Table of Curriculum(Undergraduate)

Classification	Subject No.	Subject Code	Subject Name	Lecture:Lab.: Credit (Homework)	Semester	Remark
Elective Basic	AE100	B8.100	Sky and Space	3:0:3(6)	Fall	
Manda-tory major courses	AE210	B8.210	Aerospace Thermodynamics	3:0:3(6)	Spring	
	AE220	B8.220	Aerodynamics Ⅰ	3:0:3(6)	Fall	
	AE300	B8.230	Flight Mechanics Project	3:1:3(6)	Spring	
	AE208	B8.208	Aerospace Engineering Laboratory Ⅰ	2:3:3(3)	Fall	
	AE307	B8.309	Aerospace Engineering Laboratory Ⅱ	1:6:3(3)	Fall	
	AE330	B8.330	Aerospace Structures Ⅰ	3:0:3(6)	Spring	
	AE400	B8.400	Aerospace System Design Ⅰ	2:3:3(6)	Spring	◎
Elective major courses	AE200	B8.200	Introductory Space Projects	2:3:3(6)	Fall	
	AE201	B8.201	Introductory Aeronautical Projects	2:3:3	Spring	
	AE230	B8.230	Mechanics of Aerospace Materials	3:0:3(6)	Spring	
	AE250	B8.250	Aerospace Dynamics	3:0:3(6)	Fall	
	AE280	B8.280	Software Application in Aerospace Engineering	2:3:3(6)	Spring	
	AE310	B8.310	Propulsion System	3:0:3(6)	Fall	
	AE311	B8.311	Aerospace Heat Transfer	3:0:3(6)	Spring	
	AE320	B8.320	Aerodynamics Ⅱ	3:0:3(6)	Spring	
	AE350	B8.350	Aerospace Control Engineering	3:1:3(6)	Fall	
	AE370	B8.370	Numerical Methods	3:0:3(6)	Spring	
Advanced Major	AE321	B8.321	Compressible Aerodynamics	3:0:3(6)	Fall	
	AE331	B8.331	Aerospace Structures Ⅱ	3:0:3(6)	Fall	
	AE401	B8.401	Aerospace System Design Ⅱ	2:3:3(6)	Fall	◎
	AE405	B8.405	Satellite Systems	3:0:3(6)	Fall	◎
	AE409	B8.409	Applied Mathematics for Aerospace Engineering	3:0:3	Spring	
	AE410	B8.410	Combustion Engineering	3:0:3(6)	Spring	◎
	AE420	B8.420	Viscous Aerodynamics	3:0:3(6)	Fall	◎
	AE435	B8.435	Vibration & Basic Aeroelasticity	3:0:3(6)	Spring	◎
	AE450	B8.450	Flight Dynamics and Control	3:0:3(6)	Fall	◎
	AE455	B8.455	Global Positioning System	3:0:3(6)	Fall	◎
	AE480	B8.480	Aerospace Applied Electronics	2:3:3(6)	Spring	◎
	AE492	B8.492	Special Lectures in Aerospace Engineering	3:0:3(6)	Spring and Fall	◎
	AE493	B8.493	Special Lectures in Aerospace Engineering Ⅱ	2:0:2(3)	Fall	◎
	AE494	B8.494	Special Lectures in Aerospace Engineering Ⅲ	1:0:1	Spring and Fall	◎
Research	AE490	B8.490	Thesis Study	0:6:3	Fall	
	AE495	B8.495	Individual Study	0:6:1	Fall	
	AE496	B8.496	Seminar	1:0:1	Spring and Fall	

Substitute Course List

Substitute courses in the department					
Category	Courses currently offered		Courses not currently offered		
	Course no.	Course title	Course no.	Course title	Remark
Under-graduate	AE100	Sky and Space	MAE107	Sky and Space	Abolition
Under-graduate	AE200	Introductory Space Projects	MAE291	Introductory Space Projects	Abolition
Under-graduate	AE208	Aerospace Engineering Laboratory Ⅰ	MAE308	Aerospace Engineering Laboratory Ⅰ	Abolition
			AE308	Aerospace Engineering Laboratory Ⅰ	Abolition
Under-graduate	AE210	Aerospace Thermodynamics	MAE210	Thermodynamics	Abolition
Under-graduate	AE220	Aerodynamics Ⅰ	MAE220	Fluid Mechanics	Abolition
Under-graduate	AE230	Mechanics of Aerospace Materials	MAE230	Solid Mechanics	Abolition
Under-graduate	AE250	Aerospace Dynamics	MAE250	Dynamics	Abolition
Under-graduate	AE280	Software Application in Aerospace Engineering	MAE285	Software Application in Aerospace Engineering	Abolition
Under-graduate	AE300	Flight Mechanics Project	MAE292	Introductory Aeronautical Projects	Abolition
			MAE365	Flight Mechanics	Abolition
Under-graduate	AE307	Aerospace Engineering Laboratory Ⅱ	MAE309	Aerospace Engineering Laboratory Ⅱ	Abolition
			AE309	Aerospace Engineering Laboratory Ⅱ	Abolition
Under-graduate	AE310	Propulsion System	MAE315	Propulsion System	Abolition
Under-graduate	AE311	Aerospace Heat Transfer	MAE311	Heat Transfer	Abolition
Under-graduate	AE320	Aerodynamics Ⅱ	MAE325	Aerodynamics	Abolition
Under-graduate	AE321	Compressible Aerodynamics	MAE326	Compressible Aerodynamics	Abolition
Under-graduate	AE330	Aerospace Structures Ⅰ	MAE335	Aerospace Structures	Abolition
Under-graduate	AE331	Aerospace Structures Ⅱ	MAE435	Computational Methods in Aerospace Engineering	Abolition
Under-graduate	AE350	Aerospace Control Engineering	MAE464	Fundamentals of Control Theory and Practice	Abolition
Under-graduate	AE370	Numerical Methods	MAE301	Numerical Methods	Abolition
Under-graduate	AE400	Aerospace System Design Ⅰ	MAE405	Aerospace System Design Ⅰ	Abolition
Under-graduate	AE401	Aerospace System Design Ⅱ	MAE406	Aerospace System Design Ⅱ	Abolition
Under-graduate	AE405	Satellite Systems	MAE466	Satellite Systems	Abolition
Under-graduate	AE410	Combustion Engineering	MAE415	Combustion Engineering	Abolition
Under-graduate	AE420	Viscous Aerodynamics	MAE425	Viscous Aerodynamics	Abolition
Under-graduate	AE450	Flight Dynamics and Control	MAE465	Flight Dynamics and Control	Abolition

Substitute courses in the department					
Category	Courses currently offered		Courses not currently offered		
	Course no.	Course title	Course no.	Course title	Remark
Under-graduate	AE455	Global Positioning System	MAE463	Synthetic Design of Aerospace Systems	Abolition
Under-graduate	AE480	Aerospace Applied Electronics	MAE300	Multidisciplinary Design Optimization for Aerospace Systems	Abolition
			MAE467	Appraisal of Engineering Projects under Uncertainty	Abolition
Under-graduate	AE493	Special Lectures in Aerospace Engineering II	MAE499	Aerothermochemistry and Combustion	Abolition
Graduate	AE500	Synthetic Design of Aerospace Systems	MAE565	Radiation and Combustion Phenomena	Abolition
Graduate	AE501	Multidisciplinary Design Optimization for Aerospace Systems	MAE558	Advanced Space Propulsion Systems	Abolition
Graduate	AE505	Appraisal of Engineering Projects under Uncertainty	MAE557	Rocket System Engineering	Abolition
Graduate	AE510	Aerothermochemistry and Combustion	MAE593	Advanced Aerodynamics	Abolition
Graduate	AE511	Radiation and Combustion Phenomena	MAE594	Helicopter Aeromechanics	Abolition
Graduate	AE515	Advanced Space Propulsion Systems	MAE555	Computational Fluid Dynamics	Abolition
Graduate	AE516	Rocket System Engineering	MAE518	Aeroacoustics	Abolition
Graduate	AE520	Advanced Aerodynamics	MAE522	Experimental Aerodynamics	Abolition
Graduate	AE521	Helicopter Aeromechanics	MAE523	Flight Vehicle Structures	Abolition
Graduate	AE522	Computational Fluid Dynamics	MAE524	Structural Dynamics	Abolition
Graduate	AE523	Aeroacoustics	MAE528	Mechanics of Composite Materials	Abolition
Graduate	AE525	Experimental Aerodynamics	MAE527	Smart Composite Lab	Abolition
Graduate	AE530	Flight Vehicle Structures	MAE538	Spacecraft Attitude Dynamics and Control	Abolition
Graduate	AE531	Structural Dynamics	MAE540	Introduction to Optimal Control	Abolition
Graduate	AE532	Mechanics of Composite Materials	MAE542	Advanced Linear Stability and Control	Abolition
Graduate	AE535	Smart Composite Lab	MAE584	Spacecraft Trajectory Guidance and Control	Abolition
Graduate	AE550	Spacecraft Attitude Dynamics and Control	MAE597	GNSS Remote Sensing	Abolition
Graduate	AE551	Introduction to Optimal Control	MAE595	Advanced Gas Dynamics	Abolition
Graduate	AE552	Advanced Linear Stability and Control	MAE596	Advanced Linear Stability and Control	Abolition
Graduate	AE555	Spacecraft Trajectory Guidance and Control	MAE566	Spacecraft Trajectory Guidance and Control	Abolition
Graduate	AE580	GNSS Remote Sensing	MAE556	GNSS Remote Sensing	Abolition
Graduate	AE620	Advanced Gas Dynamics	MAE625	Advanced Gas Dynamics	Abolition

Substitute courses in the department					
Category	Courses currently offered		Courses not currently offered		
	Course no.	Course title	Course no.	Course title	Remark
Graduate	AE621	Hypersonics Aerodynamics	MAE626	Hypersonics Aerodynamics	Abolition
			MAE726	Equilibrium Hypersonic Aerothermodynamics	Abolition
			MAE727	Nonequilibrium Hypersonic Aerothermodynamics	Abolition
			MAE728	Reentry Aerothermodynamics	Abolition
Graduate	AE623	Unsteady Fluid Flows	MAE628	Unsteady Fluid Flows	Abolition
Graduate	AE630	Theory of Plates and Shells	MAE636	Theory of Plates and Shells	Abolition
Graduate	AE631	Aeroelasticity	MAE637	Aeroelasticity	Abolition
Graduate	AE650	Navigation and Guidance	MAE663	Navigation and Guidance	Abolition
Graduate	AE651	Advanced Navigation Systems and Applications	MAE665	Advanced Navigation Systems and Applications	Abolition
Graduate	AE655	Experiments in Flight Control	MAE663	Experiments in Flight Control	Abolition
Graduate	AE810	Special Topics in Propulsion and Combustion	MAE860	Special Topics in Propulsion and Combustion	Abolition
Graduate	AE820	Special Topics in Aerodynamics	MAE820	Special Topics in Aerodynamics	Abolition
Graduate	AE830	Special Topics in Flight Vehicle Structures	MAE840	Special Topics in Flight Vehicle Structures	Abolition
Graduate	AE850	Special Topics in Flight Mechanics and Control	MAE880	Special Topics in Flight Mechanics and Control	Abolition

Substitute courses in the department					
Category	Course offered by the department		Course offered by other departments		
	Course no.	Course title	Course no.	Course title	Remark
Under-graduate	AE210	Aerospace Thermodynamics	ME211	Thermodynamics	unidirectional
Under-graduate	AE230	Mechanics of Aerospace Materials	ME231	Solid Mechanics	unidirectional
Under-graduate	AE311	Aerospace Heat Transfer	ME311	Heat Transfer	unidirectional
Under-graduate	AE370	Numerical Methods	ME301	Numerical Methods	unidirectional

Course Descriptions

❒ Undergraduate Program

AE100 Sky and Space

This coursework deals with the basics of flying in the air and through the space with the coverage of the history of flight, flight principles, materials and structures for flight vehicles, propulsion systems, space environment, satellites and their orbits, deep space exploration, and human beings in space. Students will join field tours to Korea Aerospace Research Institute twice and need to make group presentations.

AE201 Introductory Aeronautical Projects

The fundamental aeronautical engineering concepts and approaches will be introduced to "new comers to AE" through lectures. At the same time, the students are asked to perform LTA (Lighter than air) design projects, through which they will learn how to link the knowledge in the textbook to "real engineering world."

AE200 Introductory Space Projects

This course introduces the fundamental operational principles for the space systems. Lectures and labs on fundamentals of space systems engineering and various issues on design and operation of launch vehicles / spacecraft and related disciplines (fluid, structure, propulsion, dynamics / control and communication) will be provided.

AE208 Aerospace Engineering Laboratory I

This course serves as an introduction to the fundamental principles of instrumentation and measurements. Basic statistics, error analysis, digital data acquisition, or signal processing methods are discussed in detail. These fundamental principles are then applied to specific experiments related to thermodynamics.

AE210 Aerospace Thermodynamics

This lecture covers definition and concepts related to thermodynamic laws. 1st and 2nd laws of thermodynamics are explained. Properties of pure substances including ideal gases and real gases are covered in processes of energy conversion systems such as heat engines and heat pumps. Chemical equilibrium condition is derived from the fundamental law of the nature.

AE220 Aerodynamics I

The course covers fundamental principles of aerodynamics. When a body is in motion through air, the body experiences forces and moments. In this course, various fundamental concepts and mechanisms regarding fluid statics, integral/differential forms of basic equations, dimensional analysis and similitude, incompressible inviscid flow, and internal incompressible viscous flow will be studied.

AE230 Mechanics of Aerospace Materials

This course introduces the mechanics for the elementary structural members such as bars, torsion bars, and beams. The concepts for stress and strain, stress-strain relationship, deformation, statically determinate and indeterminate structures are covered.

AE250 Aerospace Dynamics

Basic principles of dynamics are introduced in this course. Rotating and inertial coordinate frames are used to describe dynamic motion of a number of example problems. Absolute and relative motion descriptions are introduced depending upon the types of problems. Principles of work-energy and conservation of angular and linear momentum are presented with example systems. Systems of particles are also discussed with definition of the center of mass. Both particle dynamics and rigid body dynamics including rotational degree-of-freedom are covered extensively. We also cover definition of angular momentum with respect to different base points. Various

aerospace vehicle examples are used to help understanding basic concepts.

AE280 Software Application in Aerospace Engineering

This course deals with basic scientific programming in Aerospace Engineering applications, utilizing widely-used programming languages such as MATLAB. The class consists of introductory lectures about the technical contents/theory and lab practice sessions for hands-on problem solving. This course emphasizes on problem solving & analysis rather than specific details of programming skills. Based on the basic concepts, advanced topics such as data structure, Graphic User Interface, algorithm analysis are also covered.

AE300 Flight Mechanics Project

This course addresses basic concepts of aircraft performance and stability based on the force and moment balance of an aircraft in flight; theoretical analysis is accompanied with hands-on exercises/experiments. Characteristics of the forces (lift, drag, gravity, thrust) acting on the aircraft and their relationship to flight conditions are discussed, leadnig to aircraft performance notions such as range, endurance, rate of climb, and flight envelope. Also, by analyzing the moment balance of an aircraft in flight, the concepts of static and dynamic stability in the longitudinal and lateral directions are introduced & discussed.

AE307 Aerospace Engineering Laboratory Ⅱ

This course is the second course of a two-semester laboratory course sequence dealing with experiments in aerodynamics and structure. The topics include wind tunnel testing (low-speed and high-speed), flow visualization, strain/stress, buckling, and photoelasticity.

AE310 Propulsion System

A propulsion system refers to a device that transforms energy stored in a chemical compound into propulsive power in a flight vehicle. The majority of propulsion systems are built upon heat engines in order to release the chemical energy into heat that is eventually converted to mechanical power. In this course, students learn how basic knowledge of thermodynamics, fluid mechanics, and gas dynamics is applied to the design and performance evaluation of aerospace propulsion systems.

AE311 Aerospace Heat Transfer

Fundamental concepts of basic heat transfer modes in various type of coordinates are introduced. Conduction, convection and radiation heat transfers in diverse configuration and flow conditions are covered. Also see course description of the same course in Department of Mechanical Engineering.

AE320 Aerodynamics Ⅱ

Study on forces and moments of solid bodies due the interaction with air flow. Assuming that fluids are inviscid and incompressible, mathematical description and derivation of the governing equations are covered in accordance with the conservation mass, momentum, and energy principles. Derivation of the Bernoulli's equation, the concept of circulation, the Kutta-Joukowsky theorem, and the mechanism of the generation of lift and moment are included followed by the two-dimensional thin airfoil theory and the three-dimensional lifting-line theory.

AE321 Compressible Aerodynamics

Flow characteristics of gases having density variation throughout the flow domain show a significant difference when compared with those of incompressible flows. An understanding and knowledge of compressible flows are one of the essential elements in aerospace engineering. In this course, the theory and application of compressible gases are studied.

AE330 Aerospace Structures Ⅰ

Basic structural elements including wing and fuselage, aerospace materials, basic elasticity, torsional problems for closed single-cell and multi thin-walled sections, bending and flexural shear, flexural shear flow in thin-walled sections, failure criteria for isotropic materials, and elastic buckling will be discussed in this subject.

AE331 Aerospace Structures Ⅱ

This coursework deals with the deflection and buckling analyses of plates and stiffeners in a typical semi-monocoque structure for flight vehicles. Composite structures are to be introduced with the consideration of constituent elements, processing methods, and design point of view.

AE350 Aerospace Control Engineering

Knowledges on system modeling and classical control are very important for understanding flight mechanics and aircraft control. The class will be presented with systematic modeling techniques and various analysis methods such as transfer function, Nyquist plot, Bode plot, and root locus. We also learn the basic control system design using PID and other approaches. The basic concepts on modern control in state-space are also introduced.

AE370 Numerical Methods

This course covers numerical modeling, computers and error analysis, roots of equations, linear algebraic equations, curve fitting, numerical differentiation and integration, ordinary differential equations, and partial differential equations.

AE400 Aerospace System Design I

A standardized aircraft design procedure is described including aspects of aircraft aerodynamics, performance, stability and control, structures, and propulsion in a single-system approach to create configuration of an aircraft to perform a specific mission. Determination of take-off weight, choice of aerodynamic configuration, selection of powerplant and their integration are covered. Students practice performing conceptual design using the design principles learned in this class.

AE401 Aerospace System Design II

This course provides an opportunity to apply the design method covered by Aerospace System Design I as well as engineering principles taught in other lower level undergraduate courses in the process of design of an aerospace system or subsystems, procurement of parts, fabrication, system integration, and performance evaluation, including final report with recommendations for improved design. Students experience entire stages of engineering activities from scratch to functioning engineering artifacts.

AE405 Satellite Systems

The primary objective of this course is to introduce fundamentals of spacecraft systems. With this goal in mind, topics such as basics of orbital mechanics, orbit transfer, rendezvous, station keeping and geostationary spacecraft mission are covered. In addition, attitude dynamics of rigid spacecraft are introduced in conjunction with basic principles of spacecraft attitude control. An introduction to spacecraft sub-systems for small-scale satellites is provided on a frequent basis.

AE409 Applied Mathematics for Aerospace Engineering

This course introduces mathematical methodologies used in aerospace engineering disciplines to help students (primarily senior undergraduates) build up fundamentals for graduate studies and provides the case studies on applications of these methodologies to actual engineering problems.

AE410 Combustion Engineering

Combustion is an essential phenomenon to extract heat from various type of fuels. An understanding of combustion is necessary for design of efficient power and propulsion systems. This lecture covers thermodynamics and fluid mechanics of multi-species gas system. Thermodynamic principles that governs chemical equilibrium are reviewed and evaluation of adiabatic flame temperature is deduced. Issues of laminar and turbulent flames, diffusion and premixed flames are discussed.

AE420 Viscous Aerodynamics

This is an introductory course to viscous flows. Flow physics of compressible boundary layer, skin friction, convective heat transfer, transition, turbulence, and turbulent boundary layer are studied along with mathematical derivation and description from the Navier-Stokes equations.

AE435 Vibration & Basic Aeroelasticity

This course deals with basic vibratory behaviors of flight vehicles. The governing equations for the vibration of mechanical systems are derived. The analysis methods for the free and forced vibrations of the linearized 1-DoF, 2-DoF and M-DoF systems are studied. Introduction to aeroelasticity, which is the study concerned with the interaction among inertia, elastic, and aerodynamic forces, is provided.

AE450 Flight Dynamics and Control

In the beginning, students are introduced to equations of motion of aircraft, and to the linearized and decoupled equations. Various stability/control augmentation systems such as pitch attitude control, normal acceleration control, turn coordination, yaw damper are then treated. Guidance problems such as instrument landing and path tracking are also discussed with longitudinal and lateral autopilot.

AE455 Global Positioning System

This course will provide an in-depth understanding of GPS architecture, signals, measurements and performance. It is by nature an interdisplinary course, covering subject material in orbit prediction, satellite systems, signal processing, error modeling, and computer programming. It will include detailed consideration of differential GPS since this innovation greatly increases the power and utility of the system.

AE480 Aerospace Applied Electronics

This course covers the fundamental principles of the electrical engineering and electronics, and provides design and experimental experience for the students to develop the capability to apply the principles to engineering practices. The course includes passive and active circuit elements, analog and digital systems, and electronic instrumentation. Embedded CPU are also introduced for understanding the basic structure, programming, and applications.

AE490 Thesis Study

A student registers for this course during the preparation of his thesis based on his analytical and experimental studies.

AE492 Special Lectures in Aerospace Engineering

This course is designed to extend the student's understanding of current topics and issues in aerospace engineering. The specific topics will be announced before the semester begins.

AE493 Special Lectures in Aerospace Engineering II

This course introduces domestic/abroad leading edge technologies in Aerospace annually, so that higher grade undergraduate and graduate students can understand advance technology trends for research direction selection, and acquire information for job finding. Many active researchers in government-funded research institutes and industry will be invited for each specific subjects.

AE494 Special Lectures in Aerospace Engineering Ⅲ

This course discusses special and/or advanced topics in the field of aerospace engineering for senior undergraduate students and graduate students as well.

AE495 Individual Study

This course is directed individual research for undergraduate students dealing with a specific area of interest.

AE496 Seminar

Recent advances and related topics in mechanical engineering are presented by invited lecturers.