

# Program of Aerospace Engineering for International Students (2019)

## I. Introduction

Aerospace Engineering is a modern area that exemplifies the need for interdisciplinary problem solving and the mind for innovation. Aerospace Engineering is also an area of national strategic importance and high priority for growth. The Aerospace Engineering bachelor program at SUSTech is led by the Member of Chinese National Academy of Engineering, and the faculty consists of several renowned scholars from the 1000-talent program. Major areas include aircraft design and engineering, aircraft propulsion, and aircraft manufacturing. The design and analysis of Aerospace Engineering relies on solid grasp of broad subjects of mechanics, heat transfer, material science, and electronics; the proficient knowledge of these subjects are applicable in other areas such as mechanical engineering and civil engineering. The students trained by the Aerospace Engineering program are expected to establish solid foundations of mathematics and mechanics, as well as deep understanding of basic aircraft design theory, strong capabilities in structural analysis, and good hands-on skills.

## II. Objectives and Learning Outcomes

- Objectives

The Aerospace Engineering program at SUSTech is dedicated to train students of high calipers by empowering them with solid foundations of mathematics and mechanics, broad knowledge in aerospace engineering, good overall capability of aircraft design, and a mind for innovation. The students who successfully complete the program may perform consulting, research and development, planning, and management roles in the industries of aerospace engineering, mechanical engineering, and mechanics. They can also enter top universities and research institutes to pursue master or doctoral degrees.

- Learning Outcomes

Morality and humanity. With professionalism, a firm attitude of pursuing excellence, a sound personality, a sense of social responsibility and rich humanities and sciences accomplishment.

Basic knowledge. Master the basic theoretical knowledge and skills of engineering such as mathematics, mechanics, physics, electronics, machinery and so on.

Core knowledge

Have the necessary ability of drawing, computing, experimenting and testing in this major. Through the professional curriculum design, students can initially achieve the design, control, debugging and research abilities of aircraft application system. At the same time, they have strong computer and foreign language application abilities.

Master the complete basic knowledge system of aerospace engineering, including material mechanics, engineering thermodynamics, aircraft dynamics, aerodynamics, control principle, aircraft design, aircraft turbomachinery principle, aircraft structural strength and so on.

Master the general engineering design, aircraft design, Aerial engine Design and other design methods.

Understand the frontiers of the discipline. Understand the development trends, theoretical frontiers and application prospects in the field of aerospace.

Master the basic methods of literature retrieval and data query, and have the ability to engage in scientific research and practical work.

Management ability and teamwork ability. Good organizational and management skills, good communication skills, as well as environmental adaptation, team work ability.

International vision. Has the international vision and certain international exchange and cooperation ability.

Life long learning. Have the consciousness of lifelong learning and self-learning ability, innovative consciousness and grasp the basic innovative methods.

### III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 137 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses ( 48 credits )	Science	28
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses ( 13 credits )	Humanities	4
	Social Sciences	4
	Arts	2
	Science	3
Major Course ( 76 credits )	Major Foundational Courses	20
	Major Core Courses	22
	Major Elective Courses	17
	Research Projects, Internship and Undergraduate Thesis / Projects	17
Total (not including English courses)		137

### IV. Discipline

Aerospace Engineering

### V. Main Courses

Engineering Mechanics I-Statics and Dynamics, Fundamentals of Electric Circuits, Engineering Thermodynamics, Strength of Materials, Engineering Fluid Mechanics, Aerodynamics, Aircraft Structural Strength, Fundamentals of Machine Design, Aircraft Structure Strength Lab , Aero-Thermal Fluid Lab, Jet and Propulsion, Heat Transfer, Aircraft Design Group Practice.

### VI. Practice-Based Courses

Include: Research and Innovation Projects, Metalworking Practices, Summer Internship,

Degree Thesis (or Design).

### VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B
Declare major at the end of Second Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B
	MAE203B	Engineering Mechanics I - Statics and Dynamics	MA107A

## VIII. Requirements for GE Required Courses

### (I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
MA101B	Calculus I A	4		4	1/Fall	E		MATH
MA102B	Calculus II A	4		4	1/Spr	E	MA101B	
MA107A	Linear Algebra A	4		4	1/Fall	E		MATH
PHY103B	General Physics B (I)	4		4	1/Fall	E		PHY
PHY105B	General Physics B (II)	4		4	1/Spr	E	PHY103B	
CH101B	General Chemistry B	3		3	1/Spr/Fall	E		CHEM
CS102B	Introduction to Computer Programming B	3	1	4	1/Spr/Fall	E		CSE
PHY104B	Experiments of Fundamental Physics	2	2	4	1/Spr/Fall	E		PHY
Total		28	3	31				

### (II) Physical Education

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
GE131	Physical Education I	1		2	1/Fall	C	NA	PE Center
GE132	Physical Education II	1		2	1/Spr	C	NA	
GE231	Physical Education III	1		2	2/Fall	C	NA	
GE232	Physical Education IV	1		2	2/Spr	C	NA	
Total		4		8				

### (III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Language Instruction	Prerequisite	Dept
CLE008	Elementary Chinese I	2	4	1/Fall	B	NA	CLE
CLE009	Elementary Chinese II	2	4	1/Spr	B	CLE008	
CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	

CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/ HUM/ SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	
Total		16	28				

#### (IV) English Language

All students are required to undertake the English Placement Test before selecting courses, based on which students will be assigned to 3 levels to be ready for the courses with English as the instruction language.

SUSTech English III, English for Academic Purposes are required for Level A.

SUTech English II, SUSTech English III, English for Academic Purposes for Level B.

SUSTech English I, SUSTech English II, SUSTech English III, English for Academic for Level C.

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept
CLE021	SUSTech English I	4	4	E	NA	CLE
CLE022	SUSTech English II	4	4	E	CLE021	
CLE023	SUSTech English III	4	4	E	CLE022	
CLE030	English for Academic Purposes	2	2	E	CLE023	

#### IX Requirements for GE Elective Courses

(I) Students are required to complete 4 credits for the Humanities Module and Social Sciences Module respectively, and 2 credits for the Music and Art Module. (Information about the available courses and the instruction language will be announced before the course selection session)

(II) Students are required to complete 3 credits for Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
BIO102B	Introduction to Life Science	3		3	1/Spr/Fall	B	NA	BIO
PHYS001	Open Physics Laboratory I	1	1	2	1/Smr	B	NA	PHY
MAE101	Experimental DIY: Discover the beauty of mechanics	2	2	4	1/Spr/Fall	B	NA	MAE
MAE205	Introduction to Aeronautics and Mechanics	2		2	2/Fall	B	NA	MAE
MAE206	Introduction to Aircraft Engines	1		1	2/Fall	B	NA	MAE
Total		9	2					

## X. Major Course Arrangement

**Table 1: Major Required Course (Foundational and Core Courses)**

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Take the course Advised term to	Instruction Language	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall/Spr/Smr	1/Spr	B	NA	MEE
	EE104	Fundamentals of Electric Circuits	2		2	Fall/Spr	1/Spr	B	MA107B MA101B	EE
	MAE203B	Engineering Mechanics I - Statics and Dynamics*	3		3	Fall	2/Fall	E	MA107A	MAE
	MA212	Probability and Statistics	3		3	Fall / Spr	2/Fall	B	MA102B	MATH
	MAE305	Engineering Thermodynamics*	3		3	Fall	2/Fall	B	MA102B	MAE
	MAE207	Engineering Fluid Mechanics*	3		3	Fall/Spr	2/Fall	B	MA102B	MAE
	MAE202	Mechanics of Materials*	3		3	Spr	2/Spr	B	MA107A MA102B	MAE
	Total			20	1.5	21.5				
Major Core Courses	MAE405	Aerodynamics	3		3	Fall	3/Fall	B	MA102B	MAE
	MAE307	Aircraft Structural Strength	3		3	Fall	3/Fall	E	MAE202	MAE
	ME303	Fundamentals of Machine Design	3		3	Fall/Spr	3/Fall	B	ME102 MAE203B MAE202	MEE
	MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/Fall	C	MAE207 or MAE303	MAE
	MAE316	Experiments in Aircraft Structural Mechanics	2	2	4	Spr	3/Spr	C	MAE202	MAE
	MAE407	Jet and Propulsion	3		3	Spr	3/Spr	E	MAE305 Or PHY204	MAE
	MAE308	Heat Transfer	3		3	Spr	3/Spr	E	MA102B	MAE
	MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/Fall	B	NA	MAE
Total			22	6	28					
	MAE499	Research and Innovation Projects	2	2	4	Fall/Spr	4/Fall	C	NA	MAE
	ME103	Awareness Practice of Manufacturing Engineering	3	2	5	Fall/Spr		B	NA	MEE
	MAE480	Summer Internship	4	4		Smr	3/Smr	C	NA	MAE
	MAE490	Degree Thesis (or Design) *	8	8		Spr	4/Spr		NA	MAE
				17	16					

Students who have completed Comprehensive Design I & II (COE491 & COE492) are not required to take the Graduation Project (or Thesis) (MAE490) .

**Table 2: Major Elective Courses**

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
MAE498	Research and Innovation Projects of Mechanics and Aerospace Engineering	2	2	4	Fall / Spr	2/Fall-4/Fall	C	NA	MAE
MAE208	Lectures on selected Engineering Software	2		2	Fall / Spr	2/Spr	C	NA	MAE
MAE210	Engineering Materials	3		3	Spr	2/Spr	C	NA	MAE
MAE204	Theoretical Mechanics II	3		3	Spr	2/Spr	B	MA107A MA102B	MAE
MAE211	Overseas Practice	2	2	4	Smr	2/Smr	B	NA	MAE
MAE312	Aircraft Flight Dynamics	3		3	Fall	3/Fall	E	MA102B	MAE
MAE313	Aero Engine Structure and Strength	3	1	4	Fall	3/Fall	E	NA	MAE
MAE309	General Principles of Transport Phenomena	3		3	Fall	3/Fall	E	MA102B	MAE
MAE304	Elasticity	4		4	Spr	3/Spr	C	MAE203 MAE202	MAE
MAE403	Computational Fluid Dynamics	3		3	Spr	3/Spr	E	MAE207 or MAE303	MAE
MAE310	Computational Solid Mechanics	3		3	Spr	3/Spr	E	MAE202	MAE
MAE320	Mechanism of Flight Vehicle	3		3	Spr	3/Spr	C	MAE207 or MAE303	MAE
MAE314	Advanced Numerical Methods	3		3	Spr	3/Spr	B	MA102B	MAE
MAE318	Theory of Vibration	3		3	Spr	3/Spr	E	MAE203B MA201b	MAE
MAE319	Interfacial Phenomena	3		3	Spr	3/Spr	C	PHY105B	MAE
MAE410	Fracture Mechanics	3		3	Spr	3/Spr	E	MAE202	MAE
MAE321	Multiphase Flow	3		3	Spr	3/Spr	E	MAE207	MAE
MAE412	Aeroacoustics	3		3	Fall	4/Fall	E	MAE207 Or MAE303	MAE
MAE311	Principles of Turbomachinery	3		3	Fall	4/Fall	C	MA102B	MAE
MAE413	Mechanics of Composite Materials	3		3	Fall	4/Fall	B	MA102B	MAE
MAE419	Aerodynamic analysis and design of aircraft	2		2	Fall	4/Fall	C	MAE403	MAE
MA201b	Ordinary Differential Equations B	4		4	Fall / Spr	2/Fall	B	MA102B	MATH
ME307	Fundamentals of Control Engineering	3	1	4	Fall / Spr	3/Fall	B	EE104	MEE
ME306	Fundamentals of Robotics	3	1	4	Fall / Spr	3/Spr	B	ME303 ME307	MEE
ME310	Fundamentals of Measurement Technology	3		3	Spr	3/Spr	B	ME307 EE205	MEE
ME301	Dynamics and Vibration	3	1	4	Fall / Spr	3/Spr	B	MA201b MAE203B	MEE
EE205	Signals and Systems	3	1	4	Fall	2/Fall	B	MA101B	EE

EE201-17	Analog Circuits	3		3	Fall	2/Fall	C	PHY105B EE104	EE
EE323	Digital Signal Processing	3	1	4	Fall	4/Fall	E	EE205	EE
CS205	C/C++ Programming Design	3	1	4	Spr	1/Spr	C	NA	CSE
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	B	CS102A	CSE
PHY221	Open Physics Laboratory II	1	1	2	Fall	2/Fall	B	NA	PHY
PHY201-1 5	Physics Laboratory II	2	2	4	Fall	2/Fall	B	PHY103B	PHY
PHY203-1 5	Mathematical Methods in Physics	4		4	Fall	2/Fall	C	MA107A MA102B	PHY
PHY202	Physics Laboratory III	2	2	4	Spr	2/Spr	B	PHY103B	PHY
PHY425	Modern Techniques in Materials Characterization	3	1	4	Fall	4/Fall	B	PHY206-15	PHY
Total		103	18	121					
Notes:									
1. Students are required to complete 17 credits for the Major Elective Courses.									



**Table 3: Overview of Practice-Based Courses**

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	take the course Advised term to	Instruction language	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall / Spr/ Smr	1/Spr	B	NA	MEE
MAE211	Overseas Practice	2	2	4	Smr	2/Smr	B	NA	MAE
MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/Fall	C	MAE207 or MAE303	MAE
MAE316	Experiments in Aircraft Structural Mechanics	2	2	4	Spr	3/Spr	C	MAE202	MAE
MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/Fall	C	NA	MAE
MAE499	Research and Innovation Projects	2	2	4	Fall / Spr	4/Fall	C	NA	MAE
ME103	Awareness Practice of Manufacturing Engineering	3	2	5	Fall / Spr/ Smr	1/Fall--4/Fall	B	NA	MEE
MAE480	Summer Internship	4	4		Smr	3/Smr	C	NA	MAE
MAE490	Degree Thesis(or Design)	8	8		Spr	4/Spr		NA	MAE
Total		29	25.5						

**Table 4: Overview of Course Hours and Credits**

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)		48	48	38%
General Education (GE) Elective Courses			13	9%
Major Foundational Courses	344	20	20	14%
Major Core Courses	448	22	22	15%
Major Elective Courses	1936	103	17	12%
Research Projects, Internship and Undergraduate Thesis/Projects	544	17	17	12%
<b>Total (not including English courses)</b>	<b>3272</b>	<b>223</b>	<b>137</b>	

\* Percentage of the total= Credit requirements of each line / Total credit requirements

## Curriculum Structure of Aerospace Engineering



