Department of Mechanics and Aerospace Engineering

Program of Aerospace Engineering (2017 UG Students)

I. Introduction and Objectives

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.

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.

II. Study Length and Degree Requirements

Study length: 4 years

Degree conferred: Bachelor of Engineering.

The minimum credit requirement for graduation: 136.5 credits (not including English courses)

III. Discipline

Aerospace Engineering

IV. 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.

V. Practice-Based Courses

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

Degree Thesis (or Design)

VI. Course components and minimum credit requirement

General Education (GE) Required Courses: 50.5 credits (not including English courses)

General Education (GE) Elective Courses: 10 credits

Major Foundational Courses: 20 credits

Major Core Courses: 22 credits

Major Elective Courses: 17 credits

Research and Innovation Projects: 2 credits

Metalworking practices (Awareness Practice of Manufacturing Engineering): 3 credits

Summer internship: 4 credits

Degree Thesis (or Design): 8 credits

The minimum credit requirement for graduation: 136.5 credits (not including English courses)

VII. Requirements for Science Module of GE Required Courses

Course Code	Courses	Credits
MA101B	Calculus I A	4
MA102B	Calculus II A	4
MA103A	Linear Algebra I-A	4
PHY103B	General Physics B (I)	4
PHY105B	General Physics B (II)	4
CH101B	General Chemistry B	3
CS102B	Introduction to Computer Programming B	3
BIO102B	Introduction to Life Science	3
PHY104	Experiment for Foundation of Physics	1.5

VIII. Pre-requisites for Major Declaration

Course Code	Course Name	Notes
MA102B	Calculus II A	
PHY105B	General Physics B (II)	
MA103A	Linear Algebra I-A	

IX. Course Arrangement

Table 1 Major Required Courses (Foundational and Core Courses)

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall/ Spring/ Summer	1/ Spring	B	NA	MEE
	EE104	Fundamentals of Electric Circuits	2		2	Fall/ Spring	1/ Spring	B	MA103B MA101B	EEE
	MAE203 B	Engineering Mechanics I - Statics and Dynamics*	3		3	Fall	2/ Fall	E	MA103B OR MA103A	
	MA212	Probability and Statistics	3		3	Fall / Spring	2/ Fall	B	MA102C	MATH
	MAE305	Engineering Thermodynamics*	3		3	Fall	2/ Fall	B	MA102B	
	MAE207	Engineering Fluid Mechanics*	3		3	Fall / Spring	2/ Spring	B	MA102B	
	MAE202	Mechanics of Materials*	3		3	Spring	2/ Spring	B	MA103A MA102B	
	Total		**20**	**1.5**	**21.5**					
Major Core Courses	MAE405	Aerodynamics	3		3	Fall	3/ Fall	B	MA102B	
	MAE307	Aircraft Structural Strength	3		3	Fall	3/ Fall	B	MAE202	
	ME303	Fundamentals of Machine Design	3		3	Fall / Spring	3/ Fall	B	ME102 MAE203B MAE202	MEE
	MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/ Fall	C	MAE207 OR MAE303	
	MAE316	Aircraft Structure Strength Lab	2	2	4	Spring	3/ Spring	C	MAE202	
	MAE407	Jet and Propulsion	3		3	Spring	3/ Spring	E	MAE305 OR PHY204	
	MAE308	Heat Transfer	3		3	Spring	3/ Spring	E	MA102B	
	MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/ Fall	B	NA	
	Total		**22**	**6**	**28**					
MAE499		Research and Innovation Projects	2	2	4	Fall / Spring	4/ Fall	C	NA	
ME103		Awareness Practice of Manufacturing Engineering (Metalworking Practices)	3	2	5	Fall / Spring / Summer	1/ Fall -- 4/Fall	C	NA	MEE
MAE480		Summer Internship	4	4		Summer	3/ Summer	C	NA	
MAE490		Degree Thesis (or Design)	8	8		Spring	4/ Spring		NA	
Total			**59**	**23.5**						

*Note: "Engineering Mechanics I - Statics and Dynamics" can be replaced by "Theoretical Mechanics I";
"Engineering Thermodynamics" can be replaced by "Thermodynamics and Statistical Physics I";
"Engineering Fluid Mechanics" can be replaced by "Fluid Mechanics";
"MAE202 Mechanics of Materials" can be replaced by "MAE202-16 Mechanics of Materials".

Table 2 Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
MAE498	Research and Innovation Projects of Mechanics and Aerospace Engineering	2	2		Fall / Spring	2/ Fall -- 4/ Fall	C	NA	
MAE205	Introduction to Aeronautics and Mechanics	2		2	Fall / Spring	1 Fall --4/ Fall	C	NA	
MAE206	Introduction to Aircraft Engines	1		1	Fall	2/ Fall	C	NA	
MAE208	Lectures on selected Engineering Software	2		2	Fall / Spring	2/ Spring	C	NA	
MAE210	Engineering Materials	3		3	Spring	2/ Spring	C	NA	
MAE204	Theoretical Mechanics II	3		3	Spring	2/ Spring	B	MA103A MA102B	
MAE312	Aircraft Flight Dynamics	3		3	Fall	3/ Fall	E	MA102B	
MAE313	Aero Engine Structure and Strength	3	1	4	Fall	3/ Fall	E	NA	
MAE309	General Principles of Transport Phenomena	3		3	Fall	3/ Fall	E	MA102B	
MAE304	Elasticity	4		4	Spring	3/ Spring	C	MAE203 MAE202	
MAE403	Computational Fluid Dynamics	3		3	Spring	3/ Spring	E	MAE207 OR MAE303	
MAE409	Finite Element Method	3		3	Spring	3/ Spring	B	MAE202	
MAE320	Mechanism of Flight Vehicle	3		3	Spring	3/ Spring	C	MA102B	
MAE314	Advanced Numerical Methods	3		3	Spring	3/ Spring	B	MA102B	
MAE318	Theory of Vibration	3		3	Spring	3/ Spring	E	MAE203B MA201b	
MAE311	Principles of Turbomachinery	3		3	Fall	4/ Fall	C	MA102B	
MAE413	Mechanics of Composite Materials	3		3	Fall	4/ Fall	B	MA102B	
MAE419	Aerodynamic analysis and design of aircraft	2		2	Fall	4/ Fall	C	MAE403	
ME307-16	Fundamentals of Control Engineering	2	0.5	2.5	Fall / Spring	3/ Fall	B	EE104 MA201b	MEE
ME306	Fundamentals of Robotics	3	1	4	Fall / Spring	3/ Spring	B	ME303 ME307-16	MEE
ME310	Fundamentals of Measurement Technology	3		3	Spring	3/ Spring	B	ME307-16 EE205	MEE
EE205	Signals and Systems	3	1	4	Fall	2/ Fall	B	NA	EEE
EE323	Digital Signal Processing	3	1	4	Fall	4/ Fall	E	EE205	EEE
CS205	C/C++ Programming Design	3	1	4	Spring	1/ Spring	C	NA	CSE
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/ Fall	B	CS102A	CSE
PHYS001	Open Physics Laboratory I	1	1	2	Summer	1/ Summer	B	NA	PHY

PHY221	Open Physics Laboratory II	1	1	2	Fall	2/ Fall	B	NA	PHY
PHY201-15	Physics Laboratory II	2	2	4	Fall	2/ Fall	B	PHY103B	PHY
PHY202	Physics Laboratory III	2	2	4	Spring	2/ Spring	B	PHY103B	PHY
PHY203-15	Mathematical Methods in Physics	4		4	Fall	2/ Fall	C	MA103A MA102B	PHY
PHY207-15	Electrodynamics I	3		3	Fall	2/ Fall	C	PHY203-15	PHY
PHY206-15	Introduction to Quantum Mechanics	3		3	Spring	2/ Spring	C	PHY203-15 PHY205-15	PHY
PHY425	Modern Techniques in Materials Characterization	3	1	4	Fall	4/ Fall	B	PHY206-15	PHY
Total		**88**	**15.5**	**10 3.5**					

Note 1:
A minimum of 17 credits must be obtained from the above courses and a minimum of 12 credits from the MAE courses.

Note 2:
You must be enrolled in at least one (1) of "Computational Fluid Dynamics" and "Finite Element Method".

Note 3:
For those enrolled with an Aircraft Design direction:
You must be enrolled in at least one (1) course from "Aircraft Flight Dynamics", "Mechanism of Flight Vehicle" and "Aerodynamic Analysis and Design of Aircraft ".

For those enrolled with an Aircraft Propulsion direction:
You must be enrolled in at least one (1) course from "Introduction to Aircraft Engines", "Principles of Turbomachinery" and "Aero Engine Structure and Strength".

For those enrolled with an Aircraft Structures direction:
You must be enrolled in at least one (1) course from "Engineering Materials", "Theory of Vibrations", “Elasticity” and "Mechanics of Composite".

Table 3 Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	Instruction language	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Fall / Spring / Summer	1/ Spring	B	NA	ME E
MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/Fall	C	MAE207 OR MAE303	
MAE316	Aircraft Structure Strength Lab	2	2	4	Spring	3/ Spring	C	MAE202	
MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/ Fall	C	NA	
MAE499	Research and Innovation Projects	2	2	4	Fall / Spring	4/ Fall	C	NA	
ME103	Awareness Practice of Manufacturing Engineering (Metalworking Practices)	3	2	5	Fall / Spring / Summer	1/ Fall -- 4/ Fall	C	NA	ME E
MAE480	Summer Internship	4	4		Summer	3/ Summer	C	NA	
MAE490	Degree Thesis(or Design)	8	8		Spring	4/ Spring		NA	

Table 4 Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	Credit Requirements
General Education (GE) Required Courses		50.5	50.5
General Education (GE) Elective Courses			10
Major Foundational Courses	344	20	20
Major Core Courses	448	22	22
Major Elective Courses	1656	88	17
Research Projects, Internship and Undergraduate Thesis/Projects	544	17	17
Total	2992	197.5	136.5