1.1. School of Aerospace and Mechanical Engineering

Courses Offered

Remarks:

1) Listed after each course title are the academic year-semester, and credit hour (credit)

Required Core Courses

GS1107 Introduction to Aeronautics 2(2) 1-1 GS1134 Basic Writing 2(2) 1-1 GS1135 English Communication I 2(2) 1-1 GS1139 Creative Personality & Career 1(1) 1-1 RC7103 Calculus 3(3) 1-1 RC7103 Calculus 3(3) 1-1 RC7115 General Chemistry 3(3) 1-1 RC7160 General Physics I 2(2) 1-1 RC7161 General Physics Experiment I 2(1) 1-1 GS1136 English Communication II 2(2) 1-2 GS1137 Computational Thinking & Problem Solving 4(3) 1-2 GS2491 Air and Space Industry 2(2) 1-2 RC7102 Linear Algebra 3(3) 1-2 RC7162 General Physics II 2(2) 1-2 RC7163 General Physics Experiment II 2(1) 1-2

Required Major Courses

AM3101 Statics 3(3) 1-2AM3211 Computer Aided Modelling and Drafting 4(3) 2-1AM3212 Mechanics of Materials 3(3) 2-1AM3213 Thermodynamics 3(3) 2-1RC7205 Ordinary Differential Equations 3(3) 2-1AM3214 Dynamics 3(3) 2-2AM3215 Fluid Mechanics 3(3) 2-2AM3216 Basic laboratory 4(2) 2-2AM3314 Applications of Engineering Experiments 4(2) 3-1AM3317 Seminar of Aerospace and Mechanical Engineering 1(1) 3-1AM3318 Capstone Design I 3(3) 3-2AM3406 Capstone Design II 3(3) 4-1 AM3407 Startup Capstone Design II 3(3) 4-1

Elective Major Courses

AM4219 Numerical Analysis 3(3) 2-1 AM4222 Electrical & Electronic Engineering 3(3) 2-1 AM4220 Applied Mathematics Application 3(3) 2-2 AM4227 Applications of Engineering Thermodynamics 3(3) 2-2 AM4228 Applications of Mechanics of Materials 3(3) 2-2 AM4315 Introduction to Materials 3(3) 2-2 RC7206 Boundary-value Problem and Complex Analysis 3(3) 2-2 AM4357 Aerospace and Mechanical Engineering Field Placement 1 6(3) 3 AM4358 Aerospace and Mechanical Engineering Field Placement 2 6(3) 3 AM4359 Aerospace and Mechanical Engineering Field Placement 30(15) 3

< Aerospace Engineering Major >

AM4210 Mechanics of Machinery 3(3) 3-1 AM4221 Manufacturing Processes for Engineering Materials 3(3) 3-1 AM4312 Probability and Statistics 3(3) 3-1AM4313 Aerospace Structures 3(3) 3-1 AM4316 Reciprocating Engines 3(3) 3-1 AM4317 Automatic Control 3(3) 3-1 AM4319 Aerodynamics 3(3) 3-1 AM4320 Gas Turbine Engines 3(3) 3-2AM4322 Compressible Fluid Flows 3(3) 3-2AM4324 Measurement Engineering 3(3) 3-2 AM4325 Mechanical Vibration 3(3) 3-2AM4326 Heat Transfer 3(3) 3-2 AM4328 Advanced Aircraft Structures 3(3) 3-2 AM4329 CAD/CAM 3(3) 3-2 AM4454 Aircraft Control 3(3) 3-2 AM4314 Mechanical Behavior of Materials 3(3) 4-1 AM4402 Introduction to Finite Element Method 3(3) 4-1 AM4403 Computational Fluid Dynamics 3(3) 4-1 AM4413 Rocket Propulsion 3(3) 4-1 AM4414 Aircraft Performance 3(3) 4-1 AM4436 Aircraft System Engineering 3(3) 4-1 AM4472 Satellite Systems 3(3) 4-1 AM4416 Space Flight Mechanics 3(3) 4-2 AM4417 Mechanics of Composite Material 3(3) 4-2 AM4418 Combustions 3(3) 4-2

AM4423 Aerospace Structural Design 3(3) 4-2 AM4424 Flight Simulation 3(3) 4-2 AM4425 Aircraft Conceptual Design 3(3) 4-2

< Aircraft System Engineering Major >

AM4210 Mechanics of Machinery 3(3) 3-1AM4221 Manufacturing Processes for Engineering Materials 3(3) 3-1 AM4312 Probability and Statistics 3(3) 3-1AM4313 Aerospace Structures 3(3) 3-1 AM4316 Reciprocating Engines 3(3) 3-1 AM4317 Automatic Control 3(3) 3-1 AM4319 Aerodynamics 3(3) 3-1 AM4330 Aircraft Electrical & Electronic systems 3(3) 3-1 AM4353 Systems Engineering 3(3) 3-1 AM4355 Principle of Engineering Management 3(3) 3-1 AM4226 Materials Manufacturing Exercise 2(1) 3-2 AM4320 Gas Turbine Engines 3(3) 3-2 AM4322 Compressible Fluid Flows 3(3) 3-2AM4324 Measurement Engineering 3(3) 3-2AM4326 Heat Transfer 3(3) 3-2 AM4329 CAD/CAM 3(3) 3-2 AM4342 Fluid Power Control 3(3) 3-2 AM4354 Quality and Reliability Engineering 3(3) 3-2AM4356 Industry Cost Management 3(3) 3-2 AM4440 Aviation Law 3(3) 3-2 AM4454 Aircraft Control 3(3) 3-2 AM4414 Aircraft Performance 3(3) 4-1 AM4436 Aircraft System Engineering 3(3) 4-1 AM4443 Practice on Propulsion Engine 2(1) 4-1 AM4475 Aircraft Systems 3(3) 4-1 AM4476 Aviation Maintenance Managements 3(3) 4-1 AM4477 Airworthiness and Certification 3(3) 4-1 AM4409 Aircraft Instrument System 3(3) 4-2 AM4417 Mechanics of Composite Material 3(3) 4-2 AM4425 Aircraft Conceptual Design 3(3) 4-2

AM4432 Helicopter Engineering 3(3) 4-2

< Mechanical Engineering Major >

AM4210 Mechanics of Machinery 3(3) 3-1 AM4221 Manufacturing Processes for Engineering Materials 3(3) 3-1

AM4312 Probability and Statistics 3(3) 3-1 AM4316 Reciprocating Engines 3(3) 3-1 AM4317 Automatic Control 3(3) 3-1 AM4321 Machine Elements Design 3(3) 3-1 AM4352 Applications of Fluid Mechanics 3(3) 3-1AM4324 Measurement Engineering 3(3) 3-2AM4325 Mechanical Vibration 3(3) 3-2AM4326 Heat Transfer 3(3) 3-2 AM4327 Mechanical System Design 3(3) 3-2 AM4329 CAD/CAM 3(3) 3-2 AM4342 Fluid Power Control 3(3) 3-2AM4408 Turbomachinery 3(3) 3-2AM4314 Mechanical Behavior of Materials 3(3) 4-1 AM4402 Introduction to Finite Element Method 3(3) 4-1 AM4403 Computational Fluid Dynamics 3(3) 4-1 AM4404 Design of Thermal Systems 3(3) 4-1 AM4406 Control System Design 3(3) 4-1 AM4407 Mechatronics 3(3) 4-1 AM4448 Automotive Engineering 3(3) 4-1 AM4405 Mechanical Machining System 3(3) 4-2 AM4418 Combustions 3(3) 4-2AM4419 Air Conditioning & Refrigeration 3(3) 4-2 AM4421 Robotics 3(3) 4-2AM4437 Manufacturing System Engineering and Application 4(3) 4-2AM4480 Introduction of the Medical Robot 3(3) 4-2

Course Descriptions

AM4328 Advanced Aircraft Structures 3(3)

This subject has included the application of energy principles for the analysis and the analysis of the statically indeterminate structures. The students are able to get the capability of the aircraft structural design as they understand the stress analysis of aircraft structures and aerospace vehicles.

AM4319 Aerodynamics 3(3)

This course teaches general theory of ideal fluid, stream function, velocity potential, vortex theory, airfoil and finite wing theory, supersonic flew around airfoils and wings, and wave drag.

AM4357/AM4358/AM4359 Aerospace and Mechanical Engineering Field Placement

This course offers major related practical training at the industry company in field of aerospace and mechanical engineering. Through this course, a student can acquires knowledge, technology, and attitude requested by industry companies.

AM4423 Aerospace Structural Design 3(3)

This course deals with general information on aircraft, space launch and satellite structures. In the design of aircraft structures, this class provides knowledge on aircraft loads and materials, design of aircraft component design (fastener, wing box, wing leading/trailing edges, fuselage, landing gear and engine mount). In the design space structures, this class deals with space loads under space environments (launch/cruising), static and dynamic strength design under several extreme space environments.

AM4313 Aerospace Structures 3(3)

This course deals with the development of the basic ability solving engineering problems for aerospace structures. The students study the elements of structural analysis such as structure types, materials and roles of each structural members, and their mechanical properties. They also study the load calculation of aircrafts and the deformation and the stress analysis of aerospace structures.

AM4419 Air Conditioning & Refrigeration 3(3)

This course deals with properties of moist air, conditioning process, heat transmission of structures, space heating load, space cooling load, design of fans and duct systems, principles of refrigerators, heat pump, cooling tower and related facilities.

AM4425 Aircraft Conceptual Design 3(3)

This course teaches design of external configuration of subsonic and supersonic airplane, wing loading and thrust loading, estimation of weight and drag, direct operating cost calculation, determination of optimum airplane, and analysis of performance, stability and control.

AM4454 Aircraft Control 3(3)

This course teaches derivation of kinematic and dynamic equations of motion of aero-vehicle, dynamic stability derivatives effects on system stability, open loop and feedback system response, flight control system design.

AM4330 Aircraft Electrical & Electronic systems 3(3)

Basic theory and operating principles of electrical power system components(batteries, DC/AC generators and motors) and advanced aircraft electrical systems are addressed in the classroom. Also, theory of aircraft wiring, basic electrical lighting in airframe systems, current aviation electronic systems(avionics), electro-mechanical instrumentation, today's electronic instruments and flight management systems including autopilot are to be studied.

AM4409 Aircraft Instrument System 3(3)

This course teaches basic concepts, types of errors, compensation, deflection and forced balance instruments, response to noise, deterministic and random input-output relations, accelerometers, rate gyros, principles of inertial platforms, drift, vertical gyros, directional gyros, gyro compassing atmospheric instrumentation, slaving of sensors, and hybrid measurement systems.

AM4414 Aircraft Performance 3(3)

At first, lift, drag and thrust are to be reviewed briefly. Fundamental aircraft performances, manuevers, and special performances are to be studied by analyzing equations of motion under the forces developed on aircraft. Selections of design parameters such as thrust-to-weight ratio and wing loadings for aircraft conceptual design is to be taught. Also, static and dynamic stabilities and controls are to be introduced.

AM4436 Aircraft System Engineering 3(3)

This course teaches basic concepts and structure of aircraft systems, engine systems, and special systems including fuel systems, hydraulic systems, icing systems, air systems, etc.

AM4475 Aircraft Systems 3(3)

This course deals with the thorough understanding of the structural construction, operating principles on airframe systems and processing of maintenance that are employed on current operational aircraft. In the fields of design, manufacturing, production and operation of aircraft, practically required guidelines and procedures are explained in a logical sequence so that students may advance step by step and secure a solid foundation for performing aviation

maintenance activities. And this is designed to provide aviation engineers with theoretical and practical knowledge about the aircraft systems.

AM4477 Airworthiness and Certification 3(3)

This course deals with airworthiness which is fundamental to the flight safety of aircraft. For this purpose, after introducing the definition of airworthiness and related terminologies, the students will learn the act on the airworthiness certification and its process for both civil and military aircraft. Also the technical standards for airworthiness mainly based on the ICAO annex 8 and MIL-HDBK-516 are presented. System test and evaluation which are required for demonstrating airworthiness and one of the critical milestones in the systems engineering process will also be dealt with in this course.

AM3314 Applications of Engineering Experiments 4(2)

Applied engineering experiments, such as engine dynamometers, air-conditioning and refrigeration system, flight tests, GPS communications, hybrid-rocket experiments, ground-based attitude control of satellite, are performed to enhance student's deep understanding on major engineering theories in mechanical and aerospace fields.

AM4352 Applications of Fluid Mechanics 3(3)

The course discusses the characteristics of fluid viscosity in the view points of internal flows(pipe flows) and external flows(boundary-layer theory). It also deals with the drag/lift of a body in fluid flows and the basic theory of the compressible flows. It further covers the applied study associated with the course materials.

AM4228 Applications of Mechanics of Materials 3(3)

This course deals with several topics such as stresses in beams, analysis of stress and strain, application of plane strain, deflection of beams, statically indeterminate beams, and columns. Also applications of basic solid mechanics are provided.

AM4227 Applications of Engineering Thermodynamics 3(3)

Continuing on fundamental principles from engineering thermodynamics course, real gas effect, gas-mixtures, gas-vapor mixture, basic thermodynamic relations, compressible flows as introductory and chemical reactions will be addressed. Special emphasis on engineering problem analysis and applied topics are studied.

AM4220 Applied Mathematics Application 3(3)

Mathematical problems are investigated using a science-engineering computer program. Introduced are some historical stories together with linear algebra, many aspects of numerical problems, and some techniques to interpolate given data or function values.

AM4317 Automatic Control 3(3)

This course teaches classical and modern control theories and applications, mathematical modeling of physical system, transfer function and state space representation of linear and nonlinear systems, stability analysis in time domain and frequency domain, and classical and modern control system design.

AM4448 Automotive Engineering 3(3)

This course covers the structure, operation principle, theory and application related to the power train system, brake system, suspension system, steering system, electric/electronic system. The power train system includes internal combustion engine, electric motors for power source, and transmissions. This course also covers the performance analysis of automotive vehicle.

AM4440 Aviation Law 3(3)

This course teaches theoretical and practical details of aviation law, and regulations.

AM4476 Aviation Maintenance Managements 3(3)

This course deals with basic concepts and definitions of aircraft maintenance managements which are required to control the activity of maintenance organization of the transport air-lines. It will give lectures on maintenance processes and regulations, maintenance planning and organization, maintenance safety and preventive maintenance related to practical work in the field of aircraft maintenance.

AM3216 Basic laboratory 4(2)

Through this laboratory course, students are to be obtained an ability to perform laboratory work, including statistical processing of data and error analysis. Lab practices covers several fundamental experiments on engineering mechanics, materials, structures, fluid-dynamics, power and energy systems, electronics, and instrumentation.

RC7206 Boundary-value Problem and Complex Analysis 3(3)

This lecture consists of main two parts which are boundary-value problem and complex analysis respectively. The first part introduces partial difference equations which should be understood for solving the engineering problems and gives you the solving procedure. Also, the second part covers basic complex number, fundamental theory of a complex variable and complex analysis.

AM4329 CAD/CAM 3(3)

This course introduces a variety of topics in CAD such as computer graphics, 3D curve/surface modeling methods, application of geometric models and so on, and a variety of topics in CAM such as tool path generation from CAD model, NC program generation, virtual manufacturing and so on. Especially, in order to foster the ability to utilize a commercial CAD/CAM system in the design and manufacturing of new products, it covers the practice of using the CAD/CAM system based on the learning contents.

RC7103 Calculus 3(3)

This course covers basic concepts, continuity, limit, differentiation, and integral calculus to understand the application of singular and multiple variable functions.

AM3318/AM3406 Capstone Design I/II 3(3)

Student selects a design topic which is practical and helpful in current industrial applications. Doing regular meetings with thesis advisor, open-ended problems can be well defined, modeled, or idealized for problem solving. With paper surveys, methodologies will be set up. Theoretical or experimental analysis will be performed with the related and integrated knowledges of aeronautical and mechanical engineering subjects, or prototypes for evaluating the performances can be manufactured and tested whether objectives are met. Integrated system design capabilities can be raised from this individual research project. Final report is to be submitted as a paper and presentation of result summary is mandatory.

AM4418 Combustions 3(3)

The basic thermodynamic and chemical kinetic theory of combustion is to be introduced. The combination of chemical reaction, heat transfer and fluid motion is to be analyzed. The distinct characteristics between premixed and diffusion combustion are to be studied. The flame structures, burning rate and flame propagation speed are to be examined with gaseous, liquid and solid fuel. Main subjects for applications to power systems and emission control are to be introduced.

AM4322 Compressible Fluid Flows 3(3)

This course introduces the wave phenomena due to compressible effects of fluids, and it also covers the characteristics of shock and expansion waves, and the governing equations to figure out them. The course also deals with the flow behaviors associated with supersonic aircrafts, and friction/heat transfer effects of internal compressible flows.

AM4403 Computational Fluid Dynamics 3(3)

This course teaches the basic numerical methods to analyze the flow field. The partial differential equations are converted to the finite difference equations to solve them numerically. Several different finite difference methods are compared in the physical view points and numerical view points.

GS1137 Computaional Thinking & Problem Solving 4(3)

In this course, the students learn the basics of the computer program languages like FORTRAN and C. Using the computer and the languages, they learn how to solve the problems, how to make the computer programs, how to execute them, and how to debug them from numerical examples and exercises.

AM3211 Computer Aided Modelling and Drafting 4(3)

In this course, various 3D modelling as well as assembling techniques are exercised using CAD software for mechanical product or equipment design, Fundamental theories of mechanical drafting for manufacturing are also taught which includes projection, dimensioning, roughness, geometric tolerance, and fit.

AM4406 Control System Design 3(3)

In this course, design, exercise, and experiment for practical control systems are stressed. Based on the dynamic system analysis and basic feedback control theory which has been learned in the 'automatic control' course, state feedback and estimation techniques in terms of state variable equations are newly included. Every student must select a specific topic on positioning system, robot, aircraft, satellite, boiler etc. and perform mathematical modeling and controller design and finally confirm the performance of their controllers through simulation and motor control experiment.

AM4404 Design of Thermal Systems 3(3)

This course deals with theories or optimal design of thermal management and control systems, fluid systems, power plants, heat exchangers, and HVAC

systems, utilizing fundamental disciplines in thermodynamics, fluid mechanics and heat transfer.

AM3214 Dynamics 3(3)

This course deals with the relation between the acting force on the bodies and the resulting motion. It also covers the kinematics and kinetics of a particle, the kinematics and kinetics of a system of particles, the kinematics and kinetics of the plane motion of a rigid body. Problem solving capabilities are to be enforced through practices such as Design/Tests/Analysis of open-problems for creative design.

AM4222 Electrical & Electronic Engineering 3(3)

This course deals with analysis of DC and AC networks, frequency response and transient analysis, diode and transistor, operational amplifier and analog integrated circuits, digital logic circuits and digital systems.

AM4424 Flight Simulation 3(3)

This course teaches modelling of aerospace vehicle, reduced models, six-degree of freedom simulations, parameter optimization, gradient methods, and various integral methods.

AM3215 Fluid Mechanics 3(3)

This course teaches properties of fluids, fluid statics, basic equations of fluids, dimensional analysis of flow, and ideal fluid flows. Problem solving capabilities are to be enforced through practices such as Design/Tests/Analysis of open-problems for creative design.

AM4342 Fluid Power Control 3(3)

This course teaches the theory of the liquid power control using oil or air to its practical application to industrial machines, automobiles, aircraft, robots, and so on. It also covers hydraulic and pneumatic components, their circuits and application examples, several design exercises.

AM4320 Gas Turbine Engines 3(3)

This course teaches the configurations and working principles of aircraft propulsion and gas generator for powerplants. Based on thermodynamic cycle analysis, the overall performances of air breathing gas turbines such as ramjet, turbojet, turbofan, turboprop, turboshaft and the effects of design parameters of gas turbine are to be investigated. It emphasizes on design concepts of main components such as inlet, compressors, combustors, turbines, and exhaust nozzle. This course also deals with fuel, lube, ignition and starting systems.

AM4326 Heat Transfer 3(3)

This course teaches the concepts and basic theory of heat transfer mode-conduction, convection and radiation. It also covers the extended theories, the forced, free convection and the various types of heat exchangers, boiling and condensation.

AM4432 Helicopter Engineering 3(3)

This course teaches helicopter flight theory including hovering, forward, climbing, and auto-rotation, and flight performance and stability & control of helicopter.

AM4356 Industry Cost Management 3(3)

In order to achieve sustained growth in industrial society, there should be increased industry interest through cost reductions, increased sales through promotional strategies, and maximized productivity. Cost reduction plan and practice should be thorough about this, because it means an increase in profit. This course provides fundamental knowledge on cost management to achieve cost-effective in the industry.

AM4480 Introduction of the Medical Robot 3(3)

Introduce medical robot research to develop a new medical robot. It aims to let the students understand what is important parameters to design, fabricate and develop medical robots.

AM4402 Introduction to Finite Element Method 3(3)

In this course, students study the basic techniques of the finite element method used in the structural, thermal and fluid flow analysis which can be applied to practical engineering problems. The class provides knowledge on finite element modeling, formulation, interpolation and shape functions.

AM4315 Introduction to Materials 3(3)

This course teaches first, structure and properties of materials: crystallography, defects, testing of mechanical properties, optical metal lography, fracture, creep, fatigue, environmental stability; second, engineering materials and processes: phase diagrams, solidification and growth, ceramics, polymers, composites, thermal processing, and aging.

RC7102 Linear Algebra 3(3)

This course deals with the fundamentals of vector, vector space, and vector calculus including line integral, surface integral, and gradient. Also, matrix theory and matrix algebra are studied with its application to engineering problems.

AM4321 Machine Elements Design 3(3)

This course covers design principles and process of power trasmission machine elements such as gear, shaft, bearing, belt and bolts and nuts.

AM4221 Manufacturing Processes for Engineering Materials 3(3)

This course teaches properties of materials, followed by a broad spectrum of manufacturing processes such as casting, forming, cutting, grinding, and welding. Topics in each process include the principles of processes, capabilities, typical applications, advantages, and limitations.

AM4437 Manufacturing System Engineering and Application 4(3)

This course teaches manufacturing, science and technology which are three important elements in order to get economic developments and national securities. For the better understanding of manufacturing system topics will concentrate on the principles of systems, process technology, production management (flow of managerial information), and automation/CIM. Special topics relating to venture manufacturing companies are to be studied and the reports to be submitted with oral presentation.

AM4226 Materials Manufacturing Exercise 2(1)

This course teaches techniques and equipments handling in materials manufacturing process. The course includes fundamental processes such as turning, milling, drilling, welding, bending and shearing, advanced numerical control processes using machining center, CNC lathe and wire EDM, and measurements using basic tools, 3D CMM and portable scanner. At the completion of the course.

AM4324 Measurement Engineering 3(3)

This course teaches measurement of physical quantities such as length, temperature, force, and pressure, and principle of measurement devices, electrical networks, analog and digital electronic devices, filters, and data acquisition systems, digital signal processing and error analysis of measured data.

AM4314 Mechanical Behavior of Materials 3(3)

This course offers investigation of mechanical behavior of materials based on stress and deformation, viscoelastic stress relaxation and creep behavior, yielding and fatigue behavior of materials under combined forces and cyclic loading. It also examines fracture and crack growth of materials.

AM4405 Mechanical Machining System 3(3)

This course introduces the structure, operation principle and characteristics of machine tools which perform the mechanical machining of products via the relative motion between workpiece and tool, and concentrates especially on the advanced design and performance evaluation technologies required to realize the high-speed and high-precision machine tools. Also, in order to foster the ability to evaluate the economics of mechanical machining, it covers the chip formation mechanism, cutting resistance, cutting temperature, tool life and so on.

AM4327 Mechanical System Design 3(3)

This course is to practice Design For Six Sigma (DFSS) which helps to design mechanical system right at the first time. First half of the course is for design methods at the conceptual stage such as Quality Function Deployment (QFD), Axiomatic Design, and TRIZ, The second half is for the detail design methods such as Design of Experiments, Response Surface Methods, Taguchi Methods, and Design Optimization Techniques.

AM4325 Mechanical Vibration 3(3)

This course teaches the principle of mechanical parts and flexible structures, and the characteristics of vibration. It also covers single DOF vibration system, harmonic excitation responses, general excitation responses, multi DOF systems, modal analysis, and vibrating system design.

AM4417 Mechanics of Composite Material 3(3)

This course offers investigation of stiffness and strength characteristics, various manufacturing methods, stress-strain relationship, laminate theory and failure theory, emphasizing fiber-reinforced composites used to aircraft structures, and design of composite beam and plate.

AM4210 Mechanics of Machinery 3(3)

This course teaches kinematics and dynamics of mechanical machineries and elements, velocity and acceleration of a Point in machine, force, work, and energy Principles applied to machinery design.

AM3212 Mechanics of Materials 3(3)

This course teaches relations of the stress, deformation, and strain energy of engineering materials subjected to external forces such as axial force, torsion and bending moment for statically determinate systems, and optimal conditions. Problem solving capabilities are to be enforced through practices such as Design/Tests/Analysis of open-problems for creative design.

AM4407 Mechatronics 3(3)

This course teaches digital data processing using microprocessor, design and control of servo mechanisms, dynamics and control of robots, automation using hydraulic and pneumatic devices, and smart structures and systems.

AM4219 Numerical Analysis 3(3)

This course deals with mathematical modeling and engineering problem-solving, approximations and error, root of equations, systems of linear equations, curve fitting and interpolation, numerical integration, ordinary differential equations and partial differential equations.

RC7205 Ordinary Differential Equations 3(3)

The subject deals how to model physical problem by ordinary differential equations and shows standard methods solving the equation. From first order to higher order, solutions using laplace transform will be studied. Emphasis on fourier series, integral and fourier transform will be introduced and applied.

AM4443 Practice on Propulsion Engine 2(1)

To obtain practical experiences, students operate the engine and analyze the performance of internal combustion engine by themselves to help them be familiarized with engine itself and its auxiliary equipments. Reciprocating engines and gas turbine for aircraft propulsion system will also be dismantled, inspected, and fabricated.

AM4355 Principle of Engineering Management 3(3)

This course aims to help students understand the basic concepts of business administration easier by combining the contents of Business Administration and the existing areas of engineering to pursue a better understanding of engineering technology and management. Students learn how to solve problems such as strategic management, accounting, and personnel. This course provides problem-solving skills and leadership coming from management intuition.

AM4354 Quality and Reliability Engineering 3(3)

This course is to teach the quality and reliability engineering at the introductory level, which plays fundamental roles in the entire manufacturing industry, including the aircraft. Quality is defined as the ability to conform to the requirements at the production line whereas the reliability is the extended ability over the lifetime. With this aim, the course addresses design for quality, statistical process and quality control in the quality part, and design for reliability, reliability prediction and assessment in the reliability part. Six sigma methodology is a central means to achieve the associated goal, which is studied as well in this course.

AM4316 Reciprocating Engines 3(3)

This course deals with the types, classifications, working principles, performance parameters, and cycle analyses of reciprocating internal combustion engines. Topics include details on combustion chemistry and basic theory, fuel and ignition characteristics, and introductions on subsystems such as valve mechanisms, This course also covers basic thermodynamics, ideal and actual cycle in relation to aircraft reciprocating engine, and each system including fuel, lube, cooling and ignition components.

AM4421 Robotics 3(3)

This course teaches modeling and analysis of robot dynamics, inverse dynamics and path design, design and control of robot manipulators, mobile and micro robots, robot sensors, and industrial application.

AM4413 Rocket Propulsion 3(3)

This course will cover the physics needed to analyze rocket propulsion system. The basic concepts of solid propellants rocket motor, liquid propellant engine, and electric propulsion system will be introduced. This course will also cover thermo-chemical flow in thrust chamber, dynamic flight, and heat transfer in rocket engine.

AM4472 Satellite Systems 3(3)

Introduction to satellite systems and global navigation satellite system: Featured topics include: Satellite sub systems including attitude/orbit control, structure, and thermal control. Concept of the GNSS, GNSS applications, GNSS signal structure, major error sources.

AM3317 Seminar of Aerospace and Mechanical Engineering 1(1)

This subject consists of a series of lectures of professionals in aerospace and mechanical engineering. The student can get the cutting edge of engineering study and information by attending this lecture.

AM4416 Space Flight Mechanics 3(3)

This course offers overview of space flight principles and applications, orbital mechanics including perturbation and orbit propagation, orbit transfer, orbit determination, and interplanetary flight principle.

AM3319/AM3407 Startup Capstone Design I/II 3(3)

In this course, a student selects a startup item which is related to the aerospace and mechanical engineering, and refine the idea using the integrated knowledge in the field and literature surveys. The startup idea is verified through the integrated system design, theoretical and experimental analyses and the performance demonstration of the prototype.

AM3101 Statics 3(3)

This course deals with analysis of forces induced in particle and rigid body to determine reaction by equilibrium equation.

AM4353 Systems Engineering 3(3)

Systems engineering is an interdisciplinary field of engineering that focuses on how complex engineering projects should be designed and managed over the life cycle of the project. This course introduces engineering process and management related to the system engineering and the life cycle. In detail, this course deals with life cycle, system engineering process, requirement analysis, technical review, verification, assessment, risk management, etc.

AM3213 Thermodynamics 3(3)

This course covers the basic concepts and definitions of matters, systems, properties, process and ideal gases, the conservation law of mass and energy, the second law and entropy concept, thermal power system-gasoline, diesel engine, gas turbine, and refrigeration air conditioning system. Problem solving capabilities are to be enforced through practices such as Design/Tests/Analysis of open-problems for creative design.

AM4408 Turbomachinery 3(3)

This course deals with fundamental theories and preliminary design procedures for turbomachinery such as pump, fan, compressor, and turbine.