

Short Syllabus of Aerospace Engineering (136) Curriculum

MA1122, Calculus I (4 SKS)

Short Syllabus

-

Related Courses

1. MA1123 Elementary Calculus I, Prohibited.

Bibliography

1. Purcell, E.J. dan D. Varberg (Alih bhs: I Susila), 2003, Kalkulus dan Geometri Analitik Jilid 1 dan 2, Erlangga
2. Purcell, E.J. and D. Varberg, 2000, Calculus with Analytic Geometry, 8 Edition, Prentice Hall
3. Stewart, J. (Alih bhs: I N. Susila; H. Gunawan), 2000, Kalkulus Jilid 1 dan 2, Erlangga

MA1222, Calculus II (4 SKS)

Short Syllabus

-

Related Courses

1. MA1122 Calculus I, Prerequisites.
2. MA1223 Elementary Calculus II, Prohibited.

Bibliography

1. Purcell, E.J. dan D. Varberg (Alih bhs: I Susila), 2003, Kalkulus dan Geometri Analitik Jilid 1 dan 2, Erlangga
2. Purcell, E.J. and D. Varberg, 2000, Calculus with Analytic Geometry, 8 Edition, Prentice Hall
3. Stewart, J. (Alih bhs: I N. Susila; H. Gunawan), 2000, Kalkulus Jilid 1 dan 2, Erlangga

IF1081, Algorithm & Programming IA (2 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Liem, Inggriani, 1998, Program Kecil dalam Bahasa C, - Edition, Departemen Teknik Informatika ITB
2. Kernighan and Ritchie, 1998, The C Programming Language, - Edition, Prentice Hall
3. Liem, Inggriani, 1998, Program Kecil dalam Bahasa Pascal, - Edition, Departemen Teknik Informatika ITB

IF4261, Software Engineering B (2 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Peter, C. and E. Yourdon, 1990, Object Oriented Analysis, - Edition, Prentice Hall International
2. Peter, C. and E. Yourdon, 1991, Object Oriented Design, - Edition, Prentice Hall
3. Pressman, R.S., 1997, Software Engineering - A Practitioner's Approach, 4 Edition, McGraw-Hill

BI1001, Environmental Science (2 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Cunningham, W.P. & B.W. Saigo, 1999, Environmental science: a global concern, 5 Edition, McGraw-Hill, Boston
2. Miller, G. Tyler, Jr, 2002, Living in the environment: Principles, connections, and solutions., Brooks/Cole Publishing Company, Pacific Grove, CA
3. Kupchella, C.E. & M.C. Hyland, 1993, Environmental science: living within the system of nature., Prentice-Hall International, New Jersey

FI1102, Elementary Physics IB (3 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Giancoli, D, C., 2001, Physics. Principles with Applications, Prentice Hall
2. Cutnell, J. D, 2001, Physics, John Wiley & Sons

KI1112, Basic Chemistry I B (2 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Chang, R., 2000, Essential Chemistry, 2nd Edition, McGraw Hill, New York
2. Brady J.E., and J. Holum R., 1996, Chemistry, the study of Matter and its changes., 2nd Edition, John Wiley, New York
3. Achmad, H., 1992, Seri Penuntun Belajar Kimia Dasar, Citra Aditya Bakti, Bandung

FI1202, Elementary Physics IIB (3 SKS)

Short Syllabus

-

Related Courses

1. FI1102 Elementary Physics IB, Prerequisites.

Bibliography

1. Giancoli, D, C., 2001, Physics. Principles with Applications, Prentice Hall
2. Beisser, A., 1991, Physics, Addison wesley
3. Cutnell, J.D., 2001, Physics, John Wiley & sons

KI1212, Basic Chemistry II B (2 SKS)

Short Syllabus

-

Related Courses

1. KI1112 Basic Chemistry I B, Prerequisites.

Bibliography

1. Chang, R., 2000, Essential Chemistry, 2nd Edition, McGraw Hill, New York
2. Brady J.E., and J. Holum R., 1996, Chemistry, the study of Matter and its changes., 2nd Edition, John Wiley, New York
3. Achmad H. dan E. Ratnaningsih, Kimia Organik, Ilmu Kimia dan Ilmu Kimia Lingkungan, Koordinator Kimia TPB, Jurusan Kimia FMIPA, ITB

EL2012, Fundamental of Electronics (3 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

-

PN1001, Intro. to Aerospace Engineering (2 SKS)

Short Syllabus

This lecture gives introduction to aeronautics. Topics discussed include : some aeronautic definitions, objectives and challenge. Aeronautical Engineering subjects are aerodynamic, structure, propulsion, flight mechanics, aero-elasticity, aero-acoustics, aircraft basic system, design, production and flight operation. Interconnection among subjects are also discussed.

Related Courses

1. PN1031 Earth & Space Physics, Co-requisites.
2. PN10T1 Concepts of Technology, Co-requisites.

Bibliography

1. Shevel, 1989, Fundamentals of Flight, Prentice Hall
2. Anderson, 2000, Introduction to Flight, McGraw-Hill
3. Kermode, 1970, Flight without Formulae, Pitman

PN1011, Fluid Mechanics (2 SKS)

Short Syllabus

This lecture gives basic understanding of fluid mechanic. Topics discussed are : 1. Fluid medium covering introduction, dimensions and units, air properties (gas), fluid statics, buoyancy force, hydrostatics force, fluid stream, viscosity, forces in fluid stream, dimensional analysis, and type of fluids. 2. Fluid kinematics covering review of vector calculus, stream field, vector field, scalar field, Gauss' theorem, continuity equation, stream function in 2D Incompressible Flow, strain and rotation, Stokes theorem, irrotational stream, Velocity Potential, Biot-Savart law, Theorem Vortex-Helmholtz, and Vortex in viscous fluid. 3. Fluid Mechanics covering introduction, stream line, Bernoulli in incompressible flow, Euler equation, Integration of Euler equation, Bernoulli equation for rotational flow, momentum theorem of fluid mechanics.

Related Courses

-

Bibliography

1. Kuethe, A.M., Chow C.Y., 1980, Foundations of Aerodynamics, McGraw-Hill
2. White, F.M., 1992, Fluid Mechanics, McGraw-Hill, New York
3. Sardjadi, D., 1998, Mekanika Fluida, Bandung

PN1021, Engineering Materials (2 SKS)**Short Syllabus**

This lecture introduces the students to the mechanical properties of materials especially metals and their correlation with the structure in materials and processing. The lecture also covers crystal solid structure, defect of crystal structure, testing of mechanical properties, strengthening mechanism of materials and phase diagram. By knowing the mechanical properties of materials, the students are expected to have basic knowledge on choosing materials for general structures need.

Related Courses

-

Bibliography

1. Callister, W.D., 1997, Materials Science and Engineering, 4 Edition, John Wiley & Sons, New York
2. Saxena, S., A. Antolovich, S. Warner, 1999, The Science and Design of Engineering Materials, 2 Edition, McGraw Hill, Boston

PN1031, Earth & Space Physics (2 SKS)**Short Syllabus**

This lecture gives knowledge to the students about the basic concept of earth and space physics as a medium of aircraft motion. The concept covers evolution process on the forming of the earth, earth motion and geometry, earth atmosphere layer and field, earth gravitational and electromagnetic field. A number of phenomena that happen in earth atmosphere field which are related to aeronautics like wind, weather, and air turbulence, will also be studied. Aircraft operation limitation when operating in earth atmosphere field, known as flight envelope will also be introduced in this lecture

Related Courses

-

Bibliography

1. G.J.J. Ruijgrok, 1990, Elements of Airplane Performance, Delft University Press, Delft, The Netherlands
2. Anon, 1992, The Planet Earth, The World Book Encyclopedia of Science, World Book Inc., Chicago
3. , <http://www.encyclopedia.com>,

PN10T1, Concepts of Technology (2 SKS)

Short Syllabus

The history of science, art, and technology show that since the existence of human being, the growth of science, art, and technology is based on human creativity to fulfill more secure and prosperous life need. The growth was enabled by the high ability of human being and deeper understanding about model, system, feed back, stability, decision making, and also optimization. Science, art, and technology, and also industrial development strategy are closely related with innovation and invention supporting human life need. Knowledge and implementation of Rights of Intellectual Properties (HKI) become the part of this lecture.

Related Courses

1. PN1001 Intro. to Aerospace Engineering, Co-requisites.
2. PN1031 Earth & Space Physics, Co-requisites.

Bibliography

1. Kermode, 1970, Flight Without Formulae, Pitman
2. Anderson, 2000, Introduction to Flight, McGraw Hill
3. Stinton, 1980, The Anatomy of the Aeroplane, Gramedia

PN2041, Engineering Drawing (3 SKS)

Short Syllabus

This lecture gives concept and codes on engineering drawing according to ISO standard and gives understanding concerning main geometry parameter of an aircraft. The given concept covers drawing as an engineering language, multi projection drawing, single projection drawing, cross section drawing, dimensioning, and 3D drawing. The media used are pencil and paper which is later continued with CAD application. This lecture is given to develop the students ability in presenting their ideas by drawing

Related Courses

-

Bibliography

1. , 1991, ISO Standards Handbook 12, ISO
2. G. Takeshi Sato dan N. Sugiarto, Menggambar Mesin Menurut Standar ISO,
3. G. Takeshi Sato dan N. Sugiarto, 1981, Menggambar Mesin Menurut Standar ISO,

PN2101, Engineering Mathematics 1 (3 SKS)

Short Syllabus

This lecture contains analysis techniques in engineering. The lecture includes three principal topics, which are Vector Calculus, Partial Differential Equations, and Complex Analysis. Vector Calculus topic covers Vector Differential Calculus and Vector Integral

Calculus. Partial Differential Equations topic covers Wave Equation, Heat Transfer, and Laplace Equation. Complex Analysis topic covers Complex Analytic Functions, Complex Integration, and Series.

Related Courses

1. MA1222 Calculus II, Prerequisites.

Bibliography

1. Kreyszig.E, Engineering Mathematics, John Wiley & Sons, Inc

PN2111, Aircraft Aerodynamics 1 (3 SKS)

Short Syllabus

This lecture contains three major topics which are : Fluid flow around object / body which covers control equation and stream flow around simple object, panel method, and aerodynamics interferences. Airfoil theory which covers symmetrical and non symmetrical thin airfoil theory and introduction to panel method. Conformal mapping theory and its application in airfoil design and analysis.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.

Bibliography

1. Kuethe, A.M., Chow C.Y., 1980, Foundations of Aerodynamics, McGraw-Hill
2. Sardjadi, D., 1995, Teori Airfoil, Bandung
3. Katz J., Plotkin A., Low-Speed Aerodynamics, Mc Graw Hill

PN2121, Statics (3 SKS)

Short Syllabus

The lecture gives basic understanding to static mechanic. Introductory part includes: Scalar, Vector, Newton law; units; law of gravitation. Forces Systems topics include: perpendicular forces components, moment, couple, and the resultant of two and three dimensions problems. Equilibrium in two and three dimensions. Structure: truss, frame and machine. Distributed Forces: center of mass and centroid. Pappus theorem. Supports reactions. Inner reactions. Frictions: Friction types, friction applications in the machinery. Virtual Work: work, equilibrium, potential energy and stability. Area Moment of Inertia.

Related Courses

-

Bibliography

1. JI. Meriam, Engineering Mechanics : Statics, John Wiley & Sons, Inc

PN2122, Aircraft Materials (2 SKS)

Short Syllabus

This lecture introduces the students to the mechanical properties of materials commonly used in the aircraft structures, materials failure, and structure inspections. The lecture also covers the properties of aluminum alloys, titanium steel, composite materials, fractures, fatigues, corrosion, and NDT. After attending the course the students are expected to have basic knowledge on choosing materials for aircraft structure.

Related Courses

1. PN1021 Engineering Materials, Prerequisites.

Bibliography

1. Polmear, J.J., 1989, Light Alloys, Metallurgy of the Light Metals, Edward Arnold, London
2. Brooks, C. R., 1982, Non Ferrous Alloys, American Society for Metals, Ohio

PN2201, Engineering Mathematics 2 (3 SKS)

Short Syllabus

This lecture contains analysis techniques in engineering. The lecture composes three principal parts, which are Linear Algebra, Ordinary Differential Equations, Fourier and Laplace Transformations. Linear Algebra covers Matrix, Linear System, Determinant, Eigenvalue and eigenvector. Ordinary Differential Equations covers first order ODE, second order ODE, and higher order, and First Order Invariant Linear Differential Equations System. This lecture is the continuation of Engineering Analysis 1 course.

Related Courses

1. MA1122 Calculus I, Prerequisites.
2. MA1222 Calculus II, Prerequisites.

Bibliography

1. R. Hononjeff and F.X. McKelvey, 1983, Planning and Design of Airports, McGraw-Hill
2. Jeffry, A., 1990, Linear Algebra and Ordinary Differential Equations, University Press. Cambridge

PN2211, Aircraft Aerodynamics 2 (3 SKS)

Short Syllabus

The main subject of this lecture is compressible flow. This lecture will study classical issues of compressible flow such as acoustic, quasi dimensional flow, unsteady 1-D flow, shock wave, potential flow (compressible), expansion fan, and linearized potential flow. After taking this lecture, the students are expected to be able to comprehend phenomena

such as pressure wave propagation, compression, and the "losses" after passing shock wave. It is also expected that the students can apply their knowledge technically in the process of aerodynamic characteristics analysis of the compressible flow.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.
2. PN2211 Aircraft Aerodynamics 2, Prerequisites.
3. TF2106 Thermodynamics, Co-requisites.

Bibliography

1. Anderson:, Fundamental of Aerodynamics,
2. Liepmann and Roshko:, Elements of Gasdynamics,

PN2221, Strength of Material (3 SKS)

Short Syllabus

This lecture gives the basics of structural stress calculation. Topics given in the course cover calculation of stress due to pulling load, elasticity, torsion, Mohr circle, calculation of structural deflection, indefinite static structure, buckling, energy method, failure theory. After taking the course, the students are expected to have abilities of calculating structural stress and deflection on simple structure and determining whether failure is happen due to static load.

Related Courses

1. PN2121 Statics, Prerequisites.

Bibliography

1. Craig, R.R., 1996, Mechanics of Materials, John Wiley & Sons, New York

PN2251, Kinematics & Dynamics (3 SKS)

Short Syllabus

This course introduces basic principle of rigid body dynamics, including motion (kinematics) and its relation to the forces which is responsible to the motion (kinetics). This motion is considered in various coordinate reference system which is suitable to the problem. The relation between the motion and forces are obtained using equation of motion, which is derived directly using Newton law, application of energy method and impulse-momentum principle. The discussion will be carried out step by step, starting from particle system, and then continued to the rigid body in 2D plane and rigid body in 3D space. This course is given in order to improve student abilities in solving rigid body dynamic problems by identification, modeling and analysis.

Related Courses

1. PN2121 Statics, Prerequisites.

Bibliography

1. Meriam, J.L., 2002, Engineering Mechanics, Vol 2, Dynamics, 5 Edition, Wiley Higher Education
2. Hollownenko, A.R., Dynamics of Machinery, John Wiley & Sons Inc., New York
3. Grosjean, Kinematics and Dynamics of Mechanism, McGraw Hill International Edition, Singapore

PN3101, Numerical Method (2 SKS)

Short Syllabus

This course gives analysis methods using computer program. The first section of the course will discuss the numerical error. The next section will cover numerical methods: methods for finding roots of any equation, curve fitting which consists of regression and interpolation, numerical integration, numerical differentiation, solution of linear algebra and numerical matrix operation, and numerical solution of eigenvalue and eigenvector. Some methods and their comparison will be given at each topic. Prediction of numerical error which may occur in each method will also be given.

Related Courses

1. IF1281 Algorithm & Programming, Prerequisites.

Bibliography

1. William H.Press, Saul A Teukolsky, 1987, Numerical Recipes, Cambridge University Press
2. H Djodihardjo, 2000, Metoda Numerik, 1 Edition, Gramedia Press

PN3111, Aircraft Aerodynamics 3 (2 SKS)

Short Syllabus

This course integrates knowledge which is given in the previous courses i.e. Fluid Mechanics, Theory of Airfoil and Wing, Compressible Flow. After taking the course, the students are expected to have abilities: - Prediction of aerodynamic lift produced by airfoil with high-lift devices and its application to aircraft wing, - Prediction of aircraft drag by adding drags from its components and others drag source cause by the aircraft configuration, - Knowing propeller theory and its application in the analysis/design or choosing a propeller.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN2211 Aircraft Aerodynamics 2, Prerequisites.

Bibliography

1. McCormick, B., W., "Aerodynamics, Aeronautics, and Flight Mechanics", John Wiley & Son, USA
2. Katz J., Plotkin A., "Low-Speed Aerodynamics", Mc Graw Hill

PN3121, Analysis of Light-weight Structures (2 SKS)**Short Syllabus**

This course discuss about the history, theory, modeling and analysis of lightweight structure and its application in aircraft structure and other flight vehicles. The materials of the course include: the history of aircraft structure technology; basic theory of elasticity; Airy stress function; semi monocoque structure; torsion; elastic; transversal force on semi-monocoque structure; modeling; elements of aircraft structure design. This course is given in order to improve students abilities in problem solving, and give them skills in modeling, analysis and preliminary design of aircraft structure.

Related Courses

1. PN2221 Strength of Material, Prerequisites.

Bibliography

1. Bruhn, E.F., 1965, Analisis and Design of Flight Vehicle Structures, Tri-State Offser Company, Ohio
2. Curtis, H. D., 1997, Fundamentals of Aircraft Structures Analysis, Irwin, Chicago
3. Sun, C.T., 2000, Mechanics of Aircraft Structures, Technomic, New York

PN3131, Flight Performance 1 (3 SKS)**Short Syllabus**

This course discuss about performance of an aircraft along its flight path. Topics of the course include: take off performance, climbing performance, cruising performance, gliding performance, turning performance and landing performance.

Related Courses

1. PN1031 Earth & Space Physics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN2211 Aircraft Aerodynamics 2, Prerequisites.

Bibliography

1. G.J.J. Ruijgrok, 1990, Elements of Airplane Performance, Delft University Press, Delft, The Netherlands
2. Shevel, 1989, Fundamentals of Flight, Prentice Hall
3. Nguyen X. Vinh, 1993, Flight Mechanics of High-performance Aircraft, Cambridge Aerospace Series 4, Cambridge University Press

PN3141, Airworthiness (2 SKS)

Short Syllabus

This course gives a survey of certification process of an aircraft

Related Courses

1. PN3241 Air Transportation System, Prerequisites.

Bibliography

1. Anon, 2000, Civil Aviation Safety Regulations, Part 1 - 183,
2. Anon, 2000, Federal Code of Regulations, Part 1 - 183,

PN3151, Mechanical Vibrations (2 SKS)

Short Syllabus

This lecture is discussing oscillation or vibration of a mechanical system including generating forces and the effects of the vibration. Discussion covers: Free vibration of the Linear System one degree of freedom (SDOF), equation of motion of free vibration, natural frequency, initial condition and damping influence. Forced vibration SDOF, equation of forced vibration, response to harmonic style, damping influence and also response to non harmonic forces. Later on, the discussion continues to two degree of freedom system representing system with multi degree of freedom, introduced by vibration modes concept. The lecture is given to improve the skill in solving mechanical vibration problems that occur in numerous applications, through analysis and modeling.

Related Courses

1. PN2121 Statics, Prerequisites.
2. PN2221 Strength of Material, Prerequisites.

Bibliography

1. Thomson, W.T., 1993, Theory of Vibration with Applications., 4 Edition, Prentice Hall International Inc.
2. Inman, D.J., 2001, Engineering Vibration, 2 Edition, Prentice Hall International Inc.

PN3201, (3 SKS)

Short Syllabus

This lecture discuss about statistical calculation for industrial and business application. This lecture is set to provide the students the skill of statistical analysis used in many quality controls and planning. The topics covered are: probability calculation, data type, descriptive statistic, inference statistic, discrete distribution, continuous distribution, sample distribution, point and interval anticipation, hypothesis testing, correlation and regression, and also introduction to non parametric statistics and multivariable statistics.

Related Courses

-

Bibliography

1. Dajan, A., 1991, Pengantar Metode Statistik, jilid I dan II, LP3ES, Jakarta
2. Lind, D.A., 2002, Statistical Techniques in Business & Economics, 11 Edition, McGraw Hill, New York

PN3221, Introduction to Manufacturing (2 SKS)

Short Syllabus

This lecture covers comprehensive evaluation about the method of making a product (part or component) as a complete system starting from planning (design), manufacturing process, until the quality control of the final product. Production methods discussed are : Molding (casting), Powder Metallurgy, Forming, Joining, Properties Changes (Heat Treatment, Surface Treatment and Protective Treatment), Cutting (Machining) And Non-Conventional Processes. Topics cover the definition of type, special equipments and the procedures of the processes

Related Courses

-

Bibliography

1. Sherif D. Elwakil, Processes and Design for Manufacturing, Prentice-Hall

PN3231, System Dynamics (3 SKS)

Short Syllabus

This lecture is discussing about dynamics system modeling with unified approach using energy variable as a basis to represent system dynamics. Bond graph is used as the tool to represent a dynamics system and it is then used to derive mathematical model of the system. Sophisticated system approach is specified at the basic systems of the aircraft.

Related Courses

-

Bibliography

1. S.D.Jenie, Diktat Kuliah Dinamika Sistem, Institut Teknologi Bandung
2. D.C. Karnopp, D.C. Marfolis, R.C. Rosenberg, 1990, System Dynamics : A Unified Approach, John Wiley & Sons, New York

PN3232, Flight Navigation & Guidance 1 (3 SKS)

Short Syllabus

Avionics Navigation lecture is one of the flight mechanics subjects that gives students the approach on how to determine position and velocity of a craft through measurement of a

respected geometry configuration relative to a reference. This lecture gives basic concept of navigation process with guidance circumference related to control circumference, and basic knowledge about navigation system which are operational at this time.

Related Courses

-

Bibliography

1. Prof. Said. D. Jenie, ScD., Diktat Kuliah Navigasi dan Panduan Terbang,
2. M. Kayton, W. Fried, Avionics Navigation Systems,
3. Kermode, 1970, Flight Without Formulae, Pitman

PN3233, Flight Dynamics 1 (4 SKS)

Short Syllabus

Flight Dynamics 1 lecture gives knowledge to students about dynamic or motion of an aircraft relative to reference coordinate located on the aircraft center of gravity. The topics taught in Flight Dynamics 1 includes forces and moments acting on the aircraft, equilibrium of the forces and moments acting on the aircraft, aircraft equation of motion, and aircraft static stability. Practicum of the aircraft static stability is given by testing an aircraft model in a wind tunnel and with the flying aircraft.

Related Courses

1. PN1031 Earth & Space Physics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN2211 Aircraft Aerodynamics 2, Prerequisites.
4. PN2251 Kinematics & Dynamics, Prerequisites.

Bibliography

1. Jan Roskam, 1979, Airplane flight dynamics and automatic controls, part I and II., Roskam Aviation and Engineering Corporation
2. J.A. Mulder & W.H.J.J van Staveren, 2000, Flight Dynamics, Delft University of Technology, Delft, The Netherl
3. C.D. Perkins and R.E. Hage, 1949, Airplane Performance Stability and Control, John Wiley & Sons

PN3241, Air Transportation System (3 SKS)

Short Syllabus

Air Transportation System lecture aims that the student understands various law, engineering, management and operation aspects in aviation industry. The lecture studies basic laws and policies of aviation, nationally and internationally. The lecture starts with the Introduction to Air Transportation System, Law and Policy of National Air Transportation, International Transportation Law and Agreement; it is then later continued with specific application topics like Airline Business, Airline Economics,

Airline Planning, Market Study and Forecasting Methodology, Aircraft Selection Fleet Planning and, Airport, Air Traffic Services and Management, and Maintenance Organization. The lecture is carried out with case study that occurs in air transport service industries so that the students can have illustration of practical application.

Related Courses

1. PN3141 Airworthiness, Prerequisites.
2. PN5041 Reliability Engineering, Prerequisites.
3. PN5247 Airport Engineering, Prerequisites.

Bibliography

1. Anon, 1996, Manual on The Regulation of International Air Transport, ICAO Doc.9626
2. Hisar, M. Pasaribu, 2002, Sistem Transportasi Udara, Diktat Kuliah
3. Thomson, W.T., 1986, Theory of Vibration with Application, 4 Edition, Research Studies Press LTD

PN4031, Experimental Methods (2 SKS)

Short Syllabus

Experimental Methods lecture gives knowledge of measurement techniques and principles in engineering area, especially in aeronautical engineering. The topics cover characteristic measurement of air flow, measurement of tension and strain of aircraft structures, and measuring with inertial measurement tools. Principal and measurement technique includes measuring device / instruments, measurement methods and measurement data interpretation.

Related Courses

1. PN1031 Earth & Space Physics, Prerequisites.
2. PN3131 Flight Performance 1, Prerequisites.
3. PN3233 Flight Dynamics 1, Prerequisites.
4. PN5133 Inertial System 1, Prerequisites.

Bibliography

1. Thomas G. Beckwith & N. Lewis Buck, 1978, Mechanical Measurements, Addison-Wesley, World Student Series Printing, Sec
2. , 2001, Bahasa Indonesia Ilmiah dan Tata Karya Tulis Ilmiah, Seksi Bahasa Indonesia, Dept Sosio-Teknologi Institut Teknologi Bandung
3. E.O. Doebelin, 1990, Measurement Systems: Applications and Design, McGraw-Hill, New York

PN4041, (3 SKS)

Short Syllabus

Aircraft design is a task to integrate basic knowledge in aeronautics to design an aircraft. Basic design will be given along with calculation examples. The students will be split into several groups where each group is responsible to design an aircraft according to a given design requirements and objectives.

Related Courses

1. PN2211 Aircraft Aerodynamics 2, Prerequisites.
2. PN3121 Analysis of Light-weight Structures, Prerequisites.
3. PN3131 Flight Performance 1, Prerequisites.
4. PN3141 Airworthiness, Prerequisites.
5. PN3233 Flight Dynamics 1, Prerequisites.

Bibliography

1. E. Torenbeek, Synthesis of Subsonic Airplane Design,
2. Stinton, The Anatomy of the Airplane,
3. D. Raymer, Airplane Design: A Conceptual Approach,

PN40K1, Ethics in Profession & Job Training (1 SKS)

Short Syllabus

The objective is to give the student a knowledge and experience about a professional atmosphere and code in the aeronautic-related industrial or research institutions. To broaden knowledge and experience of the students, it is strongly recommended that the training is conducted outside ITB campus, but in the special cases the internship can be accomplished inside ITB. The internship can only be carried out with the approval of ITB and the formal institution which supports the student as their working site. Every student must complete a minimum of four weeks supervised training at the working site and must submit a written report signed and assessed by their supervisor. The training last for about four month.

Related Courses

1. PN2111 Aircraft Aerodynamics 1, Co-requisites.
2. PN2122 Aircraft Materials, Co-requisites.
3. PN2221 Strength of Material, Co-requisites.
4. PN2251 Kinematics & Dynamics, Co-requisites.
5. PN3101 Numerical Method, Co-requisites.
6. PN3121 Analysis of Light-weight Structures, Co-requisites.
7. PN3221 Introduction to Manufacturing, Co-requisites.
8. PN3241 Air Transportation System, Co-requisites.
9. PN2041 Engineering Drawing, Co-requisites.

Bibliography

1. Rais Zain, 2005, Panduan Kerja Praktek Mahasiswa Teknik Penerbangan, Teknik Penerbangan ITB

PN40Z1, Final Project (5 SKS)

Short Syllabus

A thesis is an independent academic activity under supervision of one or more lecturers where the student applies and/or develops sciences/knowledge related to aeronautical technology. This activity is ended by presenting the results through seminar and conference, and a final thesis report.

Related Courses

-

Bibliography

1. , 2001, Bahasa Indonesia Ilmiah dan Tata Karya Tulis Ilmiah, Seksi Bahasa Indonesia, Dept Sosio-Teknologi Institut Teknologi Bandung

PN4111, Flight Propulsions (3 SKS)

Short Syllabus

This lecture contains basic understanding of propulsion system, cycle analysis and propulsion device, working principles and machine components analysis, machine characteristics and off design analysis of propulsion device. After following the lecture, the student are expected to be able to apply technically in working performance analysis of the engine components and the engine as a whole.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisited.
2. PN2111 Aircraft Aerodynamics 1, Prerequisited.
3. PN2211 Aircraft Aerodynamics 2, Prerequisited.
4. TF2106 Thermodynamics, Prerequisited.

Bibliography

1. (Cohen)., Gas Turbine Theory,
2. Banfe, Airline Management,
3. (Hill-Peterson), Mechanics and Thermodynamics of Propulsion,

PN4121, Aircraft Loads (2 SKS)

Short Syllabus

Aircraft Loads lecture gives the understanding of moments and forces acting at an aircraft when aircraft resides in land and also on the air. This lecture integrates some of knowledge in aerodynamics, lightweight construction, flight performance and flight dynamics. Acting forces and moment are limited at symmetrical flight with some

attention for wing and horizontal stabilizer. Flight conditions considered are cruise, maneuver and with gust. Other loads like landing and take-off, loads at landing gear and aeroelasticity influence are introduced briefly. Topics are mainly on static loads and operation loads.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN2122 Aircraft Materials, Prerequisites.
4. PN2221 Strength of Material, Prerequisites.
5. PN3131 Flight Performance 1, Prerequisites.
6. PN3233 Flight Dynamics 1, Prerequisites.

Bibliography

1. Sulaeman Kamil, Beban Pesawat (Catatan Kuliah), Penerbit ITB
2. M. F. Spott, Design of Machine Elements, 6th Edition, Prentice-Hall, USA
3. David J. Peery, Aircraft Structures,

PN4131, Flight Control 1 (3 SKS)

Short Syllabus

This lecture studies several things about basic linear system and classical control theory. The topic discussion covers mathematics model representation of dynamic system, in the form of state space as well as in transfer function form, understanding open and close loop system, feed back application, stability analysis, dynamic analysis at frequency domain and time domain, feed back gain design with root locus method, and applications in flight control system.

Related Courses

1. PN3231 System Dynamics, Co-requisites.
2. PN3233 Flight Dynamics 1, Co-requisites.

Bibliography

1. S.D.Jenie, Diktat Kuliah Kendali Terbang, Institut Teknologi Bandung, Bandung

PN4132, Astrodynamics 1 (3 SKS)

Short Syllabus

The lecture topics are: introduction to Astrodynamics, orbit of two objects problem, operational orbit maneuver and two objects orbit as the initial value problem.

Related Courses

1. MA1122 Calculus I, Prerequisites.
2. PN1031 Earth & Space Physics, Prerequisites.

3. PN3101 Numerical Method, Prerequisites.

Bibliography

1. Jenie, Diktat Kuliah Astrodinamika 1,
2. Roy, 1982, Orbital Motion, Adam Hilger, Bristol
3. Battin, 1987, Introduction to Mathematics and Methods of Astrodynamics, AIAA, New York

PN4142, Aircraft Systems (2 SKS)

Short Syllabus

In this lecture, to the student is given the understanding of system engineering, functional requirements, market requirements, and also the regulations applied to aircraft systems. Design variation and technology used in the systems are also studied. Aircraft systems discussion covers: air conditioning, anti-icing systems, bleed-air control, fuel control, aircraft engines, flight control systems, hydraulics, landing gear, electricity, warning system and avionics. This lecture is given to make an understanding of aircraft systems working procedures to fulfill existing conditions and to apply the knowledge obtained in the previous semesters such as mechanics, energy conversion, aerodynamics, system dynamics, and flight performance.

Related Courses

1. MS2190 Engineering Thermodynamics, Co-requisites.
2. PN3131 Flight Performance 1, Co-requisites.
3. PN3231 System Dynamics, Co-requisites.
4. PN4121 Aircraft Loads, Co-requisites.

Bibliography

1. Moir, I., Aircraft Systems,
2. Smit, K., 1999, Vliegtuigsystemen, Diktat kuliah LR-TU Delft
3. Craig R. R., 1981, Structural Dynamics, An Introduction to Computer Methods, John Wiley and Sons

PN4201, Management of Aerospace Industry (2 SKS)

Short Syllabus

This lecture aims to give an introduction to the management of the aircraft industries. The topics discussed are for example planning and organization functions in a company and also management principles. This lecture also briefly introduces the student to law regulations of domestic and international air transportation, and also to air transportation organizations and authorities like IATA and ICAO. Furthermore the lecture also discusses management at each aircraft industry like manufacture industry management, production and marketing management, air transportation services industry management. At the end of the lecture, the student is expected to have knowledge of management and

organization structure of an industry and also processing pattern and its operation.

Related Courses

1. PN3241 Air Transportation System, Co-requisites.

Bibliography

1. Banfe, Airline Management,

PN4242, Aircraft Maintenance (2 SKS)

Short Syllabus

At this lecture, to the student is given the understanding of the importance of maintenance, maintenance concepts, the development methods of maintenance program, the regulations, and monitoring and evaluation methods of on going maintenance program. The student is expected to be able to relate those aspects with aircraft cases in the real world problem. This lecture is given in order to make the student able to decide and apply an appropriate aircraft maintenance program for a specific condition.

Related Courses

1. PN3201 , Prerequisites.
2. PN4142 Aircraft Systems, Prerequisites.

Bibliography

1. Nowlan and Heap, 1978, Reliability-Centred Maintenance, United Airlines
2. Suwondo, E., 2001, Manajemen Perawatan Pesawat, Diktat Kuliah, Teknik Penerbangan ITB
3. Friend, C.H., 1992, Aircraft Maintenance Management, Longman Scientific & Tech.

PN4251, Aeroelasticity (2 SKS)

Short Syllabus

This lecture includes several topics. Introduction, aero-elasticity phenomena, aeroelastic experiments and calculation development, Static aeroelastic of 2D section: static equilibrium equation, torsional divergence, control surface reversal and effectiveness: Static aeroelastic of 3D structures, static equilibrium equation, uniform wing divergence, variant wing divergence, Galerkin approach method, energy theorem approach method, Rayleigh-Ritz method, lift redistribution, anti symmetric rolling; Sweep angle effect at static equilibrium: Torsional-Bending problems, lift redistribution.

Related Courses

1. PN3111 Aircraft Aerodynamics 3, Prerequisites.
2. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. Dowel, E., 1984, Modern Course on Aeroelasticity, Dover Publication, New York
2. Kermode, 1970, Flight without Formulae, Pitman

PN5011, Boundary Layer Theory (2 SKS)**Short Syllabus**

This lecture covers the history of boundary layer theory, viscous fluid dynamics which consists of the evaluation of Navier-Stokes equation and some exact solutions, boundary layer theory consisting of laminar boundary layer, transition, the concept of turbulence flow, and turbulence boundary layer, and also linear stability theory. After attending the lecture, the student

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN3111 Aircraft Aerodynamics 3, Prerequisites.

Bibliography

1. Schlichting, H., Boundary Layers Theory, McGraw Hill
2. Cebeci, T., Numerical Solutions of Boundary Layers Flow, Springer-Verlag
3. van Ingen, J.L., An Introduction to Boundary Layer Flows for Aeronautical Engineering Students, Delft

PN5012, Experimental Aerodynamics (2 SKS)**Short Syllabus**

This lecture covers wind tunnel introductory, measuring probes, interferences, correction methods, and measurement methods. The lecture is ended with a personal assignment including design, testing, and reporting an experiment. By doing the task, the student is expected to have an experience to conduct an experimental project independently.

Related Courses

1. PN1011 Fluid Mechanics, Prerequisites.
2. PN2111 Aircraft Aerodynamics 1, Prerequisites.
3. PN3111 Aircraft Aerodynamics 3, Prerequisites.

Bibliography

1. Pope, A., Low-Speed Wind Tunnel Testing, John&Wiley Sons, Inc
2. Pavian, H.C., Experimental Aerodynamics, Pitman Publishing Corp., New York

PN5013, Computational Aerodynamics (2 SKS)

Short Syllabus

The lecture contains: The properties of Partial Differential Equations (PDEs); Numerical Approach to PDEs; Solving Techniques of Parabolic, Elliptic, and Hyperbolic PDEs; Explicit Methods, Implicit Methods, and Relaxation Methods; Von Neumann Stability Analysis; Upwind and Artificial Dissipation Scheme; Boundary Conditions Formulation; Acceleration Techniques; Pre-Conditioning; Multigrid

Related Courses

1. PN2111 Aircraft Aerodynamics 1, Prerequisites.
2. PN2211 Aircraft Aerodynamics 2, Prerequisites.
3. PN3101 Numerical Method, Prerequisites.
4. PN3111 Aircraft Aerodynamics 3, Prerequisites.

Bibliography

1. Anderson, 1995, Introduction to Computational Fluid Dynamics, McGraw Hill, New York

PN5021, Finite Element Methods (2 SKS)

Short Syllabus

The lecture is an introduction to Finite Element Methods. Background in programming and mathematical aspects in matrices calculation is required. The lecture material covers structure deflection computation using unit force method which is a virtual energy method (virtual load), followed matrix method for structures and later and stiffness method finite element method for truss structures. The participants will develop FEM program for 2D and 3D truss. In addition, the lecture also covers elasticity theory for 2D plate and virtual energy (virtual displacement) to obtain matrix element stiffness. The matrix of higher orders for further element stiffness development is not discussed

Related Courses

1. PN2121 Statics, Prerequisites.
2. PN2221 Strength of Material, Prerequisites.
3. PN3121 Analysis of Light-weight Structures, Prerequisites.

Bibliography

1. S.S. RAO, 1978, Optimization; Theory and Application,

PN5022, Mechanics of Composite Structures (2 SKS)

Short Syllabus

This lecture discusses the basic concepts of material and structure of composite along with its application in general structure mechanic and in aircraft structures in particular. The concept covers: matrices and fiber system, composite system, production process, lamina and laminate theory; interlaminar tension; hygrothermal tension; strength criteria;

impact durable; environment and fatigue effects; composite structure design. This lecture is given to enhance the skill on problem solving and on modeling, analysis, and preliminary design of composite structures

Related Courses

1. PN3121 Analysis of Light-weight Structures, Prerequisites.

Bibliography

1. Hadi, B.K., 2000, Diktat Struktur Komposit, Penerbit ITB, Bandung
2. Gibson, R.F., 1994, Principles of Composite Materials Mechanics, McGraw Hill, Singapore
3. Herakovich, C.T, 1998, Mechanics of Fibrous Composite, John Wiley & Sons, New York

PN5023, Damage Tolerance Analysis (2 SKS)

Short Syllabus

This lecture gives the basic of fracture analysis on the aircraft structure which basically is the prediction of aging propagation on varying amplitude loads. The lecture materials cover damage tolerant as flight safety requirement, fundamental of fracture mechanics and fatigues of the materials, crack propagation on varying amplitude loads and various aspects in structure design. Having completed this lecture, the student is expected to have basic knowledge on applying damage tolerant analysis on the aircraft structures.

Related Courses

1. PN2122 Aircraft Materials, Prerequisites.
2. PN2221 Strength of Material, Prerequisites.

Bibliography

1. Miedlar, P.C., A.P.Berens, S.Gunderson, and J.P.G, 2002, Damage Tolerant Design Handbook: guidelines for the Analysis and Design of Damage Tolerant Aircraft S, University of Dayton Research Institute
2. Broek, D., 1991, Elementary Engineering Fracture Mechanics, Kluwer Academic Publishers, Dordrecht

PN5024, Structural Stability Theory (2 SKS)

Short Syllabus

This lecture discusses basic concept of static structure stability and its application in analyzing the stability of structure mechanics as well as of an aircraft. The concept covered consists of column techniques, buckling analysis with approximation method, beam column, plate buckling, cylindrical shell techniques and composite structure techniques. This lecture is given to provide the problem-solving skill and the analysis skill concerning structure static stability.

Related Courses

1. PN3121 Analysis of Light-weight Structures, Prerequisites.

Bibliography

1. Timo Shunko, 1968, Structural Stability, McGraw Hill, New York
2. Rivello, E., 1970, Aircraft Structures, McGraw Hill, New York

PN5031, Flight Dynamics 2 (2 SKS)

Short Syllabus

Flight Dynamics 2 course gives to student an understanding concerning aircraft maneuver stability, dynamic stability and inertia coupling stability. Aircraft stability discussion is always associated with parameters values affecting aircraft stability.

Related Courses

1. PN3131 Flight Performance 1, Prerequisites.
2. PN3232 Flight Navigation & Guidance 1, Prerequisites.
3. PN3233 Flight Dynamics 1, Prerequisites.

Bibliography

1. C.D. Perkins & R.E. Hage, 1949, Airplane Performance, Stability and Control, John Wiley & Sons, New York
2. Jan Roskam, 1979, Airplane Flight Dynamics and Automatics Controls, part I and II, Roskam Aviation and Engineering Corporation
3. J.A. Mulder & W.H.J.J van Staveren, 2000, Flight Dynamics, Delft University of Technology, Delft, The Netherl

PN5032, Flight Control 2 (2 SKS)

Short Syllabus

This lecture discuss the application of an automatic control technique to the aircraft for some specific function and flight modes. The primary function to be discussed is flight attitude control (autopilot), stability augmentation system (SAS), and control augmentation system (CAS). Flight modes being considered are longitudinal and lateral-directional modes.

Related Courses

1. PN3233 Flight Dynamics 1, Prerequisites.
2. PN4131 Flight Control 1, Prerequisites.
3. PN5031 Flight Dynamics 2, Prerequisites.

Bibliography

1. S.D.Jenie, Diktat Kuliah Kendali Terbang, Institut Teknologi Bandung, Bandung
2. J.H. Blakelock, 1965, Automatic Control of Aircraft And Missiles, John Wiley & Sons, Inc, New York
3. S.D.Jenie, Diktat Kuliah Dinamika Terbang, Institut Teknologi Bandung, Bandung

PN5045, (2 SKS)

Short Syllabus

This lecture discusses about general use of the multivariable optimization and the understanding of the optimization methods with the emphasis in single objective function. But an introduction to multi objective technique will also be given. Linear method is discussed briefly. The important thing is to build the knowledge and programming of non linear method. Case study will cover aircraft design in conceptual phase, structural design, and air transportation operation. Non linear method which will be covered are for example direct search method, random search method, univariate method, pattern search method, Rosenbrock method of Rotating Coordinates, the simplex method, descent method, Gradient of a Function, Steepest Descent method, conjugate Gradient method, Quasi Newton method, variable matrix method. The complex method, Methods of Feasible Direction, Basic Approach in the Penalty Function Method, Interior Penalty Function Method, Convex Programming Problem, Exterior Penalty Function Method, Extrapolation Technique in Interior Penalty Function Method. Penalty Function Method for Problems with Mixed Equality and Inequality Constraints. Penalty Function Method for Parametric Constraint are also briefly discussed.

Related Courses

1. IF1081 Algorithm & Programming IA, Prerequisites.
2. PN2101 Engineering Mathematics 1, Prerequisites.
3. PN2201 Engineering Mathematics 2, Prerequisites.
4. PN3101 Numerical Method, Prerequisites.
5. PN3221 Introduction to Manufacturing, Co-requisites.

Bibliography

1. S.S. RAO, 1978, Optimization; Theory and Application,
2. A.J. Moris, 1982, Foundation of Structural Optimization; A unified Approach,

PN5041, Reliability Engineering (2 SKS)

Short Syllabus

This lecture gives knowledge on modeling techniques and reliability estimation of engineering system and components. In this lecture, it is given a review on probability and statistics, reliability concept, and failure rate, reliability test and reliability data analysis, redundant system reliability, and system reliability-availability-maintainability analysis. At the end of the lecture, the student is expected to be able to analyze reliability of a system, design reliability, and understand basic principles of maintenance management.

Related Courses

1. PN3201 , Prerequisites.

Bibliography

1. E.E. Lewis, 1995, Introduction to Reliability Engineering, John Willey and Sons
2. Michael Beasley, 1991, Reliability for Engineers, McMillan Education Limited, Hongkong

PN5042, Flight Operations Planning (2 SKS)

Short Syllabus

This lecture gives knowledge and skills on the important aspects of flight operation planning, method of operation eligibility analysis, and method of flight operation planning. Topics include civil air law and regulation, aviation indoctrination, aircraft mass (weight) and performance, navigation, air traffic management meteorology, weight and balance, transportation of dangerous goods by air, flight planning, and flight monitoring, will be discussed. After following this lecture, the student is expected to be able to correctly develop air transportation planning according to regulation.

Related Courses

1. PN3131 Flight Performance 1, Prerequisites.
2. PN3141 Airworthiness, Prerequisites.
3. PN3232 Flight Navigation & Guidance 1, Prerequisites.

Bibliography

1. Anon, 1998, Flight Operation Officers/Flight Dispatcher, Doc 7192-AN/857 Part D-3, ICAO
2. Anon, Aircraft Operation Manual:B737-200 Volume I, II dan III,

PN5043, Flight Safety Management (2 SKS)

Short Syllabus

This lecture gives understanding on different approaches in safety management, comprehension of hazards-defense-losses, safety defense system, human factor in flight safety, regulator role, influence of maintenance in safety, human error management, safety attitude, and several cases related to those topics. After attending this lecture, the student is expected to know how to manage safety in an organization.

Related Courses

-

Bibliography

1. , 2001, Bahasa Indonesia Ilmiah dan Tata Karya Tulis Ilmiah, Seksi Bahasa Indonesia,

Dept Sosio-Teknologi Institut Teknologi Bandung

2. William H. Tench, 1985, Safety is No Accidents, Collins

3. James Reason, 2000, Managing the Risk of Organization Accidents, Ashgate

PN5044, Computer Based Aircraft Design (2 SKS)

Short Syllabus

This lecture gives concept on the use of computer applications that can be used as tools for aircraft design process. The effective use of every tool and the outputs from one application to another is the important part to be studied. By taking the advantage of the software tools, this will result on a faster, integrated, and optimal design process. Several tools which can be applied are for example Computer Aided Design (CAD) which handles engineering drawing, and MSc Nastran application for wing

Related Courses

1. PN2041 Engineering Drawing, Prerequisites.

2. PN3101 Numerical Method, Co-requisites.

3. PN3221 Introduction to Manufacturing, Co-requisites.

4. PN4041 , Prerequisites.

Bibliography

1. C. Bil, 1988, Development and Application of a Computer Based System for Conceptual Aircraft Design,

2. Anon, 2004, CATIA V5-R-14 User Manual, IBM

PN5046, Advanced Design Method (2 SKS)

Short Syllabus

This lecture gives in-depth and integral comprehension on different aspects in aircraft design by using various problem formulation techniques developed in Artificial Intelligence domain. Some of the techniques are : rule based, case based, and constraint based reasoning. After attending the lecture, the student is expected to be able to formulate systematically a given design problem.

Related Courses

1. IF1081 Algorithm & Programming IA, Prerequisites.

2. PN4041 , Prerequisites.

Bibliography

1. C.L. Dym, 1994, Engineering Design: a synthesis of views, Cambridge Univ Press

2. N.P. Suh, 1990, Principles of Design, Oxford Univ Press

3. K. Marriot et al, 1999, Programming with Constraints: an introduction, MIT Press

PN5047, Special Problem in Aircraft Design (2 SKS)

Short Syllabus

This lecture gives knowledge of special design problem encountered in aircraft design which are for example related to non-conventional configuration and related to fabrication and operation aspect. After following the lecture, the student is expected to have deeper understanding in designing an aircraft and in new aircraft concepts.

Related Courses

1. PN4041 , Prerequisites.

Bibliography

1. F.J. Sterk et al, Unconventional Aircraft Concept, Delft Univ. Press
2. Thomson, W.T., 1993, Theory of Vibrations with Applications, 4 Edition, Prentice Hall International Inc.

PN5048, Programming Technique in CAD (2 SKS)

Short Syllabus

This lecture gives some Computer Aided Design (CAD) concepts. Some of the functions in CAD can be modified and are naturally open to other applications, so that the user has more options to effectively exploit CAD according to their needs. CATIA becomes the main focus of the considered application for its open properties reason and since lots of users nowadays are using it. Computer programming is more aimed to build the skill on developing 3D model for aircraft with solid and surface modeling. Visual Basic and C++ become the basis of the programming language used in this lecture. The lecture is continued with object oriented programming concept.

Related Courses

1. PN2041 Engineering Drawing, Co-requisites.
2. PN3221 Introduction to Manufacturing, Co-requisites.
3. PN4041 , Co-requisites.

Bibliography

1. Ibrahim Zeid, CAD/CAM Theory and Practise, McGraw Hill Book
2. S.S. RAO, 1978, Optimization; Theory and Application,
3. Jami J. Sah., 1995, Parametric and Feature-Based CAD/CAM,

PN5045, (2 SKS)

Short Syllabus

This lecture discusses about general use of the multivariable optimization and the understanding of the optimization methods with the emphasis in single objective function. But an introduction to multi objective technique will also be given. Linear method is discussed briefly. The important thing is to build the knowledge and programming of non linear method. Case study will cover aircraft design in conceptual

phase, structural design, and air transportation operation. Non linear method which will be covered are for example direct search method, random search method, univariate method, pattern search method, Rosenbrock method of Rotating Coordinates, the simplex method, descent method, Gradient of a Function, Steepest Descent method, conjugate Gradient method, Quasi Newton method, variable matrix method. The complex method, Methods of Feasible Direction, Basic Approach in the Penalty Function Method, Interior Penalty Function Method, Convex Programming Problem, Exterior Penalty Function Method, Extrapolation Technique in Interior Penalty Function Method. Penalty Function Method for Problems with Mixed Equality and Inequality Constraints. Penalty Function Method for Parametric Constraint are also briefly discussed.

Related Courses

1. IF1081 Algorithm & Programming IA, Prerequisites.
2. PN2101 Engineering Mathematics 1, Prerequisites.
3. PN2201 Engineering Mathematics 2, Prerequisites.
4. PN3101 Numerical Method, Prerequisites.
5. PN3221 Introduction to Manufacturing, Co-requisites.

Bibliography

1. S.S. RAO, 1978, Optimization; Theory and Application,
2. A.J. Moris, 1982, Foundation of Structural Optimization; A unified Approach,

PN5051, Finite Elem Meth in Struc Dynamics (2 SKS)

Short Syllabus

The lecture discuss one degree of freedom system; finite element and vibration analysis; normal modes method in dynamic analysis; direct numeric integration method; frame structure; two and three dimension continuum, plate and shell; rigid body in flexible structure; and substructure method. After taking this lecture, it is expected that the student is able to analyze flexible structure dynamics where the equation of motion is discretized by using finite element method.

Related Courses

1. PN2221 Strength of Material, Prerequisites.
2. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. W. Weaver, Jr. and P.R. Johnston, Structural Dynamics by Finite Elements., Prentice-Hall, Inc

PN5052, Experiments in Mechanical Vibration (2 SKS)

Short Syllabus

This lecture gives basic experimental techniques in analyzing vibration problems.

Discussion covers mathematical model review of vibration system, instrument in vibration measurement, processing of digital signal, testing setup; measurement method, vibration parameter extraction, from measurement data, and also establishing vibration model based on the achieved parameter. This lecture is given to enhance the skill on solving the vibration problems through modeling and analysis relied on analytical model and experiment data.

Related Courses

1. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. Thomson, W.T., 1986, Theory of Vibration with Application, 4 Edition, Research Studies Press LTD
2. Ewins, D.J., 1986, Modal Testing: Theory and Practice, Research Studies Press LTD

PN5053, Rotor Dynamics (2 SKS)

Short Syllabus

This lecture gives basic experimental techniques in analyzing vibration problems. Discussion covers mathematical model review of vibration system, instrument in vibration measurement, processing of digital signal, testing setup; measurement method, vibration parameter extraction, from measurement data, and also establishing vibration model based on the achieved parameter. This lecture is given to enhance the skill on solving the vibration problems through modeling and analysis relied on analytical model and experiment data.

Related Courses

1. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. Thomson, W.T., 1993, Theory of Vibrations with Applications, 4 Edition, Prentice Hall International Inc.
2. Dimarogonas, A.D., Paipetis, S.A., 1983, Analytical Methods in Rotor Dynamics,

PN5054, Unsteady Aerodynamics (2 SKS)

Short Syllabus

This lecture gives the introduction of unsteady aerodynamics, basic of unsteady flow, the impact to aerodynamics performance, basic equation of unsteady flow, the equation of mass, energy, and momentum conservation. Viscosity and compressibility effects, Small Perturbation Theory, Flow around 2D section, Aerodynamics Response of Sinusoidal Motion, Aerodynamics Response of Harmonic Motion; Transient Aerodynamic Response and Gust Loads, Flow around 3D Wing section; 3D effect.

Related Courses

1. PN2111 Aircraft Aerodynamics 1, Prerequisites.
2. PN2211 Aircraft Aerodynamics 2, Prerequisites.
3. PN3111 Aircraft Aerodynamics 3, Prerequisites.
4. PN4251 Aeroelasticity, Co-requisites.

Bibliography

1. Anderson, 2000, Introduction to Flight, McGraw Hill
2. Bisplinghoff, 1955, Principles of Aeroelasticity, Dover Publication, New York
3. Leipmann, 1973, Elements of Gasdynamics, John Wiley and Sons, New York

PN5054, Unsteady Aerodynamics (2 SKS)**Short Syllabus**

This lecture gives the introduction of unsteady aerodynamics, basic of unsteady flow, the impact to aerodynamics performance, basic equation of unsteady flow, the equation of mass, energy, and momentum conservation. Viscosity and compressibility effects, Small Perturbation Theory, Flow around 2D section, Aerodynamics Response of Sinusoidal Motion, Aerodynamics Response of Harmonic Motion; Transient Aerodynamic Response and Gust Loads, Flow around 3D Wing section; 3D effect.

Related Courses

1. PN2111 Aircraft Aerodynamics 1, Prerequisites.
2. PN2211 Aircraft Aerodynamics 2, Prerequisites.
3. PN3111 Aircraft Aerodynamics 3, Prerequisites.
4. PN4251 Aeroelasticity, Co-requisites.

Bibliography

1. Anderson, 2000, Introduction to Flight, McGraw Hill
2. Bisplinghoff, 1955, Principles of Aeroelasticity, Dover Publication, New York
3. Leipmann, 1973, Elements of Gasdynamics, John Wiley and Sons, New York

PN5055, Advanced Aeroelasticity (2 SKS)**Short Syllabus**

The lecture discuss Static and Dynamic Aeroelasticity, the equation of Dynamic Equilibrium, Flutter with quasi stationer aerodynamic model, Theodorsen Aerodynamic Model and Aerodynamic Damping Effect.

Related Courses

1. PN4251 Aeroelasticity, Prerequisites.

Bibliography

1. Dowel, E., 1984, Modern Course on Aeroelasticity, Dover Publication

PN5056, Aeroacoustic & Aircraft Noise (2 SKS)

Short Syllabus

The lecture of Aircraft Aeroelastic and Noise is an optional course discussing noise generated by air flow. This lecture provides the students having already taken vibration-related courses to study acoustic problem of the aircraft. The lecture covers basic concept of acoustic, sound wave dynamics, elementary sources, sound propagation in the atmosphere, sound in space, frequency spectrum, sound reflection by the earth, noise measurement, noise certification, moving medium acoustic and aerodynamic noise.

Related Courses

1. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. Anderson, 2000, Introduction to Flight, McGraw-Hill
2. Ruijgrok, G.J., 1980, Elements of Aviation Acoustics, Netherland

PN5057, Structural Dynamics (2 SKS)

Short Syllabus

The lecture discuss Mathematical model of Continuum System, Natural Frequency and Vibration Modes, Multi Degree of Freedom System, Centered Mass Methods, Discretization Techniques, Numerical Solutions by Finite Element Method, Rayleigh and Ritz principle, Modal Synthesis and Analysis.

Related Courses

1. PN3151 Mechanical Vibrations, Prerequisites.

Bibliography

1. Craig R. R., 1981, Structural Dynamics, An Introduction to Computer Methods, John Wiley and Sons

PN5131, Flight Performance 2 (2 SKS)

Short Syllabus

This lecture studies specific problem in aircraft flying operation. The lecture covers BFL (Balance Field Length), CTOD (Continuous Take Off Distance) and ASD (Accelerate Stop Distance), ETOPS and Fuel consumption monitoring.

Related Courses

1. PN3131 Flight Performance 1, Prerequisites.

2. PN3232 Flight Navigation & Guidance 1, Prerequisites.

Bibliography

1. G.J.J. Ruijgrok, 1990, Elements of Airplane Performance, Delft University Press, Delft, The Netherlands
2. Nguyen X. Vinh, 1993, Flight Mechanics of High-performance Aircraft, Cambridge Aerospace Series 4, Cambridge University Press

PN5132, Satellite Dynamics & Control 1 (2 SKS)

Short Syllabus

The lecture contains Rotation Kinematics, including Coordinate Reference and Rotation, Angle displacement parameter, angular velocity, Attitude equation of motion, rigid body equation of motion, system with damping and double spin system. The lecture also discuss Dynamics of rigid body attitude including torsion-free motion of axisymmetric rigid body, torsion-free motion of tri-inertial rigid body, the stability of rigid body motion, rigid body motion with torsion. Torsions at spacecraft including gravitation torsion, aerodynamics torsion, radiation torsion, torsion of other environments, torsion achieved not from the environment are also discussed.

Related Courses

-

Bibliography

1. Hughes, P.C., 1986, Spacecraft Attitude Dynamics, John Wiley & Sons
2. Gerlach, O.H., 1965, Attitude Stabilization and Control of Earth Satellite, TH Delft Report VTH-122
3. Kaplan, M., 1976, Modern Spacecraft Dynamic & Control, John Wiley & Sons

PN5133, Inertial System 1 (2 SKS)

Short Syllabus

Inertial Engineering lecture gives the students basic knowledge of inertial sensors equipments such as accelerator and gyroscope. In this lecture, the concept of passive and active inertial accelerometer equipments and their applications on the aircraft is discussed. A few types of accelerometer which are commonly used on the aircrafts and missiles are also introduced. Mechanical gyroscope is given from the basic concept until the equation of motion covering both for one degree and two degree of motion.

Related Courses

1. PN3233 Flight Dynamics 1, Prerequisites.
2. PN4031 Experimental Methods, Prerequisites.
3. PN4131 Flight Control 1, Prerequisites.

Bibliography

1. Stinton, 1980, The Anatomy of the Aeroplane, Gramedia
2. Mc Laven, 1974, Open & Close Loop Accelerometer, Agardograph

PN5134, Hydromechanic Systems (2 SKS)**Short Syllabus**

In this lecture, the knowledge of fluid power system components, control engineering theory, and performance diagram is discussed. The analysis of fluid power system components consisting of hydraulics fluid, pump, accumulator, pipes, valves, and actuators are given. The analysis is further applied using pipe network synthesis to support the required servo. This lecture is given so the students know how a hydraulics system works and know how to analyze and synthesize hydraulics system networks.

Related Courses

1. PN3221 Introduction to Manufacturing, Prerequisites.
2. PN4142 Aircraft Systems, Prerequisites.

Bibliography

1. Green, W.L., 1985, Aircraft Hydraulic Systems, John Wiley & Sons
2. Keller, G.R., 1985, Hydraulic System Analysis, The Editor of Hydraulics & Pneumatic, USA
3. Viersma, T.J., 1989, Analysis, Syntesis and Design of Hydraulic Servosystems and Pipelines, Diktat Kuliah WB-TU Delft

PN5141, System Protection Engineering (2 SKS)**Short Syllabus**

This lecture gives a review of aircraft safety systems analyzing method. The lecture will discuss several topics like: Aircraft Accident Statistics and its relation to Flight Safety and Security, Introduction to System and Components, Air Safety Regulation (FAR, JAR, and CASR), Component and System Failure, Reliability Theory Observation, Availability and Maintainability, Safety Evaluation and Analysis Methods, Markov Analysis, Failure Mode, Effects and Critically Analysis, Fault Tree Analysis and Aircraft Accident Investigation. It also discuss hardware and software design problems. At the end of the lecture, the student is expected to be able to investigate the safety of a system, to analyze the danger and the risk, to give an assessment on the safety level of a system, and to set up an emergency procedure and correction to handle unsafe event.

Related Courses

1. PN3141 Airworthiness, Prerequisites.

Bibliography

1. Hisar M. Pasaribu, 2004, Teknik Keamanan Sistem, Diktat,
2. David J. Smith, 1993, Reliability, Maintainability and Risk, Butterworth-Heinemann

PN5141, System Protection Engineering (2 SKS)

Short Syllabus

This lecture gives a review of aircraft safety systems analyzing method. The lecture will discuss several topics like: Aircraft Accident Statistics and its relation to Flight Safety and Security, Introduction to System and Components, Air Safety Regulation (FAR, JAR, and CASR), Component and System Failure, Reliability Theory Observation, Availability and Maintainability, Safety Evaluation and Analysis Methods, Markov Analysis, Failure Mode, Effects and Critically Analysis, Fault Tree Analysis and Aircraft Accident Investigation. It also discuss hardware and software design problems. At the end of the lecture, the student is expected to be able to investigate the safety of a system, to analyze the danger and the risk, to give an assessment on the safety level of a system, and to set up an emergency procedure and correction to handle unsafe event.

Related Courses

1. PN3141 Airworthiness, Prerequisited.

Bibliography

1. Hisar M. Pasaribu, 2004, Teknik Keamanan Sistem, Diktat,
2. David J. Smith, 1993, Reliability, Maintainability and Risk, Butterworth-Heinemann

PN5142, Multi-variate Statistics (2 SKS)

Short Syllabus

The lecture discusses basics of multivariable analysis which is helpful to support the modeling based on empirical data. Multivariable analysis techniques to be discussed are data preparation, factor analysis, cluster analysis, discriminant analysis, multi regression, and forecasting.

Related Courses

1. PN3201 , Prerequisited.

Bibliography

1. Hair, J.F dan R.E. Anderson, 1998, Multivariate Data Analysis, 5 Edition, Prentice Hall, New Jerrey
2. Santoso, S., 2002, Statistik Multivariat, Buku Latihan SPSS, Elex Media Komputindo, Jakarta

PN5142, Multi-variate Statistics (2 SKS)

Short Syllabus

The lecture discusses basics of multivariable analysis which is helpful to support the modeling based on empirical data. Multivariable analysis techniques to be discussed are data preparation, factor analysis, cluster analysis, discriminant analysis, multi regression, and forecasting.

Related Courses

1. PN3201 , Prerequisites.

Bibliography

1. Hair, J.F dan R.E. Anderson, 1998, Multivariate Data Analysis, 5 Edition, Prentice Hall, New Jerrey
2. Santoso, S., 2002, Statistik Multivariat, Buku Latihan SPSS, Elex Media Komputindo, Jakarta

PN5231, Flight Navigation & Guidance 2 (2 SKS)

Short Syllabus

Avionics Navigation 2 course is a continuation of course PN-3233. This lecture gives the knowledge of satellite based navigation concept such as GPS application, and the basic concept of inertial navigation. This lecture gives the students knowledge how important is the navigation system in the future trends, the effectiveness, the advantages, and also the weaknesses. Inertial navigation system gives the student the knowledge of self-contained navigation concept, independent to external reference.

Related Courses

1. PN3131 Flight Performance 1, Prerequisites.
2. PN3232 Flight Navigation & Guidance 1, Prerequisites.
3. PN3233 Flight Dynamics 1, Prerequisites.

Bibliography

1. M. Kayton, W. Fried, Avionics Navigation Systems,
2. W. Wrigley, W.M. Hollister dan W.g. Denhard, Gyroscopic Theory: Design and Instrumentation, MIT Press
3. , Understanding GPS Principle and Applications, E.D. Kaplan, Artech House

PN5232, Astrodynamics 2 (2 SKS)

Short Syllabus

The lecture subjects are: Orbit path concept: determination of orbit parameter from observation r_0 , V_0 at t_0 , transition matrix, Lagrange Coefficient, elliptic, parabolic, and hyperbolic orbit as initial value problem, resolving Kepler equation, orbit mechanics of 2 bodies as boundary value problem: terminal velocity vectors, tangent orbit and shift-divided angle, base elliptic, average value theorem, the position of empty fire point,

Lambert theorem, the transformation of boundary value problem, terminal velocity diagram.

Related Courses

1. PN4132 Astrodynamics 1, Prerequisites.

Bibliography

1. Battin, 1987, An Introduction to Mathematics & Methods of Astrodynamics, AIAA, New York
2. Escobel, 1976, Method of Orbit Determination, Krieger, Malabar
3. Herrick, 1971, Astrodynamics, Van Nostrad, London

PN5234, Aeronautics (2 SKS)

Short Syllabus

The lecture discusses Introduction and Reviews, Technology, Systems, Performance, Formal Method of System Engineering, Trends and Summary;

Related Courses

1. PN3231 System Dynamics, Prerequisites.
2. PN3232 Flight Navigation & Guidance 1, Prerequisites.
3. PN3233 Flight Dynamics 1, Prerequisites.

Bibliography

1. Condy & Brown, Introduction to Avionics, Prentice Hall, New Jersey

PN5241, Human Factor Engineering (A) (2 SKS)

Short Syllabus

This lecture aims that students can understand human aspects in aviation industries, either from design aspect, flight operation, maintenance, and also organization and management. Topics covered are the introduction (history, definition, SHELL concept, industry requirements), human error aspect in aviation operation, basic of aviation physiology (environment factors, human senses, human information process, workloads and stress, communication, behavioral category, awareness of situation), human factor aspect in design (cabin and cockpit environment, anthropometry, cockpit-crew system design and integration, checklist and manual), human factor aspect in flight training and simulation (principals and training system, simulator benefits), and also special issues (airline pilot, air traffic control, airline organization and management).

Related Courses

1. PN5141 System Protection Engineering, Prerequisites.

Bibliography

1. F.Hawkins., Human Factors in Aviation,
2. Anon., 1987, Human Factors for Pilots,
3. Anon., Man-Machine Interface Aspects in Civil Aviation,

PN5245, Special Problem in Transportation (2 SKS)**Short Syllabus**

This lecture studies strategic and up-to-date issue in the air transportation planning. The lecture will focus on interactive discussion and literature study in examining these strategic issues. Active role from the student is expected throughout individual and group participation.

Related Courses

-

Bibliography

1. Dimarogonas, A.D., Paipetis, S.A., 1983, Analytical Methods in Rotor Dynamics,
2. James Reason, 2000, Managing the Risk of Organization Accidents, Ashgate

PN5247, Airport Engineering (2 SKS)**Short Syllabus**

This lecture reviews on airport engineering and operation as a system. The lecture will discuss basic planning of an airport such as aircraft characteristics affecting airport design, capacity decision and runway layout, taxiway, apron, and passenger terminal. The cases concerning airport operation and management, and also business, economical (income and outcomes sources), ownership and management model, will also be discussed. At the end of the lecture, the student is expected to be able to analyze airport system capacity such as runway service capacity, as well as that for taxiway and passenger terminal, also to understand the business aspect and operation of an airport.

Related Courses

1. PN3241 Air Transportation System, Prerequisited.

Bibliography

1. R. Hononjeff and F.X. McKelvey, 1983, Planning and Design of Airports, McGraw-Hill
2. N. Ashford and P.H. Wright, 1998, Airport Engineering, John Wiley & Sons
3. R. Doganis, 1992, The Airport Business, Routledge

MS2190, Engineering Thermodynamics (3 SKS)**Short Syllabus**

This thermodynamic class is intended for non-mechanical engineering students, and it

deals with basic concept of thermodynamics and its applications. The coverage includes the basic concept of energy, temperature, pressure, the first and second law of thermodynamics, properties of air and psychrometric chart, examples of application in gas turbine, refrigeration system, and heat pump.

Related Courses

-

Bibliography

1. Moran, M.J., and Shapiro, H.N., 2000, Fundamentals of Engineering Thermodynamics, 4 Edition, Wiley
2. Reynolds, W., 1989, Engineering Thermodynamics, Mc.Graw-Hill

MS2290, Basic Heat Transfer (3 SKS)

Short Syllabus

This course is intended for non-mechanical engineering students, and it discusses various modes of heat transfer and the application of heat transfer principles in solving engineering problems. The syllabus includes heat transfer modes, conduction without and with energy source, steady and transient heat conduction, environmental effect to conduction, shape factor, steady finite-difference analysis, one and multidimensional transient heat conduction, transient finite difference, convection, external and internal flow forced convection, introduction to radiation, and radiation exchange.

Related Courses

1. MS2190 Engineering Thermodynamics, Prerequisites.

Bibliography

1. Incropera, F.P., and David, P.D., 1996, Introduction to Heat Transfer, 3 Edition, Wiley

KU1011, Scientific Writing in Indonesian (2 SKS)

Short Syllabus

The subject is designed to equip the students with the knowledge and skills to express their ideas in scientific writing genre. The subject includes such teaching materials as spelling, word formation, grammar, logic, definition construction, paragraphs construction, and scientific writing organization.

Related Courses

-

Bibliography

1. Alwi Hasan.et.al., Tata Bahasa Baku Bahasa Indonesia., Jakarta : Balai Pustaka
2. Depdikbud RI., Pedoman Umum Ejaan Baku, Jakarta:Balai Pustaka
3. Keraf, Gorys, Komposisi ., Ende Flores : Nusa Indah

KU1131, Sport I (1 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Bompa. Tudor O, Theory and Methodology of Training, Kendal/Hunt Publishing Company
2. Harsono, Coaching dan Aspek-aspek Psikologis Dalam Coaching, CV Tambak Kusuma
3. Lautan, Rusli, dkk., Manusia dan Olahraga. Kerjasama ITB dan FPOK IKIP Bandung, Penerbit ITB

KU2071, Pancasila and Civic Education (2 SKS)

Short Syllabus

-

Related Courses

-

Bibliography

1. Manheim, Karl , Ideologi dan Utopi: Menyingkap Kaitan Pikiran dan Politik, diterjemahkan oleh Drs. F. Budi Hardiman, Kanisius
2. Budiman, Arief, Teori Negara: Negara Kekuasaan dan Ideologi, PT. Gramedia Pustaka Utama, Jakarta
3. Amal Ichlasul & Armawi, Armaidly ;, Ketebukaan Informasi dan Ketahanan Nasional, Gajahmada University Press