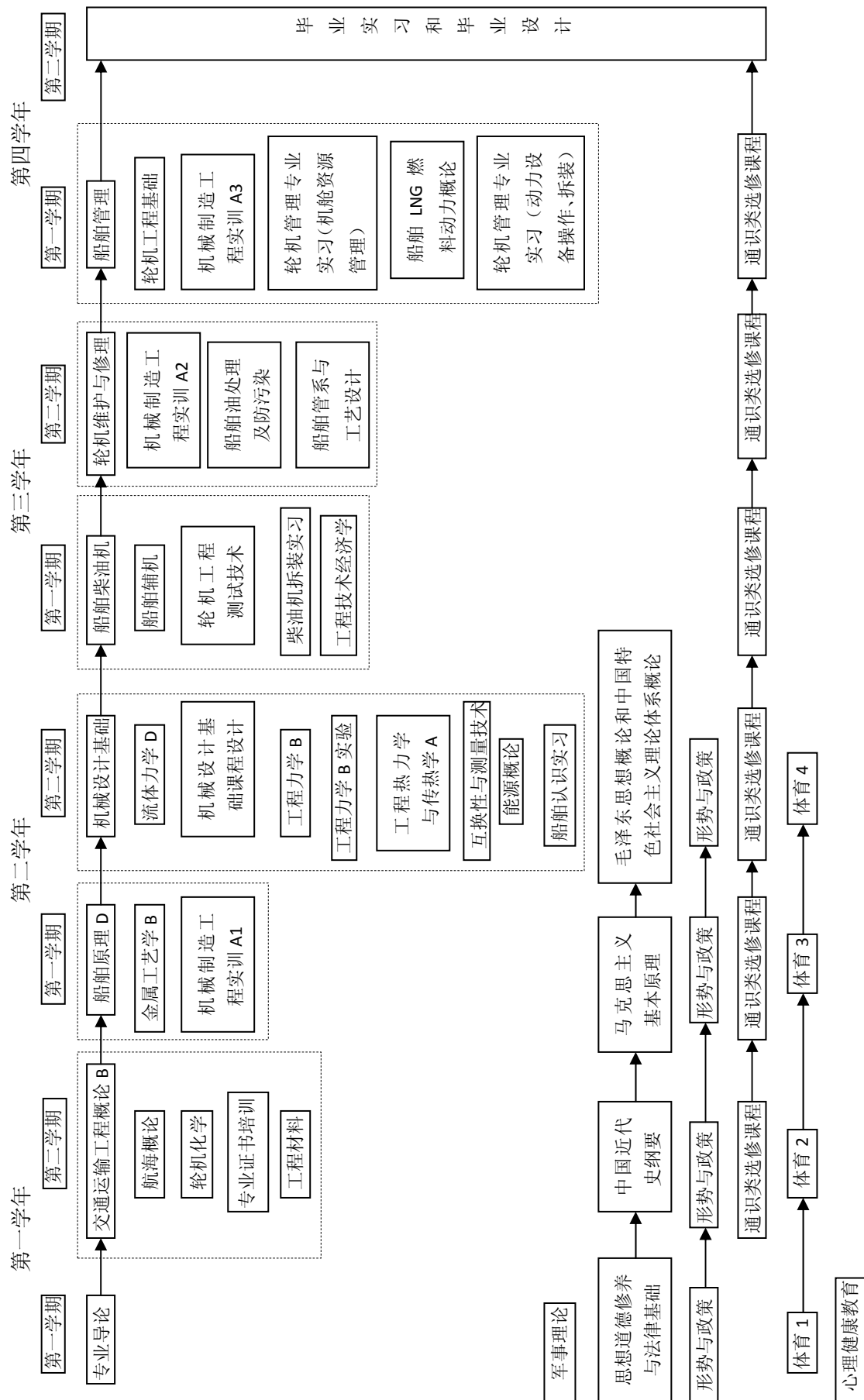
专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业(卓越工程师班)毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		思想道德修养与法律基础	√	√					√				
		中国近现代史纲要	√						√				
		毛泽东思想和中国特色社会主义理论体系概论	√						√				
		军事理论			√								
		心理健康教育					√						√
		马克思主义基本原理							√				
		体育			√		√						
		大学英语 A				√			√				
		大学计算机基础								√			
		英语听力与口语 A				√						√	√
		计算机程序设计基础(C 语言)							√	√			
		专业导论		√						√			
		高等数学 A							√	√			
		工程图学 B							√	√			
		线性代数							√	√			
		大学物理 B							√	√			
		物理实验 B							√	√			
		机械设计基础							√	√			

专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业（卓越工程师班）毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		电工与电子技术基础 B							√	√			
		交通运输工程概论 B								√		√	
		轮机化学							√	√			
		船舶原理 D								√		√	
		概率论与数理统计 B							√	√			
		跨文化交流				√							
		能源概论						√				√	
		工程技术经济学				√	√		√				
		流体力学 D							√	√			
		工程力学 B							√	√			
		工程力学 B 实验							√	√			
		工程材料							√	√			
		金属工艺学 B							√	√			
		互换性与测量技术 B							√	√		√	√
		工程热力学与传热学 A							√	√			
√		船舶柴油机									√	√	√
√		船舶辅机									√	√	√
√		船舶电气设备与系统									√	√	√
√		轮机自动化							√	√		√	√
√		轮机维护与修理									√	√	√
√		船舶管理									√		√
		航海概论		√					√				
	√	轮机自动化系统微机应用						√	√	√			
	√	轮机工程测试技术										√	√
		轮机自动化基础							√	√			

专业 核心 课程	专业 特色 课程	课程名称	轮机工程专业（卓越工程师班）毕业要求										
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
√		轮机工程英语阅读				√			√			√	√
		PLC 原理及应用								√			
		船舶计算机管理								√			
	√	船舶油处理及防污染		√									√
	√	船舶电站自动控制系统与管理							√	√			
		轮机工程英语会话				√						√	√
		船舶管系与工艺设计										√	√
		轮机工程基础							√	√			
		船舶 LNG 燃料动力概论						√		√			
		军事训练	√	√	√		√						
		电工电子实习 B								√		√	
		专业证书培训	√	√	√		√						√
		机械制造工程实训 A					√		√	√			√
		机械设计基础课程设计							√	√			
		柴油机拆装实习									√	√	√
		船舶认识实习	√	√	√	√	√						
		轮机管理专业实习	√	√	√	√	√	√	√	√	√	√	√
		毕业实习和毕业设计	√	√		√	√	√	√	√	√	√	√

### 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

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Ope-ration	实践 Prac-tice	课外 Extra-cur			
通 识 课 程  Public Basic Courses	必修课程 Required Courses	4220001111	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1		
		4220002111	中国近现代史纲要 Outline of Chinese Contemporary and Modern History	2	32					1		
		4220003111	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		3		
		1060001111	军事理论 Military Theory	1	32			16		4		
		1050001131	心理健康教育 Mental Health Education	1	16					1		
		4220005111	马克思主义基本原理 Marxism Philosophy	3	48			8		3		
		4210001111	体育 1 Physical Education I	1	32					1		
		4210002111	体育 2 Physical Education II	1	32					2	体育 1	
		4210003111	体育 3 Physical Education III	1	32					3	体育 2	
		4210004111	体育 4 Physical Education IV	1	32					4	体育 3	
		4030002111	大学英语 A1 College English A 1	3	64				16	1		
		4030003111	大学英语 A2 College English A II	3	64				16	2	大学英语 A1	
		4030004111	大学英语 A3 College English A III	3	64				16	3	大学英语 A2	
		4030005111	大学英语 A4 College English A IV	3	64				16	4	大学英语 A3	
		4120017111	大学计算机基础 Foundation of Computer	2	32		12			1		
		4030121111	英语听力与口语 A English Listening and Speaking A	1.0	24					1		
		4030122111	英语听力与口语 A English Listening and Speaking A	2.0	24					2	英语听力与口语 A	
		4120023111	计算机程序设计基础(C 语言) Fundamentals of Computer Program Design (C Language)	3	48		12			2		
		小 计 Subtotal				38	784		24	64	64	
	选修课程 Elective Courses	创新创业类 Innovation and Entrepreneurship Courses			全校学生要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程,取得至少 2 个学分。理工科专业学生至少选修一门人文社科类或经济管理类课程,其他专业学生至少选修一门科学技术类课程。 All students are required to obtain at least 9 credits, and must select art courses from Art and Physical Education Courses to obtain at least 2 credits. Science and engineering students							
		人文社科类 Arts and Social Science Courses										
		经济管理类 Economy and Management Courses										

课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
		总学时 Tot hrs.	实验 Exp.		上机 Ope-ration	实践 Prac-tice	课外 Extra-cur					
		科学技术类 Science and Technology Courses		should select at least one course from Arts and Social Science Courses or Economy and Management Courses, and other students should select at least one course from Science and Technology Courses.								
		艺术体育类 Art and Physical Education Courses										
学 科 大 类 课 程	必修课程 Required Courses	4150094111	专业导论 Introduction of Marine engineering Specialty	1	16					1		
		4050063111	高等数学 A1 Advanced Mathematics A I	5	80					1		
		4050064111	高等数学 A2 Advanced Mathematics A II	5	80					2	高等数学 A1	
		4180017111	工程图学 B Engineering Graphics B	4	64		4			1		
		4050229111	线性代数 B Linear Algebra B	2.5	40					3		
		4050023111	大学物理 B Physics B	5	80					3		
		4050224111	物理实验 B Physics Testing B	1	32	32				4		
		4180031111	机械设计基础 Foundational of Mechanical Design	3.5	56	6				4		
		4100011111	电工与电子技术基础 B Fundamentals of Electrical Engineering & Electric Technology B	5.5	88	20				4		
		小 计 Subtotal		32.5	592	58	4					
	选修课程 Elective Courses	4140114111	交通运输工程概论 B Panorama of Transportation Equipment B	1.5	24					2		
		4050334111	轮机化学 Marine Engineering Chemistry	1.5	24					2		
		4140034111	船舶原理 D Principle of Naval Architecture D	1.5	24					3		
		4050058111	概率论与数理统计 B Probability and Mathematics Statistic B	3	48					3		
		4150055111	跨文化交流 Intercultural Communication	1.5	32					3		
		4150184131	能源概论 Introduction to Energy	2	32					4		
		4150048111	工程技术经济学 Technical Economy	1	16					5		
	小 计 Subtotal		12	192								
修读说明：要求至少选修 5 学分。 NOTE: Minimum subtotal credits: 5.												



课程类别 Course Classification	课程性质 Course Nature	课程编号 Course Number	课 程 名 称 Course Title	学分 Cr	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
专 业 课 程 Specialized Courses	必修课程 Required Courses	4070072111	工程材料 Engineering Materials	2.5	40	4				2		
		4180045111	金属工艺学 B Metal Technology B	2.5	40	4				3		
		4140129111	流体力学 D Fluid Mechanics D	2	32	6				4		
		4140077111	工程力学 B Engineering Mechanics B	4	64					4		
		4140078111	工程力学 B 实验 Mechanics Experiments B	0.5	16	16				4		
		4180023111	互换性与测量技术 B Interchange Ability & Measurement B	2	32	4				4		
		4150050111	工程热力学与传热学 A Thermodynamics for Engineering and Heat Transfer A	4.5	72	12				4		
		4150006111	船舶柴油机 Marine Diesel Engine	4	64	4				5		
		4150006111	船舶辅机 Marine Auxiliary Machinery	5	80	10				5		
		4150011111	船舶电气设备与系统 Marine Electric Equipment and System	4.0	64	8				5		
		4150064111	轮机自动化 Marine Machinery Automation	3.5	56	6				6		
		4150062111	轮机维护与修理 Marine Machinery Maintenance and Repair	2	32	6				6		
		4150198131	船舶管理 Ship Management	3.5	56	4				7		
		小 计 Subtotal		40	640	88						
	选修课程 Elective Courses	4160035111	航海概论 Navigation Outline	1.5	24					2		
		4150066111	轮机自动化系统微机应用 Application of Microcomputer in Marine Engineering System	2	32	4				5		
		4150057111	轮机工程测试技术 Experimental Technique of Marine Engineering	1.5	24	4				5		
		4150065111	轮机自动化基础（限选） Foundation of Marine Automatic Control	2	32	4				5		
		4150001111	PLC 原理及应用 Principle & Application of PLC	2	32	4				5		
		4150027111	船舶计算机管理 Shipboard Computer Application	1.5	24		12			5		
		4150059111	轮机工程英语阅读上（限选） English of Marine Engineering	2	32					5		
		4150060111	轮机工程英语阅读下（限选） English of Marine Engineering	2.5	40					6	轮机工程英语阅读上	
		4150033111	船舶油处理及防污染 Marine Oily Handling and Pollution Prevention	2	32	4				6		

课程类别 Course Classification	课程性质 Course Nature	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	第二专业 Second Major
					总学时 Tot hrs.	实验 Exp.	上机 Operation	实践 Practice	课外 Extra-cur			
		4150013111	船舶电站自动控制系统与管理 Auto-control System and Management of Marine Power Station	2	32					6		
		4150058111	轮机工程英语会话 Oral English of Marine Engineering	1.5	24					6		
		4150023111	船舶管系与工艺设计 Install Technology of Ship Piping System	3	48					6		
		4150267111	轮机工程基础 Marine Engineering Foundation	2	32					7		
		4150199131	船舶 LNG 燃料动力概论 Introduction to the LNG Marine Power	2	32					7		
		小 计 Subtotal		27.5	440	20	12					
		修读说明：要求至少选修 10 学分。 NOTE: Minimum subtotal credits: 10.										

## 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	周数 Weeks	学分 Crs	建议修读学期 Suggested Term	第二专业 Second Major
1060002110	军事训练 Military Training	3	1.5	1	
4160096111	专业证书培训（含保安共计六个合格证） Training for Certificates	6	6	2(暑假)	*
4180112111	机械制造工程实训 A1 Machinery Manufacturing Engineering Practice	2	2	3	
4100069111	电工电子实习 B Practice in Electrical Engineering & Electronics B	1	1	4	
4150102111	船舶认识实习 Vessel Recognized Practice	3	3	4（暑假）	
4180109111	机械设计基础课程设计 Course Design of Mechanical Design	2	2	4	
4150101111	柴油机拆装实习 Diesel Engine Dismantling Practice	2	2	5	
4180135111	机械制造工程实训 A2 Machinery Manufacturing Engineering Practice	3	3	6	
4180139111	机械制造工程实训 A3 Machinery Manufacturing Engineering Practice	1	1	7	
4150107111	轮机管理专业实习 Marine Engineering Management Practice	13	13	7	*
4150098111	毕业实习和毕业设计 Practice or Design for Graduation	17	11	8	*
小 计 Subtotal		53	45.5		20.5

## 六、修读指导

### VI Recommendations on Course Studies

《形势与政策》课程，平均每学期 16 学时，一般按专题进行，在第七学期末考核，计 2

个课外学分，具体由学校学生发展指导中心负责组织落实。

Situation & Policy, a 16 hours/term with 2 credits course, is taught according to topics and tested at the end of the 7<sup>th</sup> term . The course will be arranged by the University Students' Affairs' Department in each school.

学院教学责任人：钱作勤  
专业培养方案责任人：毛小兵