Bachelor Program of Aircraft Design and Engineering

（in English）

“飞行器设计与工程专业”本科培养方案（英文授课）

(This document is the text compression version of the same major taught in Chinese and only for international students)

School of Aeronautic Science and Engineering & International School

Beihang University, Beijing, China

北京航空航天大学航空科学与工程学院 & 国际学院

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一、 培养目标

I. Educational Objectives

针对留学生的教育背景、认知特点及发展需求，培养具有扎实的自然科学基础知识和必备的专业知识，具有良好的学习能力、实践能力、专业能力、创新能力，团队合作精神与国际视野。培养飞行器总体设计、结构设计、外形设计、性能计算与分析、结构受力与分析、适航审定、故障诊断及维修、飞行器环境控制与生命保障等方面的专业人才。

Based on the education background and development need of oversea students, our Electronic Information Sciences are committed to developing advanced talents that: meet the needs of social development; have high moral integrity and social responsibility; are sound both in body and mind; have a solid grasp of natural science basics and essential expertise; possess good ability in learning, practice, specialty and innovation, as well as team spirit and international outlook. Training professionals in aircraft conceptual design, structural design, configuration design, performance calculation and analysis, structure stress and analysis, airworthiness certification, fault diagnosis and maintenance, aircraft environmental control and life support, etc.

二、 毕业要求

II. Degree Requirements

来华留学生应具有一定的基础汉语水平，了解中国法律法规、传统文化和风俗习惯等，热爱母校，亲华、知华、优华。

Foreign students should have some basic level of Chinese language, understanding Chinese laws and regulations, traditional culture and customs, etc., love alma mater, love China and know China.

在专业方面，毕业生具备良好数学、力学基础，具有飞行器设计工程基本理论和工程应用等方面的基础知识，具备从事飞行器设计科学研究与工程设计的基本能力，具有创新意识、科学素养、社会责任感与工程职业道德。

The students should have a solid math and mechanics foundation, the graduates will hopefully be equipped with the basic theory of aircraft design and engineering, the preliminary knowledge of engineering applications, etc., the basic capability to engage in aircraft scientific research and engineering design, which are reinforced by the sense of innovation, science literacy, social responsibility and engineering ethics.

三、 学制、学位

III. Study Period

学制：四年

Study Period：4 Years， Maximum: 6 Years (not including military service time)

授予学位：工学学士

Degrees Conferred: Bachelor of Engineering

四、 专业特色

IV. Characteristics

北京航空航天大学飞行器设计与工程专业是建国初期由多所著名大学航空工程系飞行器设计专业合并建立和发展起来的，该专业是我国首批具有硕士、博士学位授权的专业，也是首批博士后流动站单位，1992 年被评为全国同类学科第一名，现为国家重点学科。本学科每年承担和参与多项国家飞行器预研与研制、“973”工程、“863”高技术和国家自然科学基金等重大项目的研究。曾先后主持或参与研制了国内第一架轻型旅客机、“北京一号”，国内第一架高空高速无人侦察机和第一架共轴式遥控直升机，取得了上百项国家和省部级科研成果。目前本专业有以下特色：1. 国内地位高，北京航空航天大学飞行器设计学科创立五十年来，在学术研究和工程实践中形成了优良传统，积累了丰富经验，在我国航空、航天领域享有很高声誉，所隶属的一级学科“航空宇航科学与技术”在全国排名第一；2. 覆盖面广，研究对象含固定翼飞机、直升机、微小型飞行器、战术导弹/火箭弹、空天飞机等，形成了相对稳定、学科框架完善、综合性强、国防特色突出的研究方向；特别是直升机领域，经过“十年磨一剑”，已取得很大发展；3. 型号特色突出，承担包括国家重点型号项目“共轴双旋翼直升机”在内的多项国家型号项目，取得显著成果；4. 在轻型飞机和共轴无人直升机设计技术、隐身设计技术、气动弹性设计技术、先进飞行器结构设计、飞行力学等方面居国内领先水平。

Established in the early days of new China by merging the Aircraft Design majors from many famous universities’ Aerospace Engineering schools, BUAA’s Aircraft Design and Engineering is one of the first majors in China to offer PhD and Master’s degree programs, as well as one of the first post-doctoral research stations. In 1992, it was named the first among the nation’s similar disciplines, and now it is a national key discipline. Every year, the discipline undertakes or participates in the research tasks from many funding and projects, including the pre-research and development of national aircraft, national “973” Project, “863” High-tech Plan, and National Natural Science Foundations. It has developed China’s first light civil airplane named “Beijing-1”, China’s first high-altitude and high-speed unmanned reconnaissance aircraft and China’s first co-axial helicopter. The major bears the following features: 1. High domestic status. Since 1950s, BUAA’s aircraft design has formed an eminent tradition and accumulated rich experience in academic research and engineering practice, enjoying a good reputation in China aviation and aerospace fields. The first-level discipline of Aeronautic and Astronautic Science and Technology to which it is affiliated ranks first in the country. 2. Comprehensive research. The research covers the fixed-wing aircraft, helicopters, micro air vehicles (MAVs), tactical missiles/rocket projectiles, aerospace planes, etc. It

has formed a comprehensive and stable disciplinary framework which is of prominent national defence features. In particular, its helicopter research has made remarkable progress during the past decade. 3. Prominent model features. It has assumed a number of national model projects, including the national key model project “coaxial twin-rotor helicopter”, with remarkable results achieved. 4. It leads the nation’s light aircraft and coaxial unmanned helicopter design technology, stealth design technology, aeroelastic design technology, advanced aircraft structure design, flight mechanics, etc.

飞行器设计与工程专业包括飞机设计、直升机设计、适航技术与管理和飞行力学等方向可供学生选择，毕业生主要从事飞机、火箭、导弹、卫星等飞行器的设计、实验、研究、运行维护等工作，还可从事民用机械、交通运输工程、船舶与海洋工程、工业与民用建筑工程、软件工程等方面的设计与科研、教学工作。

Aircraft Design and Engineering major offers the following orientations for students to choose: aircraft design, helicopter design, technology and management of airworthiness and flight mechanics. The graduates mainly engage in the design, experiment, research, operation and maintenance of aeroplanes, rockets, missiles, satellites, etc. They can also embark on the design, research and teaching of civilian machinery, transportation engineering, ship and marine engineering, industrial and civil construction engineering, software engineering, etc.

五、 课程体系

V. Program Structure and Modules

共分为四个课程模块：基础课程、语言及文化课程、通识课程和专业课程。

There are three course modules: Foundation Courses, General Education (GE) Courses, Major Courses.

表 1 课程体系及各课程类别的最低学分要求示意图

Table 1 The Credit Requirement (Minimum) of each Course Type for Bachelor in Aircraft Design and Engineering

课程模块 Course Module	Order	课程类别 Course Type	学分 Credits
I 基础课程 Foundation Courses (FC)	A	数学与自然科学类 Mathematics and Natural Sciences (MNA)	31.0
	B	工程基础类 Engineering Fundamentals (EF)	12.5
	C	语言和文化 Language and Culture (LC)	10.0
II 通识课程 General Education	D	思政类 Ideology and Politics (IP)	——
		军理类	——

Courses (GE)		Military Theory (MT)	
	E	体育类 Physical Education (PE)	--
	F	核心通识课程 Core GE Courses (C-GE)	2.0
	G	一般通识课程 General GE Courses (G-GE)	2.0
	H	博雅类 Liberal Arts (LA)	--
III 专业课程 Major Courses (MC)	I	核心专业基础课 Core Major Course (C-MC)	88.0
	J	一般专业课 General Major Course (G- MC)	
	L	专业实践课 Practical Major Course (PMC)	

基础课程模块，主要包括数学与自然科学类（如数学、物理等）、工程基础类（如机械和 C 语言程序设计等），以及语言类。其中，《汉语》和《中国概况》是来华留学英文授课本科生的必修课。通识课程模块，旨在培养和提高学生在人文、社科等方面的知识和修养。专业课程模块，分为专业核心类和专业选修类。学生可根据个人的兴趣及发展方向，在学业指导老师的指导下学习。

Foundation courses include Mathematics and Natural Sciences courses (Mathematics, Physics, etc.), Engineering Fundamentals courses (Mechanism, C language, etc.). Language courses include Chinese courses for oversea student studied in China. General Education courses are courses to improve knowledge and cultivation in humanities and social sciences. Major courses are divided into Specialized Core Courses and Specialized Elective Courses. The students can select based on their own interest and direction under the guidance of supervisor.

六、 主要课程

VI. Main Major courses

理论力学 A（1）、理论力学 A（2）、材料力学 A、空气动力学 A、画法几何、机械制图、机械设计基础 A(1)、热工基础 A（1）、自动控制原理 B、飞行力学、飞机总体设计、飞机结构设计、飞行器结构力学、毕业设计。

Theoretical Mechanics A(1)、Theoretical Mechanics A(2)、Mechanics of Materials A、Aerodynamics A、Descriptive Geometry、Mechanical Drawing、Basics of Machine Design A(1)、Fundamentals of Thermal Engineering (1)、Automatic Control Theory B、Flight Mechanics、Aircraft Conceptual Design、Aircraft Structural Design、Structural Mechanics of Aircraft、Graduation Project.

七、 主要实践教学环节及安排

VII. Main Internship and Practical (Including experiments)

表 2 实践课程清单

Table2 Practical Course

序号 No.	课程名称 Course Title	课程类别 Course Type	开课学期 Semester	学分 Credits	总学时 Hours
1	机械工程技术训练 A Mechanical Technology Practice A	B 工程基础	2	3.5	144
2	基础物理实验 B (1) Fundamental Physics Experiments B (1)	A 数/物	3	1.5	28
3	基础物理实验 B (2) Fundamental Physics Experiments B (2)	A 数/物	4	1.5	24
4	毕业设计 Graduation Project	I 专业核心类	7-8	8.0	16weeks

八、 毕业最低学分

VIII. Minimum Required for Graduation

毕业最低学分要求：在满足各课程类别最低学分的要求下，总学分不低于 125 学分。

Minimum Required for Graduation=125 credits, and meet the credit requirement of each Course Type at the same time.

九、 教学进程计划

IX. Education Curriculum

the 1st Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B1A09101BL	工科高等数学 (1) Advanced Mathematics for Engineering (1)	90	6.0	Compulsory	MNA	Examination
B25D111I	中国概况 Introduction to China	32	2.0	Compulsory	LC	Examination
B1C251131L	汉语 (1) Chinese (1)	64	4.0	Compulsory	LC	Examination
B2F050121L	航空航天概论 B Introduction to Aeronautics and Astronautics B	32	2.0	Compulsory	C-GE	Examination
B1B061011L	大学计算机基础 University Computer Foundation	44	2.0	Compulsory	G-GE	Examination
B1B321011L	工程认识 Engineering Experience and Cognition	20	0.5	Compulsory	EF	Examination
E05B1030	工程图学 B Engineering Graphics B	64	4.0	Compulsory	C-MC	Examination

	学期学分小计 Semester Credits		20.5			

the 2nd Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B1A09102BL	工科高等数学 (2) Advanced Mathematics (2)	86	5.0	Compulsory	MNA	Examination
B1A191011L	工科大学物理 (1) University Physics for Engineering (1)	64	4.0	Compulsory	MNA	Examination
B1C251141L	汉语 (2) Chinese (2)	64	4.0	Compulsory	LC	Examination
B1A091031L	工科高等代数 Advanced Algebra	80	5.0	Compulsory	MNA	Examination
B1B322010	机械工程技术训练 A Mechanical Technology Practice A	140	3.0	Compulsory	EF	Examination
C25D121I	C 语言程序设计与实践 C Programming Language	48	2.5	Compulsory	EF	Examination
	学期学分小计 Semester Credits		23.5			

the 3rd Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B1A062041L	概率统计 A Probability Statistics A	48	3.0	Compulsory	MNA	Examination
B1A05201BL	复变函数 Complex Variables	32	2.0	Compulsory	MNA	Examination
B1A192011L	工科大学物理(2) University Physics for Engineering (2)	64	4.0	Compulsory	MNA	Examination
B1A192031L	基础物理实验 B (1) Fundamental Physics Experiments B (1)	28	1.5	Compulsory	MNA	Examination
B3I052011L	理论力学 A(1) Theoretical Mechanics A(1)	64	4.0	Compulsory	C-MC	Examination
B3I032011L	电路分析 Circuit Analysis	48+16	3.5	Compulsory	G-MC	Examination
B1C251151L	汉语(3) Chinese (3)	64	4.0	Compulsory	LC	Examination
	学期学分小计 Semester Credits		22.0			

the 4th Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B1A192041L	基础物理实验 B (2) Fundamental Physics Experiments B (2)	24	1.5	Compulsory	MNA	Examination
B3I052021L	理论力学 A(2) Theoretical Mechanics A(2)	24	1.5	Compulsory	C-MC	Examination
B3I052031L	材料力学 A Mechanics of Materials A(2)	64+16	5.0	Compulsory	C-MC	Examination
B3I052111L	空气动力学 A Aerodynamics A	64+16	5.0	Compulsory	C-MC	Examination
B3I072031L	机械原理 Theory to Machines and Mechanisms	54	2.5	Compulsory	G-MC	Examination

B3I052121L	热工基础(1) Fundamentals of Thermal Engineering (1)	64	4.0	Compulsory	C-MC	Examination
B3I321021L	工程材料学 The Science of Engineering Materials	32	2.0	Compulsory	G-MC	Examination
B1B322041L	电子工程技术训练 Electronic Technology Practice	80	2.0	Compulsory	EF	Examination
B1C251161L	汉语(4) Chinese (4)	64	4.0	Compulsory	LC	Examination
	学期学分小计 Semester Credits		27.5			

the 5th Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B3I053151L	自动控制原理 B Automatic Control Theory (B)	42+6	3.0	Compulsory	C-MC	Examination
B3I053111L	飞机总体设计 Aircraft General Design	40+8	3.0	Compulsory	C-MC	Examination
B3I053121L	飞机结构设计 Design Aircraft Structure Design	48+8	3.5	Compulsory	C-MC	Examination
B3I073041L	机械设计 Mechanical Design	64	3.0	Compulsory	??	Examination
B3I050511	弹性力学 Mechanics of Elasticity	48	3.0	Compulsory	G- MC	Examination
B3J05070A	振动力学基础 Vibration Mechanics Foundation	32	2.0	Compulsory	G- MC	Examination
	学期学分小计 Semester Credits		17.5			

the 6th Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B3I053161L	飞行力学 Flight Dynamics	36+4	2.5	Compulsory	C-MC	Examination
B3I053131L	飞行器结构力学 Structural Mechanics of Aircraft	48	3.0	Compulsory	C-MC	Examination
B3J05030AL	直升机飞行性能、操纵及稳定性 Helicopter Flight Performance, Control and Stability	16	1.0	Compulsory	G- MC	Examination
B3J05032AL	直升机总体设计 Helicopter General Design	24	1.5	Compulsory	G- MC	Examination
B3J05041AL	计算流体力学 Computational Fluid Dynamics	32	2.0	Compulsory	G- MC	Examination
B3J05044AL	实验流体力学 Experimental Fluid Mechanics	32	2.0	Compulsory	G- MC	Examination
B3J050531	断裂与损伤力学 Fracture and Damage Mechanics	32	2.0	Compulsory	G- MC	Examination
B3J050581	复合材料力学 Compound Material Mechanics	32	2.0	Compulsory	G- MC	Examination
B3J050611	结构分析中的有限元法 Structure Analysis of Finite Element Method	32	2.0	Compulsory	G- MC	Examination
B3J050691	有限元方法在结构分析中的应用 The Finite Element Method in the Application of the Structural Analysis	32	2.0	Compulsory	G- MC	Examination

	学期学分小计 Semester Credits		20.0			

the 7th Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B3J05025AL	气动弹性设计 Aero-elastic Design	16	1.0	Compulsory	G- MC	Examination
B3J05040AL	高超音速空气动力学基础 Fundamentals of Hypersonic Aerodynamics	32	2.0	Compulsory	G- MC	Examination
B3J050561	分子动力学理论与实践入门 Introduction to Molecular Dynamics Theory and Practice	32	2.0	Compulsory	G- MC	Examination
	学期学分小计 Semester Credits		5.0			

the 8th Semester

Code	Title	Hours	Credits	Note	Type	Evaluation
B3I054011L	毕业设计 Graduation Project	16weeks	8.0	Compulsory	PMC	Test

备注

(1) 只列出各学期必修课程目录

Only compulsory courses are listed;

(2) **课程类别的相关说明**

Explanation of course type:

数学与自然科学类	Mathematics and Natural Sciences (MNA)
工程基础类	Engineering Fundamentals (EF)
语言和文化	Language and Culture (LC)
核心通识课程	Core GE Courses (C-GE)
一般通识	General GE Courses (G-GE)
核心专业基础课	Core Major Courses(C-MC)
一般专业课	General Major Course(G-MC)
专业实践课	Practical Major Course (PMC)

如下课程留学生可选修

Other courses student can select

Course Type	Title	Credits	Note
PE	体育课(1) Physical Education	0.5 Credit/Semester	International students can select from the 2nd semester.
LA	文化素质拓展 Culture Quality Developing	1.0 Credit/Semester	International students can select from the 3rd semester.
G-GE	暑期学校系列课程 Courses in Summer Camp	Max 6.0 Credits /Summer Semester	International students can select the courses in summer semester (3rd semester) during the 2nd or the 3rd academic year.

G-GE	专业英语阅读与写作 Professional English Reading and Writing	2.0 Credits/Semester	International student can select since 5th semester.
	社会实践 Social Practice	1.0 Credit	
	汉语水平考试 HSK	1.0 credit	One credit will be offered if the international student passed HSK 3 or over.
	其他课程 Other Courses		See the time-table at the beginning of each semester.

十、 联系方式

X. Contact Detail

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