Department of Mechanics and Aerospace Engineering

Program of Aerospace Engineering for Class 2018

(For students to declare major at the end of the second semester)

I. Introduction

Southern University of Science and Technology is known as a rising university with the ambition to experiment higher education reform in China. The university focuses on education and research in science and engineering, supplemented by a unique program in humanities and management. We offer education programs at undergraduate, master's and doctoral levels, and draw experiences from world-class universities in building an international, innovative and world-class research-oriented university. Based on the critical strategic needs of the country and of the education programs in engineering of the university, the Department of Mechanics and Aerospace Engineering was established in December 2015. At present, our department has recruited a group of well-known scholars and young talents from home and abroad to form an international Faculty body with complementary knowledge structure and balanced emphasis on theory and applications. Currently, there are 18 full-time Faculty members in the Department of Mechanics and Aerospace Engineering, including 12 professors, 5 associate professors and 1 assistant professor. The Faculty includes one Fellow of the Chinese Academy of Sciences, one Fellow of the Chinese Academy of Engineering, and one Fellow of the Canadian Academies . All current Faculty members have overseas studying and/or working experience. Most of them have extensive teaching and scientific research experience, broad vision in their fields, expertise knowledge, and a strong sense of shared responsibility. They are competent in classroom teaching, supervising graduate and undergraduate students, and conducting cutting-edge research.

Aerospace Engineering is a modern discipline that fully reflects the comprehensive capability and innovation consciousness. It is a priority discipline of development and is of urgent need by national strategies nowadays. The program of Aerospace Engineering at SUSTech is led

by academicians of related disciplines in the MAE department, and is mainly composed of the recipients of the "Thousand Talents Program". The main areas include aircraft design and engineering, aircraft propulsion engineering, and aircraft structure and strength. The design and analysis in the field involve engineering mechanics, thermodynamics, materials science, and electrical fundamental, and these basic knowledge is also widely applied in other engineering fields such as mechanical, civil and hydraulic engineering. The talents trained in this major have good fundamental knowledge of mathematics, mechanics and aircraft engineering, as well as aircraft overall structural design, strength analysis and testing capabilities.

II. Objectives

The program of Aerospace Engineering is dedicated to cultivating creative high-caliber talents in Aerospace fields with a solid theoretical foundation of mathematics and mechanics, extensive Aerospace professional knowledge, and good aircraft design capabilities. After graduation, students will open career options of consulting, research and development, planning, management, etc. related to Aerospace engineering, mechanical engineering, mechanics, etc. in enterprises, research institutions, government agencies, etc., or enter first-class universities and research institutions worldwide to pursue master's or doctoral degrees.

III. Study Length and Degree Requirements

Study length: 4 years

Degree conferred: Bachelor of Engineering

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

IV. Discipline

Aerospace Engineering

V. Main Courses

Major Foundational Courses: CAD and Engineering Drawing, Fundamentals of Electric Circuits, Engineering Mechanics I - Statics and Dynamics, Probability and Statistics, Engineering Thermodynamics, Engineering Fluid Mechanics, Mechanics of Materials.

Major Core Courses: Aerodynamics, Aircraft Structural Strength, Fundamentals of Machine Design,

Aero-Thermal Fluid Lab, Aircraft Structure Strength Lab, Jet and Propulsion, Heat Transfer, Aircraft Design Group Practice.

VI. Practice-Based Courses

Research and Innovation Projects， Awareness Practice of Manufacturing Engineering， Summer Internship， Degree Thesis (or Design)， etc.

VII. Course Structure and Credit Requirements

General Education (GE) Required Courses: 45 credits (25 credits for Science Module, 16 credits for Citizenship Education Module, 4 credits for PE Module, not including English courses);

General Education (GE) Elective Courses: 10 credits (4 credits for Humanities Module, 4 credits for Social Sciences Module, and 2 credits for Arts Module);

Major Foundational Courses: 20 credits;

Major Core Courses: 22 credits;

Major Elective Courses: 23 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: 137 credits (not including English courses).

VIII. Requirements for Science Module of GE Required Courses

Course Cod	Course Name	Credit	Lab Credits	Hours/week	Term	Instruction Language	Prerequisite	Dept
MA101B	Calculus I A	4		4	Spr/Fall	B/E		MA
MA102B	Calculus II A	4		4	Spr/Fall	B/E	MA101B	
MA103A	Linear Algebra I-A	4		4	Spr/Fall	B/E		MA
PHY103B	General Physics B (I)	4		4	Spr/Fall	B/E		PHY
PHY105B	General Physics B (II)	4		4	Spr/Fall	B/E	PHY103B	
CS102B	Introduction to Computer Programming B	3	1	4	Spr/Fall	B/E		CS
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	B/E		PHY
Total		**25**	**3**	**28**				

IX. Pre-requisites for Major Declaration

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

X. Course Arrangement

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

Course Category	Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	4.5	Spr/Fall /Smr	1/Spr	B	NA	ME
	EE104	Fundamentals of Electric Circuits	2		2	Spr/Fall	1/Spr	B	MA103B MA101B	EE
	MAE203B	Engineering Mechanics I - Statics and Dynamics	3		3	Fall	2/Fall	E	MA103A	
	MA212	Probability and Statistics	3		3	Spr/Fall	2/Fall	B	MA102C	MA
	MAE305	Engineering Thermodynamics	3		3	Fall	2/Fall	B	MA102B	
	MAE207	Engineering Fluid Mechanics	3		3	Spr/Fall	2/Fall	B	MA102B	
	MAE202	Mechanics of Materials	3		3	Spr	2/Spr	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	Spr/Fall	3/Fall	B	ME102 MAE203B MAE202	ME
	MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/Fall	C	MAE207 OR MAE303	
	MAE316	Aircraft Structure Strength Lab	2	2	4	Spr	3/Spr	C	MAE202	
	MAE407	Jet and Propulsion	3		3	Spr	3/Spr	E	MAE305 OR PHY204	
	MAE308	Heat Transfer	3		3	Spr	3/Spr	E	MA102B	
	MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/Fall	B		

	MAE405	Aerodynamics	3		3	Fall	3/Fall	B	MA102B	
	Total		**22**	**6**	**28**					

Table 2: Major Elective Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
MAE498	Research and Innovation Projects of Mechanics and Aerospace Engineering	2	2	4	Spr/Fall	2/Fall-4/Fall	C	NA	
MAE205	Introduction to Aeronautics and Mechanics	2		2	Spr/Fall	2Fall	C	NA	
MAE206	Introduction to Aircraft Engines	1		1	Fall	2/Fall	C	NA	
MAE208	Lectures on selected Engineering Software	2		2	Spr/Fall	2/Spr	C	NA	
MAE210	Engineering Materials	3		3	Spr	2/Spr	C	NA	
MAE204	Theoretical Mechanics II	3		3	Spr	2/Spr	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	Spr	3/Spr	C	MAE203 MAE202	
MAE403	Computational Fluid Dynamics	3		3	Spr	3/Spr	En	MAE207 OR MAE303	
MAE310	Computational Solid Mechanics	3		3	Spr	3/Spr	B	MAE202	
MAE319	Interfacial Phenomena	3		3	Spr	3/Spr	C	PHY105B	
MAE320	Mechanism of Flight Vehicle	3		3	Spr	3/Spr	C	MA102B	
MAE314	Advanced Numerical Methods	3		3	Spr	3/Spr	B	MA102B	
MAE318	Theory of Vibration	3		3	Spr	3/Spr	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	

MAE410	Fracture Mechanics	3		3	Spr	4/Spr	E	MAE202	
ME307	Fundamentals of Control Engineering	3	1	4	Spr/Fall	3/Fall	B	MA201b EE104	ME
ME306	Fundamentals of Robotics	3	1	4	Spr/Fall	3/Spr	B	ME303 ME307	ME
ME310	Fundamentals of Measurement Technology	3		3	Spr	3/Spr	B	ME307 EE205	ME
EE205	Signals and Systems	3	1	4	Fall	2/Fall	B	NA	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	CS
CS203B	Data Structures and Algorithm Analysis B	3	1	4	Fall	2/Fall	B	CS102A	CS
PHYS001	Open Physics Laboratory I	1	1	2	Smr	1/Smr	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	Spr	2/Spr	B	PHY103B	PHY
PHY203-15	Mathematical Methods in Physics	4		4	Fall	2/Spr	C	MA103A MA102B	PHY /MAE
PHY207-15	Electrodynamics I	3		3	Fall	2/Fall	C	PHY203-15	PHY
PHY206-15	Introduction to Quantum Mechanics	3		3	Spr	2/Spr	C	PHY203-15 PHY205-15	PHY
PHY425	Modern Techniques in Materials Characterization	3	1	4	Fall	4/Fall	B	PHY206-15	PHY
CH101B	General Chemistry B	3		3	Spr/Fall	3/Spr	B/E		CH
BIO102B	Introduction to Life Science	3			Spr/Fall	3/Spr	B/E		BIO
Total		**95**	**16**	**111**					

1. At least choose 23 credits for the above courses. MAE’ s course no less than 12 credits.
2. Necessary to choose one from the course Computational Fluid Dynamics (MAE403) and Computational Solid Mechanics (MAE310).
3. Aircraft Design research directions: At least choose one from the course of Aircraft Flight Dynamics (MAE312), Mechanism of Flight Vehicle (MAE320) and Aerodynamic analysis and design of aircraft (MAE419).
Aircraft Power research directions: At least choose one from the course of Introduction to Aircraft Engines (MAE206), Principles of Turbomachinery (MAE311) and Aero Engine Structure and Strength (MAE313).
Aircraft Structure research directions: At least choose one from the course of Engineering Materials (MAE210), Theory of Vibration (MAE318), Elasticity (MAE304) and Mechanics of Composite Materials (MAE413).

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credits	Lab Credits	Hours/week	Terms	Advised term to take the course	language Instruction	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	4.5	Spr/Fall/ Smr	1/Spr	B	NA	ME
MAE315	Aero-Thermal Fluid Lab	2	2	4	Fall	3/Fall	C	MAE207 OR MAE303	MAE
MAE316	Aircraft Structure Strength Lab	2	2	4	Spr	3/Spr	C	MAE202	MAE
MAE417	Aircraft Design Group Practice	3	2	5	Fall	4/Fall	C		MAE
MAE499	Research and Innovation Projects	2	2	4	Spr/Fall	4/Fall	C	NA	MAE
ME103	Awareness Practice of Manufacturing Engineering	3	2	5	Spr/Fall/ Smr	1/Fall--4/Fall	B	NA	ME
MAE480	Summer Internship	4	4		Smr	3/Smr	C	NA	MAE
MAE490	Degree Thesis(or Design)	8	8		Spr	4/Spr		NA	MAE
Total		**27**	**24.5**						

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)		45	45	100%
General Education (GE) Elective Courses			10	100%
Major Foundational Courses	344	20	20	100%
Major Core Courses	448	22	22	100%
Major Elective Courses	1680	95	23	24%
Research Projects, Internship and Undergraduate Thesis/Projects	544	17	17	100%
Total (not including English courses)	3016	203	137	67%

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

Curriculum Structure of Aerospace Engineering

