南京航空航天大学

# Nanjing University of Aeronautics & Astronautics

## College of International Education

## Course Description of Bachelor of Engineering in Aeronautical Engineering

## Contents

## 1. General Information

Nanjing University of Aeronautics and Astronautics (NUAA) is one of China's premier learning and research institutions which is enlisted in '211 Project' and has developed into a comprehensive university especially featured in Aviation and Aerospace industry. Ever since it was established in 1952, it has strived to conduct world-level research and education system. More than 60 years' history witnesses its unremitting efforts and remarkable achievements.

Academia and education at NUAA represent strong capacity among all the universities in China. It has acquired national status through the quality of its excellence research work, especially in the areas of Aerospace Engineering, Mechanics, Electro mechanics, Economy and Management, etc.

## 2. Goals of the Study

**a)** The study enables graduates to become academically educated Engineers working in the chosen field and its peripheral areas who can work both in the industrial and commercial fields as well as in the administration, research and teaching, education and training. The graduates will also have the necessary knowledge and applicability for the professional practice of engineering science. They will be able to provide basic connections to neighboring disciplines such as the mechanical engineering, electrical engineering, energy technology, business administration and management etc. Those acquired in the study Competence for the application of scientific working methods creates the preconditions for a postgraduate master's program and qualify the graduate for self-employed, extra occupational training.

**b)** Graduates are well-informed by their scientific and technical knowledge, by mastering basic skills and scientific Methods as well as by their ability to abstraction capable of appropriate training time in the professional practice. They will be able to apply their knowledge and transfer the acquired competences to new problem areas.

**c)** The graduates will also be aware to meet their economic, social and environmental responsibilities due to a high degree of general education provided here. They will be able to develop and obtain professional and social judgment.

## 3. Entry requirements

The prerequisite for starting the study is general, or alternatively an adequate one subject-specific university entrance qualification in a corresponding subject area or completing the Advanced level/ high school diploma.

- The applicant must be in good health and under the age of 25
- High Schoolgraduate (A level/10+2/WAEC or equivalent) with Physics, Mathematics and/or English as compulsory core subjects.

- Students who are currently pursuing their final year at high school could also apply as long as they can obtain their graduation diploma before enrolling at the university.
- English language requirements: TOEFL, IELTS, PTE, IGCSE English course or scored above 65% (avg.) in English subject
- Students who are currently (already) in China are welcome to apply as long as they can provide attendance report above 80% from their previous university and their current visa is valid until August 15th.

## 4. Start of study and duration of study

**a)** The studies will be starting in each year around September.

**b)** The standard period of study is 8 semesters and includes the Presence in lectures, lab- works, Self-study as well as the exams.

## 5. Teaching and learning forms

**a)** The curriculum is made keeping in mind that the student can start with the basic knowledge like 'Algebra and Trigonometry' and to a gradually higher knowledge subjects like 'Engineering Mechanics' and many more. The course contents include: lectures, exercises, homework, language courses, self-study and tutorials which are constantly taught, consolidated and deepened.

**b)** Lectures introduce the topic areas of the subject.

**c)** Exercises and homework allow the students to grasp the subject matter in exemplary sections.

**d)** Language courses provide and train knowledge, skills and abilities in the respective foreign language. They develop communicative and intercultural competence in an academic and professional context as well as in everyday situations.

**e)** Self-study allows students to gain basic and in-depth expertise on one's own responsibility with the help of various media (teaching materials, literature, internet, etc.) independently in individual work or in small groups.

**f)** Consultations will set out the subject areas of the study topics and discussed and given the students the opportunity to study self-taught to discuss subject matter. Through the exercises to be solved is taught material supplemented and deepened.

## 6. Structure and course of study

**g)** Only full-time study is conducted at the Nanjing University of Aeronautics & Astronautics. The curriculum is in 8 full-time study Semester, which may be taken in maximum of 6 years to complete.

**h)** The main courses are based around Natural Sciences, Mechanics, Aerodynamics & designs, Computer Applications and Structural Analysis etc.

**i)** Content and qualification objectives, including forms of teaching and learning, prerequisites, usability, frequency, workload and duration of the individual modules are

the course descriptions

**j)** The courses are all in English.

**k)** The curriculum system of this major constitutes five course platforms: general education, discipline basics, professional education, discipline development and practical abilities.

Each course platform is composed of several course modules as follows:

| Course Platforms | Course Modules | Courses |
|---|---|---|
| General Studies | Orientation | Orientation Program; |
| | Physical Health | Physical Education (1)- (7); |
| | Computer Basis | Introduction to Computer;<br>Computer Programming;<br>Software Engineering; |
| | Natural Science | Calculus for Engineering Sciences (1);<br>Calculus for Engineering Sciences (2);<br>Calculus for Engineering Sciences (3);<br>Linear Algebra;<br>Algebra & Trigonometry;<br>Mathematical Equation;<br>Physics (1) & (2);<br>Physics Experiments (1) & (2);<br>Fundamentals of Materials Science & Engineering; |
| | Culture & Foreign Language | Introduction to China;<br>Chinese Culture;<br>Comprehensive Chinese (1) - (3); Intermediate Chinese;<br>Basic Chinese Speaking;<br>Basic Chinese Listening;<br>Reading in Chinese;<br>Communication in Chinese;<br>Chinese-to-English Translation; |
| | English Language | Essential English Writing;<br>Academic English Writing; |

| | | |
|---|---|---|
| Basic Disciplines | Theoretical Underpinnings | Introduction to Aeronautics;<br>Engineering Mechanics (1) & (2);<br>Principle of Aircraft Systems;<br>An Introduction to Aircraft Manufacturing Technology;<br>Introduction to Industrial Engineering; |
| | Technical Underpinnings | Engineering Graphics;<br>Electrical Engineering & Electronic technique (1) & (2);<br>Fundamentals of Machine Design;<br>Control System Engineering;<br>Mechanical Vibration; |
| Professional Disciplines | Aircraft Design | Aerodynamics;<br>Flight Dynamics;<br>Structural Analysis;<br>Aircraft Preliminary Design;<br>Aircraft Structural Design;<br>Aircraft Environment Control; |
| | Engine/ Power plant Studies | Introduction to Aero-Engine;<br>Fault Diagnosis and Monitoring; |
| | Aircraft Maintenance | Aeronautical Maintenance Engineering;<br>Engine Maintenance & Product Practice;<br>Structure and Maintenance of Composite Materials; |
| Development Studies | Computer Application | Fundamentals of CATIA 3D Design;<br>Introduction to CAD/CAM;<br>Information Retrieval and Utilization;<br>Numerical Analysis;<br>MATLAB Applications; |
| | Modern Enterprise Management | Introduction to Business Administration;<br>Engineering Economics;<br>Project Management;<br>An Introduction to E-Business;<br>Human Resources Management; |

| | | |
|---|---|---|
| Practical Abilities | Course Projects | Course Project of Electrical Engineering & Electronic technique;<br>Course Project of Modern Aeronautical Engineering;<br>Course Project of Machine Design; |
| | Engineering Training | Engineering Training; |
| Thesis | Graduation Project/ thesis | Graduation Thesis; |

## 7. Methods and Requirements of Taking Courses

**a)** Students of this specialty are granted to graduate after earning 160 credits at school.

**b)** Students should take courses under the instruction of Academic Affairs and select courses from university portal in accordance with school policy. Students should select the courses of the next term in every April and October and submit them through the on-line course selecting system.

**c)** Students should reasonably arrange the courses according to their learning situation. The credits in each term should be no less than 18 points, and no more than 30 points, (restrictions for students who study minor subject and those who are allowed to exempt from studying and listening can be properly relaxed). Students should take credits according to their grades as follows:

| Grades/ Study Year | Required Credits | Accumulated Credits Requirements |
|---|---|---|
| 1st | 39 | 39 |
| 2nd | 46 | 85 |
| 3rd | 39 | 124 |
| 4th | 31 | 155 |

**d)** The courses of this major include: compulsory course and optional courses in the institute. Requirements and credits of each course to be graduated are:

- Compulsory courses are altogether 138.5 credits;
- Optional courses in the institute are altogether 31.5 credits.

1. Grade Point System:

Grade Point Calculation for Nanjing University of Aeronautics and Astronautics courses.

The grade point is one of the assessment methods of study quality and the basic data to calculate the weight point of the course. The corresponding relations between the scores and grade point are as follows:

a. Corresponding relations between the scores and grade point:

| Percentage system | Grade point | Five-Grade system | Grade point |
|---|---|---|---|
| 90-100 | 4.0-5.0 | Excellent | 4.5 |
| 80-89 | 3.0-3.9 | Good | 3.5 |
| 70-79 | 2.0-2.9 | Satisfactory | 2.5 |
| 60-69 | 1.0-1.9 | Pass | 1.5 |
| 0-59 | 0 | Fail | 0 |

b. Corresponding relations between the scores of make-up examinations and courses re-taken and grade point:

| Percentage system | Grade point | Five-Grade system | Grade point |
|---|---|---|---|
| 90-100 | 3.0-4.0 | Excellent | 3.5 |
| 80-89 | 2.0-2.9 | Good | 2.5 |
| 70-79 | 1.0-1.9 | Satisfactory | 1.5 |
| 60-69 | 0.80-0.98 | Pass | 1 |
| 0-59 | 0 | Fail | 0 |

c. Corresponding relations between the scores of exempt courses and grade point:

| Percentage system | Grade point | Five-Grade system | Grade point |
|---|---|---|---|
| 90-100 | 5.0-6.0 | Excellent | 5.0 |
| 80-89 | 4.0-4.9 | Good | 4.5 |
| 70-79 | 3.0-3.9 | Satisfactory | 3.5 |
| 60-69 | 0 | Pass | 0 |
| 0-59 | 0 | Fail | 0 |

2. Weight Point

The weight point is one of the assessment methods of study quality and the basic data to calculate the cumulative GPA. The calculation method is the grade point multiplied by the number of credits of the course concerned multiplied by the weight coefficient. The weight coefficient is based on the degree of difficulty, importance and credits of the course in the academic program.

Exam will be on total 100 marks. 30% of them will come from homework, quiz, attendance and from other class performances. NUAA takes student's overall growth very seriously.

| SL | Description | Percent % |
|---|---|---|
| 1 | Final Exam | 70% |
| 2 | Homework, Quiz, Attendance, Class performance | 30% |
| | Total | 100% |

The calculation formula is as follows:

Weight point = grade point× number of credits of courses concerned weight coefficient

3. Cumulative GPA

This is a figure used to indicate the overall performance of a student. The calculation method is the total grade points of all the courses taken (including failed ones after make-upexaminations and re-taking) divided by the total number of credits. The highest corresponding grade point(s) of the scores of the make-up examination(s) and the course(s) re-taken is/are calculated and there will not be any repetition. The calculation formula is as follows:

$$\text{GPA} = \frac{\sum AllCoursesGradePoints}{\sum AllCoursesCredits} \quad \text{(Rounding off to 1 decimal place)}$$

Retaking Courses

If someone fails in any course, he or she has to take retake exam at the beginning of each semester. If he/she still fails to pass he or she has to take the course on which semester it would be available.

If someone fails to clear his or her course for two consecutive years he or she would be in probation period. University board would decide about his situation whether he or she would be able to continue his degree.

If someone fails to obtain degree within 6 years, he/she would be disqualified from university.

## Types of Courses

The courses included in undergraduate curricula are divided into several groups as follows:

## Compulsory Courses

In each discipline a number of courses will be identified as core courses which form the nucleus of the respective bachelor's degree program. A student has to complete all of the designated core courses for his discipline.

## Optional Courses

Apart from the core courses, students will have to complete a number of courses which are optional in nature in that students will have some choice to choose the required number of courses from a specified group/number of courses.

## Special Summer Courses

In summer vacations and other times university might arrange special courses depending on need of situations. Some teachers from foreign universities might come and teach for 32 hours that means 2 credit hours. Students are allowed to take courses of various disciplines and according to their schedule.

Teacher's profile and course would be available on university web portal. This course might be replaced with the optional courses if its content is same of any optional course of the student or can be added as extra courses.

## Class Hours

Normal class hours would be 2 hours with 15 minutes of break in every 45 minutes. 30 minutes break would be applicable in between two classes.

# Attachment

# Course outlines of the Bachelor program of Aeronautical Engineering

| | |
|---|---|
| **Course Code** | 0510104W |
| **Course Name** | Engineering Graphics |
| **Study Hour** | 56 |
| **Credit** | 3.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

**1. Course nature and academic status**

This course is a required technical course in engineering colleges, it is an application-oriented course that introduce the preparation, representation and reading of engineering drawings. It mainly includes projection theory, drawing basis, mechanical drawing and computer drawing. This course not only emphasizes on precise understanding and apprehension of the basic theories, procedures and skills of drawing, but also emphasizes on comprehension and application of various representation modes and drawing technologies, helps students have an all-round and integrated grasp of the relationship between technology and standard in design. Objective of the course should be to improve student quality and innovation, and form a serious and responsible attitude and rigorous and meticulous work style.

**2. Course aims (theory, ability and technique)**

After completing this course, students should be able to:

1. Understand and use the basic theory of orthographic projection and learn how to apply projection to view and analysis of engineering solids;
2. Comprehend the structure and the representation of engineering components.
3. Have the skills in spatial-visual thought, spatial imagination, exploration and innovation.
4. Read drawings and draw mechanical drawings by using traditional drawing instruments, or freehand or computer.
5. Work with a careful, down-to-earth, meticulous, serious and faithful style and with a science spirit.

**Requirements for courses; ability and knowledge in advance**

The Basic Application of Computer

It is one of the introductory computer courses, the content focuses on basic computer knowledge, basic concepts and basic skills. After taking this course, students should master basic computer knowledge and basic operation methods, text processing methods and some basic use of computer tools for further study and lay the foundation of knowledge related software.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**1. Descriptive Geometry (12 lecture hours):**

Requirements:

1. Principles of orthographic projection
2. Projection of points, lines and planes;
3. Relative position of lines and planes;
4. Projecting transformation (transform);
5. Projection of basic solid;
6. Acquire points and lines on surface;
7. Intersections of planes and solids;
8. Intersections of solids.

**2. Fundamental of Drawing (18 lecture hours):**

Requirements:

1. Traditional drawing equipment's and their utilization;
2. Related provision in National Standards
3. Geometric construction;
4. Freehand sketching;
5. Three-viewed drawings of composite solid;
6. The methods of dimensioning and viewing composite solid drawings;
7. Axonometric projection (isometric projection, oblique axonometric projection);

**3. Representation of Drawing (third-angle projection) (18 lecture hours):**

Requirements:

1. Views
2. Sectional views
3. Cross-sections
4. Partial enlarged views
5. Simplified and conventional representation
6. Application of methods of representation

**4. Computer Drawing (8 lecture hours):**

Comprehensively understanding AutoCAD 2009, which can produce projection drawings, axonometric projection drawings, detail drawings and assembly drawings.

**Teaching methods (Lectures, practice, etc.)**

Engineering Graphics is one of the application-oriented courses, so in the teaching process, the advanced teaching methods must be adopted, as followings:

1. Correctly handle the difficulties of teaching content and focus, concepts and applications, transformation of two and three dimensions, classic and contemporary issues.
2. Carry out regular communication among teachers, so that give full play to each teacher characteristics.
3. In class, organic integrate lectures and exercises.
4. Pay more attention to practice-oriented teaching, such as mapping, computer drawings and so on.
5. Introduces CAD technology, describes the space situation with the help of three-dimensional model, making the visualization of abstract content.
6. Adopt heuristic and interactive teaching methods.
7. Carry out multimedia classroom teaching.
8. Developed and make use of advanced teaching site.

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

The grade is given according to the performance of the students in three fields.

The first includes attendance, Q & A in class, exercises in class, homework, 40% in weight， then final exam, 60% in weight.

| | |
|---|---|
| **Course Code** | 0810106W |
| **Course Name** | Linear Algebra |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course is an introduction to linear algebra, a branch of mathematics dealing with matrices and vector spaces. This is designed for students in engineering. Topics include matrices and systems of equations; determinants; vector spaces; linear transformations; orthogonality; eigenvalues and some applications of algebra.

2. Course aims (theory, ability and technique)

A student who is successful in Linear Algebra should be able to:

a. Use Gauss Elimination Method to solve linear systems of equations.
b. Know elementary operations and change matrices into row echelon form.
c. Familiar with matrix addition, scalar multiplication, matrix multiplication, matrix inversion, transpose of matrix.
d. Grasp the concepts of elementary matrices and partitioned matrices.
e. Compute the determinants of matrices, use the value of determinants to determine whether the matrix is nonsingular or not.
f. Determine whether the vectors are linearly dependent or not.
g. Find basis and dimension for a vector space.
h. Use the Gram-Schmidt process to obtain an orthonormal basis.
i. Determine whether a matrix is diagonalizable or not.
j. Find the matrix associated with a quadratic form, use a change of coordinate to make the conic section be in standard form.
k. Determine whether the matrices are positive definite or not.

**Requirements for courses, ability and knowledge in advance**

The prerequisites are two or three years of high school mathematics with some knowledge of calculus.

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1: Matrices and Systems of Equations (12 hours)**

§1.1Systems of linear equations. (2 hour)
§1.2 Row echelon form. (2 hour)
§1.3 Matrix Algebra. (4 hour)
§1.4 Elementary matrices. (2 hour)
§1.5 Partitioned matrices. (2 hour)

**Chapter 2: Determinants (6 hours)**

§2.1 The determinant of a matrix. (2 hour)
§2.2 Properties of determinants. (3 hours)
§2.3 Cramer's rule. (2 hour)

**Chapter 3: Vector Spaces (12 hours)**

§3.1 Definition and Examples. (2 hour)
§3.2 Subspaces. (2 hour)
§3.3 Linear Independence. (2 hour)
§3.4 Basis and Dimension. (2 hour)
§3.5 Change of Basis. (2 hours)
§3.6 Row Space and Column Space. (2 hours)

**Chapter 4: Linear Transformations (4 hours)**

§4.1 Definition and Examples. (1 hour)
§4.2 Matrix Representations of Linear Transformations. (2 hours)
§4.3 Similarity. (1 hour)

**Chapter 5: Orthogonality (4 hours)**

§5.1 The Scalar Product in $R^n$ . (1 hour)
§5.2 Inner Product Spaces. (1 hour)
§5.3 Orthonormal Sets. (1 hour)
§5.4 The Gram-Schmidt Orthogonalization Process. (1 hour)

**Chapter 6: Eigenvalues (10 hours)**

§6.1 Eigenvalues and Eigenvectors. (2 hour)
§6.2 Diagonalization. (2 hour)
§6.3 Hermitian Matrices. (2 hour)
§6.4 Quadratic Forms. (2 hours)
§6.5 Positive Definite Matrices. (2 hour)

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|---|---|
| **Course Code** | 0810109W |
| **Course Name** | Algebra & Trigonometry |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course is an overview of the fundamental concepts of algebra. Topics include linear and quadratic equations and inequalities; the Cartesian plane and graphing; functions and graphs; operations and compositions of functions; polynomial and rational functions; exponential and logarithmic functions; system of equations, inequalities and matrices; complex number system; and basic trigonometry.

2. Course aims (theory, ability and technique)

A student who is successful in College Algebra should be able to:

a. Perform simplifications on exponents and powers of ten.
b. Write the equation of a line in slope-intercept form when given two points.
c. Solve linear equations for unknowns; solve composition of function; solve inequalities.
d. Factor and utilize the zero factors rule; plot simple quadratic functions; identify and graph a quadratic function using shifts and translations of a basic graph.
e. Solve various types of equations including polynomial, exponential, and logarithmic equations algebraically and graphically.
f. Solve a system of two or three linear equations.
g. Find complex roots of equations.
h. Find the zeros of a polynomial function using the synthetic division
i. Grasp the basic concepts and techniques in trigonometry.

**Requirements for courses, ability and knowledge in advance**

The prerequisites are motivation and a good working knowledge of high school algebra and trigonometry. Students must score 70% or higher on the Placement Test in order to receive an exemption from this course.

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1: Fundamental Concepts of Algebra (7 hours)**

§1.1 Real numbers, coordinate lines, and integral exponents. (1 hour)
§1.2 Radicals and rational exponents. (1 hour)
§1.3 Polynomials and algebraic expressions. (1 hour)
§1.4 Factoring. (1 hour)
§1.5 Fractional expressions. (1 hour)
Review (2 hours)

**Chapter 2: Equations and Inequalities (7 hours)**

§2.1 Linear equations and applications. (1 hour)
§2.2 Quadratic equations and applications. (2 hours)
§2.3 Miscellaneous equations. (1 hour)
§2.4 Inequalities. (1 hour)
Review (2 hours)

**Chapter 3: Functions (8 hours)**

§3.1 Coordinate systems in two dimensions and graphs. (1 hour)
§3.2 Functions. (1 hour)
§3.3 Graphs of functions. (1 hour)
§3.4 Linear functions. (1 hour)
§3.5 Composite and inverse functions, variations. (2 hours)
Review (2 hours)

**Chapter 4: Polynomial Functions and Rational Functions (6 hours)**

§4.1 Quadratic functions. (2 hours)
§4.1 Graphs of polynomial functions of degree greater than 2. (1 hour)
§4.3 Rational functions and conic sections. (2 hours)
Review (1 hour)

**Chapter 5: Exponential & Logarithmic Functions (7 hours)**

§5.1 Exponential functions. (1 hour)
§5.2 Logarithms. (1 hour)
§5.3 Logarithmic functions. (1 hour)
§5.4 Exponential equations. (1 hour)
§5.5 Logarithmic equations. (1 hour)
Review (2 hours)

**Chapter 6: System of Equations and Inequalities (3 hours)**

§6.1 System of equations. (1 hour)

§6.2 System of linear equations in two and three variables. (1 hour)

Review (1 hour)

**Chapter 7: Complex Numbers (3 hours)**

§7.1 Definition of complex numbers. (1 hour)

§7.2 Conjugates and inverses, Complex roots of equations. (1 hour)

Review (1 hour)

**Chapter 8: Zeros of Polynomials (3 hours)**

§8.1 Properties of division. (1 hour)

§8.2 Synthetic division. (1 hour)

Review (1 hour)

**Chapter 9: Trigonometry (4 hours)**

§9.1 Algebraic skills, measurements of angles. (1 hour)

§9.2 Trigonometric functions and inverse trigonometric functions. (1 hour)

§9.3 Trigonometric equations and identities. (1 hour)

Review (1 hour)

| | |
|---|---|
| **Course Code** | 1690101W |
| **Course Name** | An Introduction to Computer |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

The course provides a preliminary tutorial to students on computers. As an introductory course, it covers a lot of things in computer, but not in a detailed level. The course gradually introduces the basic underlying principles of computer mechanisms, including hardware, software, network, operating systems, etc.

2. Course aims (theory, ability and technique)

The course's aim is to let the student know the basic principles of computers. The content includes:

Digital devices;
Hardware;
Software;
Network;
Operating system and file system;

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Structure of the final grade**

Paper test covering all important part of the course;

Presence and class performance: 20%, homework: 20%, final examination: 60%

Focuses on the important concepts in computer science;

Forms of exam: test;

| | |
|---|---|
| **Course Code** | 1900101W |
| **Course Name** | Orientation Program |
| **Study Hour** | 24 |
| **Credit** | 1.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status
This course introduces the history of the university and college, the regulations of undergraduate international students of NUAA, the China laws related to foreigners and also the introduction of each major.

2. Course aims (theory, ability and technique)
The course aims to help the international student to know the China laws and regulations of NUAA and understand the Chinese culture, which is advantageous for international students to enjoy the life in China.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.
The course includes 24 hours. 2 hours are for the laws. 4 hours are for the introduction of NUAA and College of International Education. Another 4 hours are for the introduction of the 4 majors. 2 hours are for the campus order. 10 hours introduce the regulations of NUAA. The last 2 hours are used for exam.

**Structure of the final grade**
The final grade includes the exam and class performance. The exam takes 90% and the class performance takes 10%. The examination is open-book exam. The students can bring the Handbook for International Students of NUAA to the exam venue.

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|---|---|
| **Course Code** | 1900105W |
| **Course Name** | Basic Chinese Speaking |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

**Course structure (Table of contents)**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

The goal of this course is to improve the communicative skills in listening and speaking in Mandarin. It provides basic training on pronunciation and tones, high-frequency sentence patterns, especially on speaking in Mandarin.
By the end of the semester, students will achieve:
(1) Abilities to distinguish and to pronounce all the individual syllables in the phonetic Romanization system of Mandarin, and to read the spelling.
(2) Abilities to listen and speak the basic sentence patterns introduced in the course.
(3) Abilities to communicate effectively with the basic patterns introduced in the course.

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|---|---|
| **Course Code** | 1900108W |
| **Course Name** | Comprehensive Chinese (1) – (3) |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

Comprehensive Chinese (1) to (3) are courses to teach the international students nearly every aspects of their lives. These courses include; Pronunciation (发音),Grammar (语法) and Writing (书写). After completing this course, students will be able to give a short introduction of themselves with accurate pronunciations, write applications and letters, handle everyday situations from asking help to someone to negotiating price with a seller etc. Comprehensive Chinese (2) will be provided to those students who passed the Comprehensive Chinese (1) successfully and later on those who will pass Comprehensive Chinese (2), they will be permitted to study Comprehensive Chinese (3). NEW PRACTICAL CHINESE READER 1, 2 and 3 are the course books for these courses.

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|---|---|
| **Course Code** | 1900109W |
| **Course Name** | An Introduction to China |
| **Study Hour** | 24 |
| **Credit** | 1.5 |

Introduction to China is a fundamental course for the international students. This course is designed for the foreign students who study in Chinese context. It provides basic information about China and Chinese people so as to help the students survive and study comfortably and confidently in China. Last but not least, this course not only teaches about China, the teacher also engages the students to know more about each other and tell others about the country they are from.

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|---|---|
| **Course Code** | DXTY |
| **Course Name** | Physical Education (体育)1-7 |
| **Study Hour** | 30 |
| **Credit** | 0.5 |

One of the most important part of life is to be fit in all situations. To keep the youth power fit, Physical Education is mandatory for all the international students. All of them have to go to class once a week until 13th week. On 13th week, final exam will be held. In the class, teacher makes the students to do exercise to warm up and then everyone practices TaiChi (太极拳) together with the teacher for first thirty minutes. Rest of the time they are given opportunity to play Badminton, Football, basketball and Volleyball. During this time, teacher inspects and makes sure everyone is participating.

| | |
|---|---|
| **Course Code** | 0110101W |
| **Course Name** | An Introduction to Aeronautics |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status
This course is an important basic course for graduated students of aeronautic engineering majors.
2. Course aims (theory, ability and technique)
The course mainly covers the basic theory of the aerodynamics, airplane lift and drag, airplane stability and control, aircraft propulsion, airplane structure design and airplane instruments.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**1 Rich History** (6 hrs)

1.1 Introduction

1.2 Myths and legend of flight

1.3 Early scientific research

1.4 Flight in balloons

1.5 The Era of the Dirigible

1.6 Heavier-Than-Air Aircraft Development

1.7 Wright Brothers' Flyer I

1.8 The Adolescence of Airplane

1.9 The Golden Age of Aviation

1.10 Airplanes in the World War II

1.11 Jet Airplane

1.12 Advances in Aeronautics.

**2 Basic Aerodynamics** (4 hrs)

2.1 The Atmosphere

2.2 Atmospheric Regions

2.3 Continuity Equation

2.4 Bernoulli's Principle

2.5 About Viscous Flow

2.6 About Compressibility

2.7 Measurement of Airspeed

2.8 Wind Tunnels.

**3 Airfoil, Wing and Airplane** (4hrs)

3.1 Introduction

3.2 Airfoil Lift

3.3 Wing Lift

3.4 Airplane Lift

3.5 High Lift Devices

3.6 Wing and Airplane Drag

3.7 Mach Number Effects

**4 Elements of Airplane Performance** (4hrs)

4.1 Introduction

4.2 Equations of Motion

4.3 Drag Curves

4.4 Power Curves

4.5 Range and endurance

4.6 Gliding Flight

4.7 Climbs

4.8 Takeoff and Landing

4.9 Turning Flight

4.10 V-n Diagram.

**5 Airplanes' Stability and Control** (4hrs)

5.1 Introduction

5.2 Coordinate System

5.3 Control Surfaces

5.4 Stability Definition

5.5 Longitudinal Control Analysis

5.6 Longitudinal Stability

5.7 Directional Stability and Control

5.8 Lateral Stability and Control

**6 Aircraft Propulsion** (2hrs)

6.1 Introduction

6.2 Air plane Propellers

6.3 Piston Engines

6.4 Turbo jet Engines

6.5 Afterburners

6.6 Turbofan Engines

6.7 Turboprop Engine

6.8 Turboshaft Engine

6.9 Ramjets

**7 Aircraft Structure** (2hrs)

7.1 Introduction

7.2 Mechanics Conception

7.3 An Airplane's Loads

7.4 Structural Layout

7.5 Component Sizing;

**8 Aircraft Instruments** (2hrs)

8.1 Introduction

8.2 Early Airplane Instruments

8.3 Instrument Classification

8.4 Typical Instruments

8.5 Navigation Conception

**9 Introduction to helicopter** (2hrs)

9.1 Introduction

9.2 Helicopter lift

9.3 Helicopter control

9.4 Helicopter structure

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|---|---|
| **Course Code** | 0810120W |
| **Course Name** | Calculus for Engineering Sciences (1) |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course covers in depth the differential calculus portion of a three-course engineering calculus sequence. Topics include limits, continuity, derivatives, and integrals of algebraic and transcendental functions of one variable, with applications. Upon completion, students should be able to apply differentiation and integration techniques to algebraic and transcendental functions.

2. Course aims (theory, ability and technique)

(1). Students will be able to evaluate limits and continuity, and compute derivatives and integrals of selected functions. Students will display proficiency by demonstrating the following competencies:

a. Define and use algebraic techniques to evaluate limits. Evaluate one-sided limit and limits at infinity.
b. Define continuity and determine whether a function is continuous at a point and on an interval.
c. Define a derivative and use the definition to differentiate selected functions.
d. Use the product, quotient, and chain rule to differentiate selected functions.
e. Differentiate selected trigonometric functions.
f. Differentiate the natural and general exponential and logarithmic functions.
g. Implicitly differentiate selected two-variable functions.
h. Differentiate inverse trigonometric function.
i. Define and differentiate the hyperbolic functions and their inverses.
j. Evaluate indefinite and definite integrals of elementary functions, including selected trigonometric functions.
k. Evaluate indefinite and definite integrals by substitution, integration by parts, and partial fractions.

l. Integrate natural and general exponential functions.
m. Integrate functions whose antiderivatives involve logarithms.
n. Integrate functions whose antiderivatives involve inverse trigonometric functions.
o. Numerical integration.
p. Apply the Fundamental Theorem of Calculus.
q. Improper integrals.

2). Students will be able to utilize calculus techniques to analyze the properties and sketch the graphs of functions. Students will display proficiency by demonstrating the following competencies:

a. Identify horizontal and vertical asymptotes.
b. Use the first derivative to determine where a function is increasing and decreasing, and the location of relative extrema.
c. Use the second derivative test to determine concavity of intervals of functions and the location of pointes and inflection.
d. Use the first derivative test to determine whether critical values are maxima, minima, or neither.
e. Use the second derivative test to determine whether critical values are maxima, minima, or neither.
f. Use the information from the first and second derivatives to sketch the graphs of selected functions.
g. Identify the absolute extrema of functions.
h. State Rolle's Theorem and find values which satisfy it.
i. State the Mean Value Theorem and find values which satisfy it.

(3). Students will be able to utilize the techniques of differentiation and integration together with appropriate technology to solve practical problems and to analyze and communicate results. Students will display proficiency by demonstrating the following competencies:

a. Solve practical problems involving related rates.
b. Use differentials to approximate change.
c. Use Newton's method to approximate the zero of a function.
d. Use derivatives to solve optimization problems.
e. Find the area of a region using integrals.
f. Find volumes by slicing; Disks and washers.
g. Find volumes by cylindrical shells.

**Requirements for courses, ability and knowledge in advance**

The prerequisites are motivation and a good working knowledge of college algebra and trigonometry.

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1 Preliminaries (10 hours)**

§1.1 Rates of change and limits (2 hours)
§1.2 Finding limits and one-sided limits (2 hours)
§1.3 Limits involving infinity (2 hours)
§1.4 Continuity (2 hours)
§1.5 Tangent lines (2 hours)

**Chapter 2 Derivatives (13 hours)**

§2.1 The derivative as a function (2 hours)
§2.2 The derivative as a rate of change (2 hours)
§2.3 Derivatives of products, quotients, and negative powers (2 hours)
§2.4 Derivatives of trig. Function (2 hours)
§2.5 The chain rule and parametric equations (2 hours)
§2.6 Implicit differentiation (2 hours)
§2.7 Related rates (1 hours)

**Chapter 3 Application of Derivatives (9 hours)**

§3.1 Extreme values of function (2 hours)
§3.2 The mean value theorem (2 hours)
§3.3 The shape of a graph (1 hours)
§3.4 Modeling and Optimization (2 hours)
§3.5 linearization and differentials (2 hours)

**Chapter 4 Integration (12 hours)**

§4.1 Indefinite integrals (2 hours)
§4.2 Integral rules; integration by substitution (2 hours)
§4.3 Estimating with finite sums (2 hours)
§4.4 Riemann sum and def. integrals (2 hours)
§4.5 The mean value and fundamental theorems (2 hours)
§4.6 Substitution in definite integrals (2 hours)

**Chapter 5 Application of Integrals (4 hours)**

§5.1 Volumes by slicing and rotation about axis (2 hours)
§5.2 Lengths of plane curves (2 hours)

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|---|---|
| **Course Code** | 0820107W |
| **Course Name** | Physics (1) – (2) |
| **Study Hour** | 32 - 56 |
| **Credit** | 2.0-3.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Physics sets up a bridge linking the phenomena of nature and principles relating these phenomena. This course provides the basic theories and concepts in physics, emphasizing on how particles move and interact individually and collectively. Through the course, the students will learn how to ask appropriate questions, design experiments to try to answer the questions, and draw appropriate conclusions from the results. This course covers mechanics, thermodynamics, wave and optics, electricity and magnetism, and selected topics in modern physics （special theory of relativity）.

2. Course aims (theory, ability and technique)

Present students the physics concepts and theories in a logical, clear, and comprehensive style;
Provide students the basic skills and abilities to understand new knowledge and solve problems in advanced science and engineering;
Let students know how to design experiments and analyze results;
Obtain the technique to discover the hidden patterns in nature that govern everyday phenomena, from motion and forces to energy and conservation laws.

**Requirements for courses, ability and knowledge in advance**

Conceptual physics; general mathematics; calculus;

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

Chapter 1 Preludes: units, scales and precision (2 hrs)

Chapter 2 Mathematical Toolbox: vectors and their operations (2 hrs)

Chapter 3 Kinematics I:1D motion (4 hrs)

Chapter 4 Kinematics II: 2D and 3D motion, uniform circular motion (4 hrs)

Chapter 5 Newton's Laws of motion (4 hrs)

Chapter 6 The gravitational force and the gravitational field (4 hrs)

Chapter 7 Hooke's law and oscillation (4 hrs)

Chapter 8 Work, energy and CWE theorem (6 hrs)

Chapter 9 Impulse momentum and collisions (4 hrs)

Chapter 10 Spin and orbital motion (4 hrs)

Chapter 11 Solids and Fluids (4 hrs)

Chapter 12 Kinetic Theory (4 hrs)

Chapter 13 Electric charges, forces, and field (8 hrs)

Chapter 14 Electric potential (6 hrs)

Chapter 15 Magnetic forces and field (10 hrs)

Chapter 16 Magnetic induction (8 hrs)

Chapter 17 The special theory of relativity (10 hrs)

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|---|---|
| **Course Code** | 0820108W |
| **Course Name** | Physics Experiments (1) |
| **Study Hour** | 16 |
| **Credit** | 0.5 |

Physics Experiments (1) consists of 4 experiments:

**Using an Oscilloscope;**

a) Understand the structure of oscilloscope;

b) Know the use oscilloscope to measure the amplitude and frequency of alternating current (AC);

**Newton's Ring;**

a) Observe the phenomenon of equal thickness interference;

b) Grasp the technique of microscope;

c) Determinate the radius of curvature of Newton rings.

**Resistance measurement with bridge circuit and;**

a) Learn the theory of Wheatstone bridge.

b) Study the accuracy measurement;

c) Determinate the resistance with slide-wire Wheatstone bridge and box Wheatstone bridge;

**Moment of Inertia;**

a) Determine experimentally the moment of inertia of a body;

b) Verify the law of the parallel axis theorem;

c) Learn the energy relations for rotating bodies.

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|---|---|
| **Course Code** | 0950101W |
| **Course Name** | An Introduction to Business Administration |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

**Course structure (Table of contents)**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

Week 1 Setting up a Business
Case Study: Sunny Engineering Company

Week 2 Marketing: an Overview
Case Study: Rags to Riches

Week 3 Products and Pricing
Case Study: Factory Option—Take It or Leave It?

Week 4 Channels of Distribution
Case Study: Who Was That Mystery Buyer?

Week 5 Promotion
Case Study: Advertising in a Crisis

Week 6 Money and Banking
Case Study: Why Banks Fail?

Week 7 Financing
Case Study: The Timing of Financial Planning

Week 8 Accounting
Case Study: Cooking the Book

Week 9 The Securities Market
Case Study: Personal Investment in Securities

Week 10 Risk Management and Insurance
Case Study: Group Health Insurance Programs Feel the Effects of AIDS

Week 11 Business Law
Case Study: Duties Assumed under Contract

Week 12 Human Resources Management
Case study: Application Exercise

**Teaching Methods (Lectures or practice, etc.)**

We will learn from a variety of methods: readings, lectures, cases, in-class discussions, a group research project, videos, and individual and experiential assignments. Open class participation and discussion are essential and critical. Because many of the discussions will be based on assigned readings, it is important to have done them carefully in preparation for each session.

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|---|---|
| **Course Code** | 1690104W |
| **Course Name** | Computer Programming |
| **Study Hour** | 64 |
| **Credit** | 4.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course is an important basic introduction course for undergraduate students whose major is non-computer science. It is an engineering course. This course mainly covers the basic concept about C programming language. It introduces the concept of fundamental data types and operations, control flows, further data structures, I/O system, general algorithms and the basic methods of structured programming. This course provides the necessary foundation for student in their future study and work related to computer.

2. Course aims (theory, ability and technique)

The purpose of this course is to make students to get the basic concept about computer programming and to write middle scale programs by themselves through practice and course design.

Software used in Lab is Turbo C 2.0. or Visual C++ 6.0

**Requirements for courses; ability and knowledge in advance**

Course: Introduction to Computer

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

This course contains 48 theory hours, distributed as follows:

Chapter 1 Introduction to Computer Programming (3 hrs)

Chapter 2 Getting Started in C Programming (5 hrs)

Chapter 3 Processing and Interactive Input (4 hrs)

Chapter 4 Selection (4 hrs)

Chapter 5 Repetition (4 hrs)

Chapter 6 Modularity Using Functions: Part 1 (3 hrs)

Chapter 7 Modularity Using Functions: Part 2 (5 hrs)

Chapter 8 Arrays (6 hrs)

Chapter 9 Character Strings (2 hrs)

Chapter 10 Data Files (4 hrs)

Chapter 11 Arrays, Addresses, and Pointers (6 hrs)

Chapter 12 Structures (2 hrs)

Experiment (Course design)(16 hrs) about the whole course, finish a middle scale program

**Teaching methods (Lectures, practice, etc)**

Lectures + Labs Practices + Course Design + Homework

**Structure of the final grade:**

Attendance + class performance + Homework + lab test (30%),
middle term exam (20%),
final exam (50%)

**forms of exam:** lab test + paper test

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|---|---|
| **Course Code** | 1900104W |
| **Course Name** | Basic Chinese Listening |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

The goal of this course is to lay a good foundation in Chinese for further study and to strive for a well-rounded development of communicative skills in listening, speaking, and reading in Mandarin Chinese. It provides basic training on pronunciation and tones, character recognition and production skills, syntactic structures and usage, and high-frequency vocabulary words, but the main focus will be on listening.

By the end of the semester, students will achieve:

A) Abilities to distinguish and to pronounce all the individual syllables in the phonetic Romanization system (*Hanyu pinyin*) of modern standard (Mandarin) Chinese;
B) Abilities to listen and then understand the basic sentence patterns and vocabulary words introduced in the course.
C) Abilities to communicate effectively with the basic sentence patterns and vocabulary words introduced in the course;

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|---|---|
| **Course Code** | 1900120W |
| **Course Name** | Chinese Culture |
| **Study Hour** | 24 |
| **Credit** | 1.5 |

**Course Description:**

This short course describes about the traditional cultures and habits of Chinese people. The course includes the traditional festivals of Chinese, Chinese Mythology, Chinese language, traditional sports of China, traditional Healing method, Chinese Opera and Music, Chinese literature etc. The teacher also familiarizes some famous historic places of China to the students. In the class, the students also practice writing in Calligraphy under the supervision of the teacher.

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|---|---|
| **Course Code** | 1900202W |
| **Course Name** | Essential English Writing |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

Throughout the whole 4 years of University life students would go through a quite a lot of writing. It would be technical writing or academic writing. This course would enable them to correct their basic mistakes of English writing skills.

Topics to be covered: English Writing Overview; Letters to the editor; Paragraph structure; Poetry; Thesis Statement; Word Choice Examples to Correct;

- Attendance and Class work 30%
- Final Exam 70%

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|---|---|
| **Course Code** | 0130204W |
| **Course Name** | Engineering Mechanics (1) |
| **Study Hour** | 58 |
| **Credit** | 3.5 |

**Course description：** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Engineering mechanics, which involves theoretical mechanics and mechanics of materials, is an important required course for undergraduate students majoring in aeronautical engineering and mechanical engineering.
Theoretical mechanics (including statics, kinematics, and kinetics) deals with the external effects of rigid bodies, whereas mechanics of materials is concerned with the internal effects of deformable bodies.

2. Course aims (theory, ability and technique)

(1) To provide students with the fundamental knowledge of engineering mechanics, and to establish students' abilities to understand the basic concepts and principles contained in engineering mechanics.
(2) To develop students' abilities to calculate the reactions necessary to ensure static equilibrium, and to solve static equilibrium problems involving friction.
(3) To provide students with the knowledge of kinematic and kinetic analyses for particles and rigid bodies, and to develop an understanding of energy and momentum methods in kinetics.

**Requirements for courses; ability and knowledge in advance**
1. Higher Mathematics.
2. General Physics

**Teaching methods (Lectures, practice, etc.)**

Lecture and discussion are utilized in class teaching. New concepts, principles and methods are discussed in class. Examples are presented on the blackboard to show how the concepts, principles and methods are applied to real problems. Problems using the concepts, principles and methods will be assigned as homework. Experiments are conducted in the mechanics laboratory.

**Forms of examination and requirements:**

Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.) 10% based on attendance, 20% based on homework, and 70% based on the final exam. Students are expected to attend all sessions of the course and required to complete all the assigned homework problems.

Topics Covered are mentioned below:

(1) Statics of Particles

(2) Statics of Rigid Bodies

(3) Structural Analysis

(4) Friction

(5) Kinematics of Particles

(6) Planar kinematics of Rigid Bodies

(7) Kinetics of Particles:

- (a) Force-Acceleration
- (b) Work-Energy
- (c) Impulse-Momentum

(8) Planar Kinetics of Rigid Bodies:

- (a) Force-Acceleration
- (b) Work-Energy
- (c) Impulse-Momentum

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|---|---|
| **Course Code** | 0130205W |
| **Course Name** | Engineering Mechanics (2) |
| **Study Hour** | 58 |
| **Credit** | 3.5 |

Engineering Mechanics is one of the most important subjects for Aeronautical Engineering students. Engineering mechanics, which involves theoretical mechanics and mechanics of materials, is an important required course for undergraduate students majoring in aeronautical engineering and mechanical engineering. Theoretical mechanics (including statics, kinematics, and kinetics) deals with the external effects of rigid bodies, whereas mechanics of materials is concerned with the internal effects of deformable bodies.

To provide students with the knowledge of strength, rigidity, and stability, and to develop students' abilities to understand the concepts and principles encountered in mechanics of materials.

**Teaching methods (Lectures, practice, etc.)**
Lecture and discussion are utilized in class teaching. New concepts, principles and methods are discussed in class. Examples are presented on the blackboard to show how the concepts, principles and methods are applied to real problems. Problems using the concepts, principles and methods will be assigned as homework. Experiments are conducted in the mechanics laboratory.

**Forms of examination and requirements:**
Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.) 10% based on attendance, 20% based on homework, and 70% based on the final exam. Students are expected to attend all sessions of the course and required to complete all the assigned homework problems.

**Topics Covered:**
(1) Tension-Compression, Torsion, and Bending
(2) Analysis of Stress, and Combined Loadings
(3) Stability of Columns

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|---|---|
| **Course Code** | 0320205W |
| **Course Name** | Electrical Engineering & Electronic Technique (1) |
| **Study Hour** | 52 |
| **Credit** | 3.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

**1. Course nature and academic status**
This course is a compulsory fundamental course for the undergraduate of electric-related majority.

**2. Course aims (theory, ability and technique)**
This course will introduce the principles which describe the operation of d.c. and a.c. circuits, covering both steady and transient states, and applies these principles to filter networks, operational amplifiers, three-phase supplies, transformers, d.c. machines and three-phase induction motors.

**Requirements for courses; ability and knowledge in advance**

**Courses:**
1. Advanced Mathematics
2. Physics

**Knowledge:**
Concept for function, limit, integration, differential, and Fourier series, knowledge for basic elements and some basic electric laws.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Lectures:**

Ch1. Basic Circuit Concept and Laws (6 hours)

Ch2. Analysis of Circuit with Resistors (8 hours)

Ch3. Sinusoidal Alternating Circuit Analysis (10 hours)

Ch4. Three-phase Circuits (8 hours)

Ch5. Non-sinusoidal Periodic Current Circuits (6 hours)

Ch6. Transient Analysis of Circuits (8 hours)

Ch7. Magnetic Circuits and Iron Cores (6 hours)

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

Final grade includes three parts: Class Interaction 10%, Homework and experiments 20%, Final exam 70%.

Final examination is test. The test will focus on basic circuit concept and laws, analysis of circuit with resistors, sinusoidal AC analysis, three-phase circuit analysis, non-sinusoidal periodic current circuit analysis, circuit transient analysis and magnetic circuits & iron cores.

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|---|---|
| **Course Code** | 0810121W |
| **Course Name** | Calculus for Engineering Sciences (2) |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This is the second of three courses in the engineering calculus sequence. Topics include vectors in the plane and in space, lines and planes in space, infinite series, polar coordinates, parametric equations, and vector-valued functions.

2. Course aims (theory, ability and technique)

(1). Students will be able to analyze the properties of sequences and infinite series. Students will display proficiency by demonstrating the following competencies:

a. Define and evaluate limits of sequences of numbers.
b. Determine whether a sequence is bounded or unbounded. Find the Least Upper Bound lower bound and the Greatest Lower Bound of a sequence.
c. Find the formula of an infinite series given by numbers.
d. Determine whether a series of nonnegative terms is convergent or divergent.
e. Determine whether an alternating series is convergent or divergent.
f. Find the interval and radius of convergence of a power series.
g. Write Taylor and Maclaurin series of a given single-variable function.

(2). Students will be able to sketch the graphs using polar coordinates and utilize integration techniques to find areas bounded polar functions. Students will display proficiency by demonstrating the following competencies:

a. Identify and plot points in polar coordinates.
b. Find rectangular (polar) coordinates when a point or function is given in polar (rectangular) coordinate system.
c. Sketch the graphs of simple polar functions.
d. Find areas bounded by polar graphs using integration.

(3). Students will be able to perform basic vector calculus. Students will display

1. proficiency by demonstrating the following competencies:
2. Plot vectors in plane and in space.
3. Find length of a vector.
4. Find the unit vector in the direction of a vector.
5. Find velocity and acceleration of motion using vectors.
6. Find the angle between two vectors.
7. Perform the calculation of the dot and the cross product.
8. Find lines and planes in space.
9. Differentiation and integration of vector-valued functions

**Requirements for courses, ability and knowledge in advance**

The prerequisites are motivation and a good working knowledge of calculus for engineering sciences (1).

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter Infinite Series (10 hours)**

§8.1 Limits of Sequences of Numbers (2 hours)
§8.2 Bounded Sequences (2 hours)
§8.3 Series of Nonnegative Terms (2 hours)
§8.4 Power Series (2 hours)
§8.5 Taylor and Maclaurin Series (2 hours)

**Chapter Vectors in the Plane and Polar Functions (12 hours)**

§9.1 Vectors in the plane (1 hour)
§9.2 Dot Products (2 hours)
§9.3 Vector-Valued Functions (2 hours)
§9.4 Polar Coordinates and Graphs (4 hours)
§9.5 Calculus of Polar Curves (3 hours)

**Chapter Vectors and Motions in Space (10 hours)**

§10.1 Cartesian (Rectangular) Coordinates and Vectors in Space (2 hour)
§10.2 Dot and Cross Products (2 hours)
§10.3 Lines and Planes in Space (2 hours)
§10.4 Vector-Valued Functions and Space Curves (4 hours)

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|---|---|
| **Course Code** | 0810103W |
| **Course Name** | Calculus for Engineering Sciences (3) |
| **Study Hour** | 48 |
| **Credit** | 3.0 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This is the third of three courses in the engineering calculus sequence. Topics include limits, continuity, and derivatives of multivariable functions, extreme values of two-variable functions, multiple integrals and their applications, and vector calculus including Green's Theorem, Curl and Divergence, line integrals, surface integrals, and Stoke's Theorem.

2. Course aims (theory, ability and technique)

(1). Students will be able to evaluate limits and continuity, and compute derivatives of selected multivariable functions. Students will display proficiency by demonstrating the following competencies:

a. Define and evaluate limits of multivariable functions.

b. Define continuity and determine whether or not a multivariable function is continuous at a point and on a region.

c. Define partial derivatives and compute partial derivatives of selected multivariable functions.

d. Find partial derivatives of a multivariable function using the chain rule.

e. Find gradient vectors, directional derivatives, and tangent planes of selected multivariable functions. Find normal lines.

f. Linearize the multivariable functions and find the differentials.

g. Use the first and the second derivative test to find extreme values and saddle Points of a function.

(2). Students will be able to perform multiple integration in various coordinate systems. Students will display proficiency by demonstrating the following competencies:

a. Set up the formulation of double integral and compute the value in two-dimensional rectangular coordinates.
b. Set up the formulation of double integral and compute the value in polar coordinates.
c. Set up the formulation of triple integral and compute the value in three-dimensional rectangular coordinates.
d. Set up the formulation of triple integral and compute the value in cylindrical coordinates.
e. Set up the formulation of triple integral and compute the value in spherical coordinates.
f. Find area and volume using double and triple integrals.

(3). Students will be able to perform integration in the vector fields. Students will display proficiency by demonstrating the following competencies:

a. Find the line integral of a function and evaluate.
b. Define a vector field and calculate the work, circulation, and the flux.
c. Define conservative fields and potential function. State the properties of a conservative field. Perform the component test for conservative fields.
d. State and apply the Green's Theorem in the plane.
e. Find surface areas and evaluate surface integrals.
f. Find integrals when the surfaces are defined parametrically.
g. State and apply the Stoke's Theorem and the Divergence Theorem.

**Requirements for courses, ability and knowledge in advance**

The prerequisites are motivation and a good working knowledge of calculus for engineering sciences (1) and (2).

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 11 Multivariable Functions and Their Derivatives (18 hours)**

§11.1 Functions of Several Variables (1 hour)

§11.2 Limits and Continuity in Higher Dimensions (1 hour)

§11.3 Partial Derivatives (2 hours)

§11.4 The Chain (2 hours)

§11.5 Directional Derivatives, Gradient Vectors and Tangent Planes (4 hours)

§11.6 Linearization and Differentials (2 hours)

§11.7 Extreme Values and Saddle Points (4 hours)

review (2 hours)

**Chapter 12 Multiple Integrals (14 hours)**

§12.1 Double Integrals (4 hours)

§12.2 Double Integrals in Polar Form (2 hours)

§12.3 Triple Integrals in Rectangular Coordinates (2 hours)

§12.4 Triple Integrals in Cylindrical and Spherical Coordinates (4 hours)

review (2 hour)

**Chapter 13 Integration in Vector Fields (16 hours)**

§13.1 Line Integrals (2 hour)

§13.2 Vector Fields, Work, Circulation, and Flux (2 hours)

§13.3 Path Independence, Potential Functions, and Conservative Fields (2 hours)

§13.4 Green's Theorem in the Plane (2 hours)

§13.5 Surface Area and Surface Integrals (2 hours)

§13.6 Stoke's Theorem (2 hours)

§13.7 Divergence Theorem (2 hours)

review (2 hours)

| | |
|---|---|
| **Course Code** | 0820106W |
| **Course Name** | Physics Experiments (2) |
| **Study Hour** | 16 |
| **Credit** | 0.5 |

Physics Experiments (2) consists of 4 experiments:

**Michelson;**

a) Grasp the principle of Michelson interferometer;

b) Know the difference between the equal inclination interference and equal thickness interference;

c) Determinate the wavelength of laser;

**Hysteresis Loop;**

a) Learn the basic principles of magnetic hysteresis;

b) Know the properties of ferromagnetic materials;

c) Determine their dissipation energy of magnetization

**The Hall Effect;**

a) Learn the principle of Hall Effect;

b) Observe the phenomenon of Hall Effect;

c) Study the relationship between the hall voltage and excitation current;

**Determining the Velocity of Ultrasound;**

a) Study the relation between the speed of sound and the parameter of gas;

b) Know the function and the use of transducers of constructed of piezoelectric materials;

c) Determinate the speed of ultrasonic sound wave.

| | |
|---|---|
| **Course Code** | 0910201W |
| **Course Name** | Engineering Economics |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course covers the basics of economic analysis from an engineering perspective. Because cost is such an important component in decision-making, various techniques for comparing alternatives on an economic basis are presented. Other topics include depreciation, inflation considerations, and cost estimating.

2. Course aims (theory, ability and technique)

After completing the course, the student should be able to identify which alternative should be selected from two or more mutually exclusive alternatives on the basis of economic considerations.

**Requirements for courses; ability and knowledge in advance**

Probability Statistics

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Chapter 1 Engineering Economics Decisions（2h）**

1.1 The Rational Decision-Making Process

1.2 The Engineer's Role in Business

1.3 Types of Strategic Engineering Economics Decisions

1.4 Fundamental Principles in Engineering Economics

**Chapter 2 Time Value of Money （4h）**

2.1 Interest

2.2 Economic Equibalance

2.3 Interest Formulas for Single Cash Flows

2.4 Uneven-Payment Series

2.5 Equal-Payment Series

2.6 Dealing with Gradient Series

2.7 Composite Cash Flows

2.8 Case Study

**Chapter 3 Understanding Money Management （4h）**

3.1 Market Interest Rates

3.2 Calculating Effective Interest Rates Based on Payment Periods

3.3 Equivalence Calculations with Effective Interest Rates

3.4 Debt Management

3.5 Case Study

**Chapter 4 Equivalence Calculations under Inflation （2h）**

4.1 Measure of Inflation

4.2 Actual versus Constant Dollars

4.3 Equivalence Calculations under Inflation

4.4 Case Study

Quiz

**Chapter 5 Present-Worth Analysis （3h）**

5.1 Loan versus Project Cash Flows

5.2 Initial Project Screening Methods

5.3 Present-Worth Analysis

5.4 Methods to Compare Mutually Exclusive Alternatives

5.5 Case Study

**Chapter 6 Annual Equivalence Analysis（3h）**

6.1 Annual Equivalent Worth Criterion

6.2 Applying Annual-Worth Analysis

6.3 Comparing Mutually Exclusive Projects

6.4 Case Study

**Chapter 7 Rate-of-Return Anaylsis（4h）**

7.1 Rate of Return

7.2 Methods for Finding Rate of Return

7.3 Internal-Rate-of-Return Criterion

7.4 Incremental Analysis for Comparing Mutually Exclusive Alternatives

7.5 Resolution of Multiple Rates of Return

7.6 Case Study

**Chapter 8 Accounting for Depreciation and Income Taxes（2h）**

8.1 Accounting Depreciation

8.2 Book Depreciation Methods

8.3 How to Determine Accounting Profit

**Chapter 9 Project Cash Flow Analysis （4h）**

9.1 Understanding Project Cost Element

9.2 Why Do We Need to Use Cash Flow in Economics Analysis

9.3 Income-Tax Rate to Be Used in Economics Analysis

9.4 Incremental Cash Flow from Understanding a Project

9.5 Developing Project Cash Flow Statement

9.6 Effects of Inflation on Project Cash Flows

9.7 Discount Rate to Be Used in After-Tax Economic Analysis

9.8 Case Study

**Chapter 10 Handing Project Uncertainty （4h）**

10.1 Origins of Project Risk

10.2 Methods of Describing Project Risk

10.3 Including Risk in Investment Evaluation

10.4 Investment Strategies under Uncertainty

10.5 Case Study

Quiz

**Chapter 11 Replacement Decisions (4h)**

11.1 Replacement-Analysis Fundamentals

11.2 Economic Service Life

11.3 Replacement Analysis Methods

**Chapter 13 Financial Statements (4h)**

13.1 Accounting

13.2 Financial Statements

13.3 Using Ratios to Make Business Decisions

13.4 Case Study

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance, ), focus of exam, forms of exam(test, interview, final report, etc.)**

Class participation (including attendance) 10%

Assignments 10%

Midterm test 20%

Project (including presentation) 10%

Finial exam 50 %

| | |
|---|---|
| **Course Code** | 1900117W |
| **Course Name** | Reading in Chinese |
| **Study Hour** | 32 |
| **Credit** | 2.0 |

This course emphasizes to build up students' ability of reading in Chinese. This course aims at

1) Develop international students' reading competence in Chinese.

2) Foster students' communicative competence in Chinese;

3) Make students understand Chinese characters, words and useful expressions in cultural context

Throughout the course, students get many comprehensions to read and exercises to do based on them. Exercises are fill in the gap, selecting true or false and answer to the questions. The final exam question pattern is the same.

| | |
|---|---|
| **Course Code** | 1900116W |
| **Course Name** | Academic English Writing |
| **Study Hour** | 48 |
| **Credit** | 3 |

Defining academic writing; Classification of academic writing; The role of academic writing; Writing of academic books; Academic thesis writing; Writing of conference papers; Tables and graphs; Writing of posters; Academic Writing Skills; Word order; Basic word order in English; Breaking up long sentences; Removing redundancy; Structuring paragraphs.

| | |
|---|---|
| **Course Code** | 8410002W |
| **Course Name** | Information Retrieval & Utilization |
| **Study Hour** | 16 |
| **Credit** | 0.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Obligatory course for students to improve their information literacy

2. Course aims (theory, ability and technique)

1. Master the basic principles and skills of retrieval
2. Be familiar with the distribution of library resources and know how to use

Proficiency in using literature databases and search engines

Theory Courses:

1. necessary parts：

1. Basic concepts（1h）
2. Introduction of library Resources in library Online Services 、Conventional Services）（1h）
3. Basic Knowledge of Retrieval（1h）
4. Databases Web of Knowledge Village2、EBSCO、Elsevier、Springer、CSA（3hs）
5. Search Engine（Scirus, Google scholar）（1h）

2、optional parts：

AIAA, ASME Citation, IEL, LexisNexis Academic, ACM （1h）

Experiment courses：

8hs to practice searching skills

| | |
|---|---|
| **Course Code** | 9110101W |
| **Course Name** | Engineering Training |
| **Study Hour** | 2 weeks- 40 hours (4 hours every day) |
| **Credit** | 2 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

**1. Course nature and academic status**

All students who are registered for a Bachelor degree are required to undergo 'Engineering Training' after Year 2. ET provides multi-disciplinary practical experience and learning activities as part of the overall education package for largely engineering-use students, and is structured as series of training modules in which students gain direct, hands-on experience.

**2. Course aims (theory, ability and technique)**

ET is to provide exposure for the students on practical engineering fields, especially the Electrical and Mechanical field. The training programs, which can be divided into three main lines: product design, product manufacturing, and engineering management, are deliberately designed for the students to:

1. Get a feel of the work environment.
2. Own the cognition of machine tools, machining processes, and basic mechanical engineering implementation procedures.
3. Practice basic engineering techniques.
4. Nurture students' creativity and innovation.
5. Cultivate the team spirit.

**Requirements for courses; ability and knowledge in advance**

Assessment will be made on the basis of the following:

1. Pass the safety education program.
2. Successful participation in specified training programs.
3. Complete the training report.

Basic engineering knowledge on metalworking and application software.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

The training is mainly divided three parts:

1. Product design (CAD/CAM)
2. Product manufacturing (Traditional Metalworking, CNC Programming/Machining, Non-Traditional Machining).
3. Industrial Management (PDM/ERP)

Normally the training will last for 2 weeks, we adjust the training cycles according to students' different majors, or some special requirements.

**Teaching methods (Lectures, practice, etc.)**

Technology-based or project-based practical experience, integrated with lectures.

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

Assessment is mainly based upon the quality of the practical work, score of the online test, and the training report. Students with the total score under level C will have to retake the course.

| | |
|---|---|
| **Course Code** | 0220201W |
| **Course Name** | Engineering Thermodynamics |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Thermodynamics is a basic course that serves as the background for many thermo-fluid courses. The main objective of the course is to provide the engineering student with the basic principles of thermodynamics through the study of the first and second laws of thermodynamics and applications

This course is an introduction to the concept of energy. It provides the basic tools necessary for the analysis of any engineering system in which energy transfer or energy transformations occur; thus, thermodynamics is an important part of the training of almost all engineering disciplines.

2. Course aims (theory, ability and technique)

a. To familiarize the students with basic concepts of the First and Second Laws ofThermodynamics and their applications in engineering problems.
b. To provide the students with a comprehensive treatment of classical Thermodynamics.
c. To prepare the students to effectively use Thermodynamics in the practice of engineering.

Through the study of course 0220201W the student will be able to:

1. Determine properties of real substances, such as steam and refrigerant 134-a, and ideal gases from either tabular data or equations of state.

2. Analyze processes involving ideal gases and real substances as working fluids in both closed systems and open systems or control volumes to determine process diagrams, apply the first law of thermodynamics to perform energy balances, and determine heat and work transfers.
3. Analyze systems and control volumes through the application of the second law.
4. Analyze the basic Otto and Rankine cycles

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

| Week | | | |
|---|---|---|---|
| 1 | Ch0 Introduction<br>Ch 1 Basic Concepts | 7 | Ch7 Entropy<br>Ch7 Entropy |
| 2 | Ch2 Energy<br>Ch2 1st Law | 8 | Ch7 Entropy<br>Ch9 Gas Power Cycles |
| 3 | Ch3 Properties<br>Ch4 Closed System | 9 | Ch9 Gas Power Cycles |
| 4 | Ch4 Closed System<br>Ch5 Open System | 10 | Ch10 Vapor and Combined Power Cycles |
| 5 | Ch5 Open System<br>Ch6 2nd Law | 11 | Ch11 Refrigeration Cycles<br>Ch15 Compressible Flow |
| 6 | Ch6 2nd Law<br>Ch6 2nd Law | 12 | Ch15 Compressible Flow |

| | |
|---|---|
| **Course Code** | 1900118W |
| **Course Name** | Communication in Chinese |
| **Study Hour** | 32 |
| **Credit** | 2 |

This course will help students expand from their base in first year Chinese (or its equivalent) to continue to develop their four skills of aurally understanding, speaking, reading and writing. Many of the grammatical constructions introduced in first year Chinese will be repeated in this course with increasing sophistication in terms of style and usage. While many of the linguistic task's students will learn to handle are similar to those of first year Chinese, the level of language required to carry out these tasks is more advanced. In this course students are required to comprehend and produce paragraph-level Chinese. Rigorous practice of spoken and written Chinese in complex communicative activities will be conducted. Students will also do intensive reading of expository writings on a variety of cultural topics. A daily grading system will beemployed.

| | |
|---|---|
| **Course Code** | 0810110W |
| **Course Name** | Numerical Analysis |
| **Study Hour** | 32 |
| **Credit** | 2 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course is an important basic course for specialty for undergraduate students of non-mathematical majors.

2. Course aims (theory, ability and technique)

This course mainly covers classical numerical theory, including Solution of Nonlinear Equations, Solution of Systems of Linear Equations, Approximation of Functions, Numerical Integration and Numerical Solution of Ordinary Differential Equations. It requires that students should master the basic discipline of numerical analysis, be able to carry out the classical numerical methods for some mathematical problems and have the basic knowledge and skills to use computers to solve mathematical problems and conduct research by both algorithm-designing and computer programming so that they are prepared with the necessary foundation for their future study and work.

**Requirements for courses, ability and knowledge in advance**

Calculus

Linear Algebra

Fundamentals of C Programming

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1 Mathematical Preliminaries and Error Analysis (**4 hrs)

Introduction; Computational efficiency; Computer arithmetic; Floating point form; Errors; Sources of errors; Loss of significance errors; Errors in computer arithmetic; Error propagation; An introduction to MATLAB.

**Chapter 2 Solution of Nonlinear Equations (**6 hrs)

Introduction; Bisection method; Fixed point iteration; Newton's method; Secant method; Regula-falsi method; Multiple roots; Some numerical results; MATLAB Demos. A summary to Chapter 2

**Chapter 3 Solution of Systems of Linear Equations** (10hrs)

Introduction; Gaussian Elimination; Gaussian elimination algorithm; Partial pivoting; Scaled partial pivoting; LU factorization; Vector and matrix norms; Error of calculated solution; A practical error bound; Residual correction method; Jacobi iterative method; Convergence of the Jacobi method; Gauss-Seidel iterative method; Termination of the iteration; Comparison of direct and iterative methods. A summary to Chapter 3

**Chapter 4 Approximation of function** (4hrs)

Introduction; Lagrange form; Newton's divided difference formula; Error of the interpolating polynomial. A summary to Chapter 4

**Chapter 5 Numerical Integration** (4hrs)

Introduction; Numerical integration based on interpolation: Trapezoid rule, Simpson's rule, Composite Trapezoid rule. A summary to Chapter 5

**Chapter 6 Solution of Ordinary Differential Equations** (4hrs)

Introduction; Euler's method; local and global truncation errors; Taylor methods; Runge-Kutta methods. A summary to Chapter 6

| | |
|---|---|
| **Course Code** | 0320203W |
| **Course Name** | Electrical Engineering & Electronic Technique (2) |
| **Study Hour** | 52 |
| **Credit** | 3 |

**Course structure (Table of contents)**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

| | | |
|---|---|---|
| Week 1 | 4 | Chapter 1 Introduction<br>Chapter 2 Diode<br>Section 1 Introduction<br>Section 2 PN Junction |
| Week 2 | 4 | Section 3 Bipolar Junction transistor<br>Section 4 Introduction<br>Section 5 BJT |
| Week 3 | 4 | Chapter 3 Amplifier<br>Section 1 BJT Amplifier Circuit<br>Section 2 Static Analysis<br>Section 3 Dynamic Analysis<br>Section 4 Graphic Analysis |
| Week 4 | 6 | Section 5 DC Analysis<br>Section 6 AC Analysis<br>Chapter 4 BJT Linear Model<br>Section 1 Three Terminal Model |
| Week 5 | 6 | Chapter 5 BJT AS Switcher<br>Section 1 Forward Active Region<br>Section 2 Saturated Region and Cut off Region |

| | | |
|---|---|---|
| Week 6 | 4 | Chapter 6 Integrated Operational Amplifier<br>Section 1 Introduction<br>Section 2 Basic Amplifier Circuits<br>Section 3 Dynamic Analysis |
| Week 7 | 4 | Exercise and Quiz |
| Week 8 | 6 | Chapter 7 Digital Circuit Introduction |
| Week 9 | 6 | Chapter 8 A/D Converter<br>Section 1 Introduction<br>Section 2 Basic A/D converter principle<br>Section 3 DAC and ADC Applications |
| Week 10 | 4 | Chapter 9 Digital Circuit Gate<br>Section 1 Introduction<br>Section 2 Basic Gate Function<br>Section 3 Truth Table |
| Week 11 | 4 | Digital Circuit Exercice and Quiz |
| Week 12 | | Final Exam |

| | |
|---|---|
| **Course Code** | 0610211W |
| **Course Name** | Fundamentals of Materials Science and Engineering |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This is a rudimental course of materials science and engineering, also an important foundation course of the discipline. The emphasis of the course is placed on studying the interrelationship among composition, processing, structures and properties (or performance) of materials, by which the students can grasp the general principles of materials design, selection and application.

2. Course aims (theory, ability and technique)

The intention of running this course is to learn basic knowledge for comprehension of materials science and engineering by which the students can study and grasp the key subject concepts and knowledge. In addition, heat processing will also be introduced, effort will be made to foster students' ability in materials design, as well as in materials applications.

**Requirements for courses, ability and knowledge in advance**

General Physics, General Chemistry

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1 Introduction (1 hr)**

**Chapter 2 Atomic structure and interatomic bonding (1 hr)**

Ionic bond; Metallic bond; Covalent bond

**Chapter 3 Structures of metals (2 hrs)**

Crystal structure Atomic Packing factor Unit cell; Body-centered cubic; Face-centered cubic; Grain boundary; Polycrystalline

**Chapter 4 Imperfections in Solids (4 hrs)**

Dislocation line; Grain size; solid solution; Point defect; Vacancy

**Chapter 5 Diffusion (2 hrs)**

Activation energy, Concentration gradient Diffusion coefficient Driving force Fick's first and second laws Interstitial diffusion Vacancy diffusion

**Chapter 6 Mechanical properties (2 hrs)**

Elastic deformation; Plastic deformation; Engineering strain; Engineering stress; Yield strength; Tensile strength; Toughness; Hardness; Ductility

Mechanical testing - Tensile testing (1 hr) and Hardness testing (1 hr ) The primary objectives of conducting a standard tensile test are to determine the stress-strain behavior of a material and to analyze the results of the tensile test to find the mechanical/material properties of the sample.

**Chapter 7 Deformation and strengthening mechanisms (4hrs)**

Slip**;** Critical resolved shear stress; twinning; Cold working; Strain hardening; Recovery; Recrystallization; Solid-solution strengthening

**Chapter 8 Failure (4 hrs)**

Ductile fracture; Brittle fracture; Ductile-to-brittle transition; Fatigue; Creep; Corrosion fatigue Impact testing (0.5 hr): Impact testing is testing an object's ability to resist high-rate loading.

**Chapter 9 Phase diagram （6hrs）**

Component; Phase; Phase diagram; Phase equilibrium; Microconstituent; Primary phase; Ferrite; Austenite; Pearlite; Tie line; Lever rule; Cementite; Intermetallic compound; Eutectic reaction; Eutectoid reaction; Fe-$Fe_3C$ phase diagram; Carbon steel; Iron-carbon alloy system

Experiment: Metallography Specimen Preparation and Examination

**Chapter 10 Phase transformation（6hrs）**

Phase transformation; Supercooling; Superheating; Spheroidite; Transformation rate; Coarse pearlite; Fine pearlite; Bainite; Isothermal transformation diagram; Martensite; Tempered martensite; Nucleation; C-curves

**Chapter11 Heat treatment of metal alloys（6hrs）**

Austenitizing; Annealing; Normalizing; Quenching; Tempering; Hardenability; Overaging; Precipitation hardening; Spheroidizing; Stress relief; Austempering; Martempering; Surface treatment

Experiment: Heat Treatment –Quenching & Tempering

.

**Chapter12 Cast iron (2hrs)**

Cast Iron (Fe-C-Si) Phase Diagram Gray Cast Iron Solidification Ductile Cast Iron Solidification Concepts of Graphitization in Cast Iron Properties of Cast Iron

**Chapter13 Metal Alloys（4hrs）**

Plain carbon steel; structural steels; Alloy steels; Stainless steels; white cast iron; grey cast iron; Aluminum alloys; Titanium alloys; Copper alloys

**Chapter14 Heat processing （4hrs）**

Casting; forging; welding

| | |
|---|---|
| **Course Code** | 0810209W |
| **Course Name** | Mathematical Equations |
| **Study Hour** | 24 |
| **Credit** | 1.5 |

**Course Contents are:**

• Ordinary Differential Equations;

• Fourier series;

• Partial Differential Equations;

• Method of Separation of Variables

• Laplace's equation;

• Homogeneous heat equation with homogeneous BCs;

• Nonhomogeneous heat equation with homogeneous BCs

• Homogeneous wave equation with homogeneous BCs;

• Nonhomogeneous heat equation with homogeneous BCs

• Method of Characteristics

• Harmonic functions

| | |
|---|---|
| **Course Code** | 9210034W |
| **Course Name** | Course project: Electrical & Electronic Technique |
| **Study Hour** | 1.5 (Weeks) |
| **Credit** | 1.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Curriculum design of electrical and electronic technology is an experiment and practice course students can select after they have learned the course of "Electrical and Electronic Technology". This is a very practical technology-based courses. Students are required to design a digital electronic clock, which is a kind of timing device which displays time with digits.

2. Course aims (theory, ability and technique)

The course purpose is to enable students to learn the application of basic theory, basic knowledge and basic skills of electrical and electronic technical aspects, lay the necessary foundation for learning follow-up courses and follow in engineering work in the future. Its basic requirements are to let students comprehensively apply the knowledge learned, stimulate students' interest, develop their thinking ability, scientific attitude, observation ability and practical ability.

The course is consisting of the following components: a standard second signal, second and minute(modulo-60) counter displaying number from 0 to 59, hour(modulo-24) counter displaying number from 0 to 23, week(modulo-7) counter displaying number from 1 to 7, correction manually, and the whole point timekeeping.

1. First, the teacher assigns the task and give out the components;

2. Then, the students consult the reference materials, design the circuits and finish the connection work;

3. And then, the students come to the lab to debug the circuits;

4. Finally, the students write and hand in the reports.

| | |
|---|---|
| **Course Code** | 1900208W |
| **Course Name** | Intermediate Chinese |
| **Study Hour** | 32 |
| **Credit** | 2 |

Intermediate Chinese, as an elective course of undergraduate students, is specificallydesigned for the students who are at the intermediate level. This course is a comprehensive skills class, takes training students' communicative competence as the goal and develops students listening, speaking, reading and writing ability by vocabulary and grammar teaching.

To follow the objective laws of teaching Chinese as a foreign language, this course is required to teach language knowledge, language skills and communication ability together. It may divide into three stages: glossary stage, grammar stage, and communication stage.

After glossary stage, students will grasp more than 600 intermediate level words, and write the certain amount the common Chinese characters. In the second stage, students will learn more than 30 basic grammar points and 30 Chinese culture notes, and get familiar with some basic sentence patterns. The goal of the third stage is to consolidate the grammar points students have learned, expand their vocabulary, and train their communication ability. Through a large number of classroom exercises, students will be able to communicate with native speaker.

| | |
|---|---|
| **Course Code** | 0420214W |
| **Course Name** | MATLAB Applications |
| **Study Hour** | 32 |
| **Credit** | 2 |

MATLAB is the abbreviation of “Matrix Laboratory”. It is a high-level technical computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation. Although it contains hundreds of commands to do mathematics, MATLAB is more than a fancy calculator. It is an extremely useful and versatile tool for both scientists and engineers.

The goal of this course is to get the students started using MATLAB successfully and quickly. This course focuses not only on "the syntax of MATLAB", but also on understanding the fundamental ideals, principles, and techniques of programming, which is the essence of a good programmer. A student might not be a MATLAB coding expert when he (or she) finishes this course, but he (or she) will be prepared to become one and be ready to explore more of MATLAB programming on his (or her) own after this course.

| | |
|---|---|
| **Course Code** | 0770202W |
| **Course Name** | Principle of Aircraft Systems |
| **Study Hour** | 34 (Including 4 hours of Experiment) |
| **Credit** | 2 |

Since the airframe structure, the power plant, and the systems installed in aircraft are three main parts that consisted of an airplane, thus it is important that student major in Aeronautical Engineering be familiar with those installed systems that designed to perform specific functions.

This course mainly introduces the ATA (Air Transportation Association) chapter-section-object numbering system in accordance with ATA-Specification; and the function, composition, construction, working and control principle of each individual system installed in modern civil aircraft, such as hydraulic, landing gear, fuel, pneumatic, environment control, fire protection, ice and rain protection system, etc.

The knowledge in this professional course is helpful and useful for students' future career, no matter in aircraft design or maintenance field.

| | |
|---|---|
| **Course Code** | 0120202W |
| **Course Name** | Fundamentals of Aerodynamics |
| **Study Hour** | 51 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Aerodynamics is a fundamental course for undergraduate's major in aeronautical engineering, which requires the students bear solid skills in both mathematics and mechanics. The principal theories and methods contribute to the basis of Aircraft design, helicopter engineering and were broadly spread in the applications of general fluid engineering.

2. Course aims (theory, ability and technique)

This course is supposed to let the listener master the basic theories and fundamental methods, understand the interaction between solid bodies (esp. aircraft) and fluid in moving flow, and get ready for learning advanced course in relevant fields.

After joining this course, a qualified student should be able to use basic aerodynamic principles to solve typical problems in specific flow fields.

Student's proficiencies, such as self-study, logical thinking, recognition of typical flow and computability are supposed to be improved.

**Requirements for courses; ability and knowledge in advance**

Some prerequisite course is listed as follows,

1. Engineering mathematics, including vector calculus
2. Ordinary and partial differential equations
3. Introduction to flight
4. Engineering mechanics

The students are required to master the following skills a prior,

1. Basic operation of vector calculus
2. Understanding of Ordinary and partial differential equations and common solving strategy
3. Knowledge about aerodynamic force and industrial applications

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**1. Introduction (necessary parts) (6 hours)**

1.1 Fluid properties

1.2 Fundamental Variables

Terminologies and physical quantities

1.3 Aerodynamic forces and Moments

1.4 Vector calculus

**2. Aerodynamics: some fundamental principles and equations (necessary parts) (10 hours)**

2.1 Models of the fluid: Control volumes and Fluid elements

2.2 Continuity Equation

2.3 Momentum Equation

2.4 Energy Equation

2.5 Substantial Derivative

2.6 Governing Equations in terms of the Substantial Derivative

2.7 Pathlines, Streamlines, and Streaklines

2.8 Angular velocity, Vorticity, and Strain

2.9 Circulation

2.10 Velocity potential

2.11 Relationship between the stream function and Velocity potential

**3. Fundamentals of inviscid, incompressible flow (necessary parts) (8 hours)**

3.1 Bernoulli's equation

3.2 Incompressible flow in a duct

3.3 How to measure airspeed

3.4 Pressure coefficient

3.5 Condition on velocity for incompressible flow

3.6 Governing equation for irrotational, incompressible flow

3.7 Uniform flow

3.8 Source flow

3.9 Uniform flow + Source flow

3.10 Doublet Flow

3.11 Nonlifting flow over a circular cylinder

3.12 Vortex Flow

3.13 Lifting flow over a cylinder

3.14 The Kutta-Joukowski theorem and the Generation of Lift

3.15 Nonlifting flows over Arbitrary bodies

3.16 The flow over a circular cylinder

**4. Incompressible flow over airfoils (necessary parts) (8 hours)**

4.1 Introduction

4.2 Airfoil Nomenclature

4.3 Airfoil Characteristics

4.4 Philosophy of theoretical solutions for low-speed flow over airfoils

4.5 The Kutta condition

4.6 Kelvin's Circulation theorem and the Starting Vortex

4.7 Classical thin airfoil theory

4.8 The cambered airfoil

4.9 Lifting flows over arbitrary bodies

4.10 Applied Aerodynamics

**5. Incompressible Flow over Finite Wings (necessary parts) (4hours)**

5.1 Introduction: Downwash and Induced Drag

5.2 The Vortex Filament, The Biot-Savart Law, and Helmholtz's Theorems

5.3 Prandtl's Classical Lifting-Line Theory

5.4 Lifting-Surface Theory and The Lattice Numerical Methods

**6. Compressible Flow: Some Preliminary Aspects (necessary parts) (4hours)**

6.1 Introduction

6.2 A Brief Review of Thermodynamics

6.3 Definition of Compressibility

6.4 Governing Equations for Inviscid, Compressible flow

6.5 Definition of Total conditions

6.6 Some Aspects of Supersonic Flow: Shock Waves

**7. Normal Shock Waves and Related Topics (necessary parts) (2hours)**

7.1 Introduction

7.2 The Basic Normal Shock Equations

7.3 Speed of Sound

7.4 Special Forms of the Energy Equations

7.5 Calculation of Normal Shock-Wave Properties

**8. Oblique Shock and Expansion Waves (necessary parts) (4hours)**

8.1 Introduction

8.2 Oblique Shock Relations

8.3 Supersonic Flow over Wedges and Cones

8.4 Shock Interactions and Reflections

8.5 Detached Shock Wave in Front of a Blunt Body

8.6 Prandtl-Meyer Expansion Waves

8.7 Shock-Expansion Theory:

8.8 Applications to Supersonic Airfoils

**9. Oblique Shock and Expansion Waves (4hours)**

9.1 Introduction

9.2 Oblique shock relations

9.3 Supersonic flow over wedges and cones

9.4 Detached shock waves

9.5 Expansion waves

**10. Compressible Flow through Nozzles, Diffusers, and Wind Tunnels(2hours)**

10.1 Introduction

10.2 Governing equations for quasi-one-dimensional compressible flow

10.3 Nozzle flow

10.4 Diffuser

10.5 Supersonic wind tunnel

**11. Subsonic compressible flow over airfoils (3hours)**

11.1 Velocity potential equation

11.2 Linearized form

11.3 Prandtl- Glauert correction

11.4 Critical Mach number

11.5 The area rule

11.6 Supercritical airfoil

11.7 CFD Applications: Transonic airfoil and wings

**12. Linearized Supersonic Flow (3hours)**

12.1 Introduction

12.2 Derivation of the linearized supersonic pressure coefficient formula

12.3 Application to supersonic airfoils

12.4 Viscous flow: Supersonic airfoil drag

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance, ), focus of exam, forms of exam(test, interview, final report, etc.)**

The final exam takes the form of closed test. The final marks come from two parts, 70% from final exam and 30% from presence, in-class response and latency records.

| | |
|---|---|
| **Course Code** | 0130206W |
| **Course Name** | Structural Mechanics |
| **Study Hour** | 51 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Structural Analysis is a compulsory course for undergraduate students majoring in aeronautical engineering. The course covers three parts: elasticity, structural mechanics. It provides the theoretical basis for learning structural design and structural experiments.
Structural Analysis is a core course not only for undergraduate students majoring in aeronautical engineering, but also for students in engineering mechanics, and aircraft design & engineering, etc.

2. Course aims (theory, ability and technique)

The aims of the course are to construct an entire theoretical system of structural analysis for students. The knowledge in this course is related to that in other courses. The relations and differences of substances within the course are delivered to students. Some points of rules are extracted from the course to students. The final goal is to improve students' ability to tackle the problems in engineering using the techniques learnt from the course.

**Requirements for courses; ability and knowledge in advance**

Calculus; Linear algebra; Mechanics of materials

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

The course consists of the following chapters (the sections with △ are optional parts):

**1.** Introduction to Structural Analysis (2 hours)
1.1 Flight history for human beings;
1.2 Construction and function of aircraft components;
1.3 Why Structural Analysis?
1.4 Overview of Structural Design Process.

**2.** Basic elasticity (12 hours)
2.1 Assumptions;
2.2 Some concepts;
2.3 Equations of equilibrium;
2.4 Geometrical equations and compatibility equations;
2.5 Physical equations;
2.6 Boundary conditions;
2.7 Saint-Venant's principle.

**3.** Two-dimensional problems in elasticity (8 hours)
3.1 Plane stress and Plane strain;
3.2 Basic equations for plane problems;
3.3 Solution for plane problems;
3.4 Inverse and semi-inverse methods.

**4.** Torsion of solid sections (8 hours)
4.1 Prandtl stress function solution;
4.2 The membrane analogy;
4.3 Torsion of a narrow rectangular strip;
4.4 St. Venant warping function solution.

**5.** Introduction to energy principles (10 hours)
5.1 Strain energy;
5.2 Complementary strain energy;
5.3 The principle of virtual displacements and the principle of the stationary value of the total potential energy;
5.4 The principle of virtual forces and the principle of the stationary value of the total complementary energy;
5.5 Application of energy principles to structural analysis.

**6.** Bending of open and closed, thin-walled beams (8 hours)
6.1 Introduction;
6.2 Sign conventions and resolution of bending moments;

6.3 Direct stress distribution due to bending;
6.4 Load intensity, shear force and bending moment relationships;
6.5 Approximations for thin-walled sections.

**7.** Shear of beams (6 hours)
7.1 General stress, strain and displacement relationships for open and single cell closed sectionthin-walled beams;
7.2 Shear of open section beams;
7.3 Shear of closed section beams.

**8.** Torsion of beams (4 hours)
8.1 Torsion of closed section beams;
8.2 Torsion of open section beams.

**9.** Structural idealization (6 hours)
9.1 Principle;
9.2 Idealization of a panel;
9.3 Effect of idealization on the analysis of open and closed section beams.

**Teaching methods (Lectures, practice, etc.)**

The course is delivered using multimedia PPT and blackboards. Some examples are illustrated to show the points of knowledge in each chapter. Problems of new concepts, principles and methods are assigned as homework.

**Forms of examination and requirements**
**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

The final grades are composed of three parts: 15% based on attendance, 15% based on homework assignments, and 70% based on a final exam. For the final exam, books and notes are generally closed.

| | |
|---|---|
| **Course Code** | 0310301W |
| **Course Name** | Control System Engineering |
| **Study Hour** | 51 |
| **Credit** | 3 |

**Course Outline:**

**Part 1 Introduction to Control Systems** (4 hrs)

Introduction; History; Examples; Basic components of a control system; Open-loop control vs closed-loop control; Typical input signals; Basic requirements of a control system. (Lab: Demonstration of a control system.)

**Part 2 Mathematical Modeling of Control Systems** (8 hrs)

Time-domain modeling (Establishment of input-output differential equations and linearization); Laplace transform; Definition and Properties of transfer functions; Transfer functions of typical control components; Structure diagram of control systems; Signal flow graphs and Mason Formula.

**Part 3 Time-Domain Analysis of Control Systems** (12hrs)

Dynamic performance indices; 1st-order systems; 2nd-order systems; high-order systems; Stability analysis (concepts, definitions, conditions and Routh stability criterion); Definition and calculation of steady-state error (Final-Value Theorem and its application condition); Type and open-loop gain of a control system and their effects on steady-state error; Effects of disturbances on steady-state error and correction. (Lab: Servo-system.)

**Part 4 Root-Locus Analysis of Control Systems** (12hrs)

Concepts and properties of Root-Locus; Root-Locus Plots; Design aspects of Root-Locus (Effects of adding poles and zeros); Generalized Root-Locus (zero-degree Root-Locus and parameter Root-Locus).

**Part 5 Frequency-Domain Analysis of Control Systems** (15hrs)

Frequency-domain specifications and frequency response; Frequency characteristics of typical components; Minimum-Phase system; Frequency response plots (Bode's plot and Nyquist's plot); Establishment of transfer function from Logarithm frequency characteristics; Stability criteria in frequency-domain; Relative stability (Gain margin and phase margin); Frequency-domain characteristics of closed-loop system; Relationship between frequency characteristics and time-domain response. (Lab: Frequency-domain control design and analysis of a $2^{nd}$-order system.)

| | |
|---|---|
| **Course Code** | 0210301W |
| **Course Name** | An Introduction to Aero- Engine |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course is one of main subjects for foreign students in Aeronautical Engineering. Students will have a general idea about different types turbo-engines used in the world and know how they work. The course consists of turbo-engine principle, turbomachinery, engine structural design and analysis and so on. It touches multiple disciplines such as aerodynamics, material sciences, structural mechanics, as well as thermodynamics. The syllabus is based on teaching analysis and design methods. It's a required course and it is useful when students work in aeronautical industries.

2. Course aims (theory, ability and technique)

After taking this course, students should know history and present products about aircraft engines, and master some theories used in their later work, get improved in their ability to resolve problems in industries.

**Requirements for courses; ability and knowledge in advance**

Pre-requisites: Theoretical mechanics, Thermodynamics, Fluid mechanics, Theory of elasticity.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Chapter 1 Theoretical basis (Teaching 6 hours)**

The chapter introduces some functions used in this course, consisted of aerodynamics and thermodynamics. Also, we present concepts about conservation of energy, momentum and mass as well as the second law of thermodynamics. Students must master those theories and concepts so to be able to apply in the course.

1.1 The first law of thermodynamics (*) (1)

1.1.1 Equation of state of ideal gas

Concept of ideal gas and its state and relations.

1.1.2 Specific heat and Heat

Concept of specific heat Cp and Cv, and heat calculation.

1.1.3 Internal energy and calculation

Concept of specific internal energy and calculation.

1.1.4 Work

Concept of work and calculation.

1.1.5 Enthalpy

Concept of enthalpy of substance and its relation with internal energy.

1.1.6 The first law of thermodynamics (conservation of energy)

Through conservation of energy law to analyze the relations of heat, internal energy, work and enthalpy so too deeply understand the first law of thermodynamics. And some examples.

1.1.7 Thermodynamic processes

Learn different thermodynamic processes, such as constant temperature process, constant pressure process, constant volume process and adiabatic process (isentropic process); also, their characteristics and relations

1.2 The second law of thermodynamics (conservation of energy) (*) (1)

1.2.1 Entropy

Focus on concept of entropy of substance and calculation, using examples to explain its physical meaning.

1.2.2 The second law of thermodynamics

Understand this law and method to analyze, using examples to explain its physical meaning.

1.3 Basic equations of aerodynamics (*) (2)

1.3.1 Continuity equation

Learn conservation of mass law and from that derive gas continuity equation. And know how to use it.

1.3.2 Energy equation

By conservation of energy derive energy equation for gas. Use it correctly.

1.3.3 Bernoulli's principle

Learn Bernoulli's equation and understand its physical meaning.

1.3.4 Sound speed and Mach number

Definitions of sound speed and Mach number. Establishment of concept of subsonic, transonic and supersonic flow.

1.3.5 Stagnation parameters of flow and aerodynamic functions

Explain stagnation parameters of air flow and related aerodynamic functions. Able to know their physical meaning and how to use them.

1.3.6 Equation of momentum

Based on conservation of momentum principle and analysis methods, derive the momentum equation for gas. Application of the equation.

1.3.7 Equation of moment of momentum
Presentation of equation of moment of momentum.
1.3.8 Shock waves and expansion waves
Concept of shock waves as well as expansion waves, and their characteristics.

**Chapter 2 Principle of gas turbine engines (Teaching 10 hours)**

This chapter focuses on explanation how gas turbine engines work and what performance characteristics are for the engines. Assuming an ideal cycle, we can analyze engine's principle and performance, calculate thrust. Finally, we obtain some main parameters: thrust, shaft power, thermal efficiency, propulsive efficiency, sfc, etc. It presents also variations of gas turbine engines.
2.1 Gas turbine engine's thermodynamic cycles (2) (*)
2.1.1 Ideal cycle
Learn and analyze the ideal cycle, understand its characteristics and physical meaning, know how to calculate thermal efficiency.
2.1.2 Real cycle
Learn and analyze the real cycle, understand its characteristics, physical meaning and difference to the ideal cycle, know how to calculate thermal efficiency.
2.2 Thrust generation (2)
2.2.1 Propulsive power and efficiency (*)
Definition of propulsive power and efficiency and calculation methods, and their physical meaning.
2.2.2 Total efficiency (*)
Definition of total efficiency and calculation method, and its physical meaning. Relation with thermal efficiency and propulsive efficiency.
2.2.3 Parameters changing through the airflow in an engine (*)
Changes of axial velocity, pressure and temperature in the engine.
2.2.4Thrust distribution in the components of turbo-engines.
Mechanical components on which forces are applied and transmitted.
2.3 Gas turbine engine performance characteristics and specifications (1)
2.3.1 Performance characteristics
Concept of main characteristics and their relations.
2.3.2 Specifications
Learn basic specifications of a turbo-engine and its meaning.
2.3.3 Future development
Tendency of future development.
2.4 Variations of gas turbine engines (1)
2.4.1 Turbojet with afterburner
Learn characteristics and performance of jet engines with afterburner.
2.4.2 Ramjet and scramjet engines

What is ramjet and scramjet engines.
2.4.3 Turbofan engine
Learn characteristics and performance of turbofan engines.
2.4.4 Turbofan with afterburner
Learn characteristics and performance of turbofan engines with afterburner.
2.4.5 Turboprop engine
Know what turboprop is and its usage.
2.4.6 Turboshaft engine
Know what turboshaft is and its usage.
2.4.7Variable cycle jet engines
Have some idea about variable cycle engines.

**Chapter 3 Turbo-engine's components(14h)**
This chapter focuses on the main components of turbo-engines. Students should know their principles and how to analyze them, be familiar with intake, compressor, combustion chamber, turbine, afterburner and nozzle as well as their functions and characteristics, master analysis methods to get the background for further analysis of entire engine performance.

3.1 Intake (2)
3.1.1 Subsonic intake
Learn its functions and characteristics, know how to analyze its performance.
3.1.2 Supersonic intake
Learn its functions and characteristics, know how to analyze its performance.
3.2 Compressor (6)
3.2.1 Types and structures
Learn its functions and characteristics, be familiar with different types of compressors and their structures.
3.2.2 Basic equations
From basic physics equations, learn the equations of inner flow in a compressor and analysis methods.
3.2.3 Axial compressor
Learn axial compressor characteristics and methods of performance analysis.
3.2.4 Centrifugal compressor
Learn centrifugal compressor characteristics and methods of performance analysis.
3.2.5 Compressor performance
Understand compressor performance map and how to use it.
3.3 Turbine (2)
3.3.1 Structures
Learn its functions and characteristics, be familiar with different types of compressors and their structures.

3.3.2 Working principle
Understand the gas flow in the turbine, principles and analysis methods.
3.3.3 Turbine performance
Understand turbine performance map and how to use it.
3.4 Combustion chamber (2)
3.4.1 Basic specifications
Learn functions and requirements of a combustion chamber.
3.4.2 Structural types
Be familiar with types and structures
3.4.3 Working process and main parts
Understand the principle of interaction of gasoline and air, of establishment of stable combustion zone, and functions and specifications of the main parts.
3.4.4 Combustion chamber performance
Know definition of the performance parameters and their meaning.
3.5 Afterburner (1)
3.5.1 Performance specifications
Learn functions and requirements of an afterburner.
3.5.2 Working process and main parts
Understand the principle of interaction of gasoline and air, of establishment of stable combustion zone, and functions and specifications of the main parts.
3.6 Nozzle (1)
3.6.1 Principle
Learn function of nozzle.
3.6.2 Structure
Be familiar with its structure.

**Chapter 4 Gas turbine engine performance（18 hours）**

This chapter focuses on the analytical methods of engine performance in different flying condition. With coordination of the components, establishing the common working line and working point, we can analyze engine's performance including rotation, speed and altitude performance. This chapter presents also generic engine performance and equivalent evaluation method.

4.1 Coordination of components (2)
4.1.1 Conditions of coordination
Learn conditions of coordination of the main components and physical meaning.
4.1.2 Discussion of regulation
Learn regulation of engines, objective and characteristics.
4.1.3 Common working line
Learn how to establish the common working line and analytical methods.

4.2 Engine's performance (2)
4.2.1 Rotation performance
Learn meaning and characteristics of rotation performance, as well as analytical method.
4.2.2 Speed performance
Learn meaning and characteristics of speed performance, as well as analytical method.
4.2.3 Altitude performance
Learn meaning and characteristics of altitude performance, as well as analytical method.
4.2.4 Transient performance
Learn meaning and characteristics of transient performance.
4.3 General performance and equivalent calculation in test beds (2)
4.3.1 Scaling parameter groups
Learn principle of dimensionless and how to get scaling parameter groups
4.3.2 Generic performance of engines
Learn generic performance of engines and analytical methods.
4.3.3 Equivalent evaluation in test beds
Learn equivalent evaluation in test beds and analytical methods.
4.4 Two spool turbo-engines (0.5)
4.4.1 Two spool turbo-engines working characteristics Know two spool turbo-engines working characteristics.
4.4.2 Two spool turbo-engines coordination Know how two spool turbo-engines work.
4.4.3 Regulation and performance of two spool turbo-engines
Learn regulation and performance of two spool turbo-engines.
4.5 Turbo-engines with afterburner (0.5)
4.5.1 Characteristics of afterburner
Learn characteristics of afterburner.
4.5.2 Regulation and performance of engines with afterburner
Learn regulation and performance of engines with afterburner.
4.5.3 Power boost by water injection
Know why injecting liquid to boost power.
4.6 Turbofan (1)
4.6.1 Characteristics of turbofan engines
Learn turbofan engines' characteristics.
4.6.2 Regulation and performance of turbofan engines
Learn regulation and performance of turbofan engines.

**Forms of examination and requirements**
**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**
Close-book examination with 50 multiple-choice questions. Every student has different question set. Final examination takes 70% of total mark and assignments 30%.

| | |
|---|---|
| **Course Code** | 0510309W |
| **Course Name** | Fundamentals of Machine Design |
| **Study Hour** | 58 (including 4 hours of Experiment) |
| **Credit** | 3.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status
Machinery Design is an important technological basic course in mechanical engineering education. It aims to develop engineering students' competence of machine design that is the primary concern of machinery manufacturing and the key to manufacturing good products.

2. Course aims (theory, ability and technique)
This course is required to provide engineering students - future engineers - with an elementary knowledge of machine design, to teach them the method, procedures and calculation of machine design, to train them in dealing with practical issues such as simplifying configurations of mechanical elements, establishing models of mathematics and physics, selecting materials, processes and heat-treatments, understanding inspection and maintenance of machinery.

**Requirements for courses; ability and knowledge in advance**
Mathematics; Mechanics; Mechanisms and machine theory.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

After two chapters concerning basic principles of machinery design, this course takes 58 hours to focus on several typical mechanical elements including screws, key joints, belts, gears, worm gears, sliding bearings, rolling bearings, clutches, and shafts. And in order to improve design skill, the experiments of screwing efficiency, belt and gear transmission are prepared for students.

| | |
|---|---|
| **Course Code** | 0510310W |
| **Course Name** | Course Project: Fundamentals of Machine Design |
| **Study Hour** | 2 (Weeks) |
| **Credit** | 2 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Course design is an important practice to develop the students' abilities to integrate and synthesize individual design methods. through some typical projects, students will have a significant advancement in design skills and abilities, which would provide them with some crucial experience in engineering design.

2. Course aims (theory, ability and technique)

The project will provide a scenario to thoroughly train the designers' fundamental skills from the following aspects:

1. Use material properties data for strength, stiffness, stability and ductility in the analysis and design of mechanical components so that the safety and reliability of operation can be ensured.
2. Design machine members subjected to several typical load cases such as axial tensile/compressive forces, bending moments, and torques.
3. Properly consider stress concentrations and fatigue in design calculations.
4. Analyze combined stress status by using the strength theories
5. Design gears for definite life considering strength, lubrication and wear.
6. Design power transmission shafts carrying various combinations of gears/worms and belt pulleys to ensure reliability and efficiency.
7. Specify geometrical features of shafts such as shoulders, and retaining ring grooves and properly consider these features in the detailed structural designs.
8. Specify commercially available bearings for shafts considering both radial and thrust loads.
9. Appropriately design housing and frame type components in terms of strength, stiffness and rigidity criteria, at the same time fully consider the factors of manufacturing, assembly and maintenance.

**Task to be carried out:**
Each student should submit an individual solution. The submitted work shall include a written report of approximately 15 – 25 pages on paper including assembly drawing.

(1). Power/energy conversion, transmission system design
(2). Mechanical Component Design
Shaft design and sizing
Gears, belt drives, joints (Fasteners, couplings, screws) and bearing, selection and design
Mounting of shafts & bearings in gearbox

1. Attachment to foundation, bolt selection and sizing, structural support frames
2. Assembly drawings of complete gearbox
3. Report
4. Presentation

**Requirements for courses; ability and knowledge in advance**
1. Engineering graphing
2. Machine design
3. Engineering mechanics
4. Mechanical engineering materials

Course structure explanation:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.
**2 weeks, 8 hours per day**
the project should involve a full range of design aspects on:
1) Determination of layout;
2) Sketch of transmission;
3) Design calculations of transmission drives, shafts, bearings, couplings, etc;
4) Assembly drawing (A0);
5) Detailed drawings of several selected key components

Documentation of design and calculations.

**Forms of examination and requirements**
**Structure of the final grade (including presence, class performance, ), focus of exam, forms of exam(test, interview, final report, etc)**
1) final report
2) assembling drawing (A0)
3) presentation

| | |
|---|---|
| **Course Code** | 0540402W |
| **Course Name** | An Introduction to Aircraft Manufacturing Technology |
| **Study Hour** | 32 |
| **Credit** | 2 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Aircraft manufacturing technology is the most important procedure for transferring design idea to real product. It will guide the production of aircrafts and affect the production period and cost greatly. Due to its tremendous work, complex cooperation, difficult in management, aircraft manufacturing technology differs from general manufacturing technology.

2. Course aims (theory, ability and technique)

Through learning this course, students can

1) understand the basic theory and principle of aircraft manufacturing technology,

2) know major characteristics of aircraft structural materials and their applications,

3) find out primary technologies for sheet metal forming, composite material forming and not traditional machining,

4) comprehend assembly principles and primary joining methods,

5) realize CAD/CAM applications in aircraft manufacturing.

The course will train students in the following aspects.

1) Ability in analyzing problems in aircraft manufacturing.

2) Capacity in grasping and applying aircraft manufacturing technology in practices.

**Requirements for courses; ability and knowledge in advance**

Students for this course should have basic knowledge about Introduction to Aviation, Machinery Manufacturing Technology, Engineering Materials.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

1. Necessary parts
    1) basics of aircraft manufacturing (4 hours)
    2) aircraft structural materials (4 hours)
    3) sheet metal forming (8 hours)
    4) composite materials forming (6 hours)
    5) assembly theory and methods (8 hours)
    6) CAD/CAM in aircraft manufacturing (2 hours)

**Forms of examination and requirements**

Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)

1.Forms of exam include blank filling, choice question, short answer question and discussion.
2.Final grades include exam, class performance and presentation.

| | |
|---|---|
| **Course Code** | 1230302W |
| **Course Name** | Chinese to English Translation |
| **Study Hour** | 32 |
| **Credit** | 2 |

The course is designed to teach Chinese to the speakers of English. The content of the course is about Chinese to English translation. The course will enable English-speaking students to cope with all aspects of studying and living in China, including understanding lectures and academic texts, writing assignments, speaking in seminars and giving presentations.

| | |
|---|---|
| **Course Code** | 0910303W |
| **Course Name** | An Introduction to Industrial Engineering |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

The contents of this course are: Introduction; Facility location & layout; Cost-Response Time (product); Service and Number of Facilities; Systematic Layout Planning; A.G.-Activity- Relationship Diagram; Simplified systematic layout planning; Operations Planning and Control; Demand forecasting; Operations planning; Inventory planning and control; Operations scheduling; Dispatching and process control; Time-series decomposition; Exponential smoothing; Inventory Control

| | |
|---|---|
| **Course Code** | 190S1803 |
| **Course Name** | Aircraft Design |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

The lecture aircraft design is a compulsory part of the advanced studies in aeronautical engineering at the Hamburg University of Applied Sciences. This course was included in the summer course and was taken by Prof. Dr. Scholz. Program Website: http://aero.profscholz.de/

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|---|---|
| **Course Code** | 0930303W |
| **Course Name** | Project Management |
| **Study Hour** | 32 |
| **Credit** | 2 |

This course discusses the factors necessary for the successful project management. Topics include project management concepts, needs identification, the project manager, teams, project organizations, project communications, project planning, scheduling, control and associated costs.

The course aims to:

- Understand the growing need for better project management, especially for information technology projects.
- Explain what a project is, provide examples of information technology projects, list various attributes of projects, and describe the triple constraint of projects.
- Describe project management and discuss key elements of the project management framework, including project stakeholders, the project management knowledge areas, common tools and techniques, and project success factors.
- Understand the role of the project manager by describing what project managers do, what skills they need, and what the career field is like for information technology project managers.

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|---|---|
| **Course Code** | 1610302W |
| **Course Name** | Software Engineering |
| **Study Hour** | 48 |
| **Credit** | 3 |

This course is intended to provide the students with an overall view over software engineering as an engineering discipline and with insight into the processes of software development. Software engineering is the branch of computer science that creates practical, cost-effective solutions to computing and information processing problems, preferentially by applying scientific knowledge, developing software systems in the service of mankind. This course introduces the fundamentals of software engineering, including understanding software requirements, design methods, development approaches, and verification techniques.

The course highlights a number of fundamental software Engineering topics and techniques, mainly:

- Social-technical systems
- Software process models
- Software requirements
- Software design methods
- Software development approaches
- Software verification and validation
- Software management

| | |
|---|---|
| **Course Code** | 0110301W |
| **Course Name** | Flight Dynamics |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Flight Dynamics is an important basic course for undergraduate students of aircraft design majors. It is a theory to research the movement characteristics of the aircraft and spacecraft according to the principal of the mechanics. This course mainly covers the aircraft flight dynamics including the performance of the aircraft and the stability and control.

2. Course aims (theory, ability and technique)

With the knowledge about the performance, the students should be capable of calculating the performance characteristics of the airplane in categories of flight such as the power off glide, level flight, climb flight, range and endurance, takeoff, landing, and turning flight. In the section about static stability and control the students will study the basic principles of static stability and control and discuss the methods that are suitable for preliminary estimation of the stability characteristics of typical airplane configurations.

**Requirements for courses; ability and knowledge in advance**

Adequate background knowledge should be needed in advance on basic aerodynamics, dynamics, and linear control systems to help students grasp the main subject matter.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Chapter 1 Introduction to Flight Dynamics** (2 hrs)

Introduction; History; Category; Examples; Basic components of the course; Methods to study the course; interrelated courses; Development of the flight dynamics.

**Chapter 2 Background Knowledge (**6 hrs)

Part 1 Matrix and Vector

Concepts about matrix and vector; Method to resolve the differentiation equations and get the Eigen value and eigenvector; reference frame.

Part 2 Classical Mechanics

Principle about kinematics of a Particle and dynamics of a Particle

Part 3 Aerodynamics

Parameters about airfoil and wing; lift, drag and pitching moment; Aerodynamic center and center of pressure; High-Lift Devices

*Knowledge about the powerplant

**Chapter 3 Aircraft performance** (18hrs)
Equations of motion for flight in vertical plane; important concepts about performance; methods to calculating the performance characteristics of the airplane in categories of flight such as the power off glide, level flight, climb flight, range and endurance, takeoff, landing, and turning flight.

**Chapter 4 static stability and control** (22hrs)
Concept of Equilibrium and Stability; basic principles of static stability and control; the methods that are suitable for preliminary estimation of the static longitudinal stability, static directional stability and lateral stability

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

The final grade includes 30% class performance and 70% grade of final exam. The form of exam is close paper.

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|---|---|
| **Course Code** | 0710302W |
| **Course Name** | Aeronautical Maintenance Engineering |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

**Course description**: Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This is a compulsory course of Civil Aviation Engineering, and is also an important basic course for understanding and mastering the whole civil aviation engineering, including reliability, maintenance and logistics support.

2. Course aims (theory, ability and technique)

This course aims at:

(1) Master the basic theory of reliability, maintenance and logistics support, and study the whole developing procedure and content of the aeronautical maintenance engineering.

(2) Cultivate the ability of applying those theories (reliability, maintenance and logistics support)to aeronautical maintenance engineering

(3) Study modeling method of maintenance optimization and corresponding solution methods

**Requirements for courses; ability and knowledge in advance**

Requirements for courses; ability and knowledge in advance:

(1) Have learned the course of mathematical statistics

(2) Have the ability of using the MATLAB or Excel software.

(3) Have a general understanding of the civilian aircraft, aviation.

**Chapter 1： Introduction (necessary parts 4 hours)**

Including: background, maintenance Engineering Objectives, terms and definitions

**Chapter 2： Maintenance Mathematics (necessary parts 4 hours)**

Including: several commonly used maintenance mathematics method and probability distribution.

**Chapter 3： Reliability (necessary parts 8hours)**

Including: basic reliability knowledge, reliability networks and reliability analysis methods.

**Chapter 4：Corrective Maintenance (necessary parts 4 hours)**

Including: corrective maintenance types, definition, mathematical models and Failure Rate Equations

**Chapter 5：Preventive Maintenance (necessary parts 4 hours)**

Including: Preventive maintenance elements, measures and models.

**Chapter 6：Maintenance Steering Group (necessary parts 4 hours)**

Including: Aircraft Systems/Powerplant Analysis Procedure, Aircraft Structural Analysis Procedure, Zonal Analysis Procedure, and Lightning/High Intensity Radiated Field (L/HIRF) Analysis

**Chapter 7：Maintainability (necessary parts 4 hours)**

Including: Maintainability management in system life cycle, Maintainability design characteristics, Maintainability measures and functions

**Chapter 8：Maintenance Costing (optional parts 4 hours)**

Including: Reasons for maintenance costing and factors influencing maintenance costs, maintenance labor cost estimation.

**Chapter 9：Logistics support (optional parts 4 hours)**

Including: Spare part types, ASD S3000L content and procedure.

**Forms of examination and requirements**

Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)

The presence, class performance account for a total score of 40%, and the final examination account for a total score of 60%, and the form of examination is Open-Book Exam.

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|---|---|
| Course Code | 0710303W |
| Course Name | Course Project: Modern Aeronautical Engineering |
| Study Hour | 20 |
| Credit | 1 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This is a compulsory course of Civil Aviation Engineering, and is also an important basic course for understanding and mastering the theory introduced in the course of the aeronautical maintenance engineering.

2. Course aims (theory, ability and technique)

This course aims at:

(1) Master the basic theory of data analysis, reliability, maintenance through examples;

(2) Cultivate the ability of applying those theories;

This course aims at Applying all the theories they get to know in the course. The project course contents are:

Part 1：Introduction

Including: requirement, objectives

Part 2：Method of data analysis

Including: method way, question-answer.

Part 3：Modeling

Including: method way, question-answer.

Part 4：Example

Including: question-answer.

Part 5：Interview

Including: check the mastery of each group.

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|---|---|
| **Course Code** | 0540301W |
| **Course Name** | An Introduction to CAD/ CAM |
| **Study Hour** | 54 (Including 12 hours of Experiment) |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Computer Aided Design and Manufacturing area is one of the fastest growing areas in the engineering industry today. CAD/CAM systems have become basic systems that can help the designer to design a product by using the speed and efficiency of a computer. Over the course, the students will learn the basic theory involved in the area of computer–aided design. This course covers the representation of curves, surfaces, solid models, parametric feature models, and also some new CAD technology such as reverse engineering, surface deformation method and so on.

2. Course aims (theory, ability and technique)

This course is taught with a combination of theory and practice. Side by side with the theory of the representation of curves, surfaces and solid models, the course requires a student to undertake assignments with a major commercial software, CATIA. Over the course of the semester, students will create a surface model, an assembly model with several solid parts, a simulated milling tool path.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

This course contains theory and practice.
The theory part takes 42 hours. Students will learn fundamental theories about:

Introduction to CAD/CAM/CAE Systems (2 hrs)

Representation and Manipulation of Curves (16 hrs)

Representation and Manipulation of Surfaces (8hrs)

Geometric Modeling System (8hrs)

Numerical Control Machining (6hrs)

Tool Path Generation Algorithms (4hrs)

During the lecture, there are several times of class quizzes will be assigned. The practice part takes 12 hours. It includes workbenches in CATIA and curve design (2 hrs), constraints and parametric design in CAD system (2 hrs), impeller design (2 hrs), mechanical part design (2 hrs), assembly design (2 hrs), and NC machining (2 hrs).

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc)**

This course has several class quizzes, 3 practice assignments, practice exam, and a closed exam at the end. The score is composed of class performance and practice assignments (30%), practice exam (20%) and closed exam (50%).

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|---|---|
| **Course Code** | 0710305W |
| **Course Name** | Engine Maintenance & Product Practice |
| **Study Hour** | 60 (15 days) |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This course provides a simple and self-contained description of the working and underlying principles of the aero gas turbine engine. In this course students study the WJ-5 engine, CFM56-3/CFM56-5/V2500 turbine fan engine, PW4000 turbine fan engine. They Disassembly and Assembly the WJ5 engine, study the work procedure, practice on every part of WJ-5 engine, and maintain the WJ-5 engine in Y7 aircraft, enhanced practice abilities. so that they are prepared with the necessary foundation for their future study and work.

2. Course aims (theory, ability and technique)

Course focuses on WJ5 engine working principle and structure, students by disassemble WJ5 engine, increase practice capacity, master the main structure and failure mode of turbine engines, turbine engine maintenance and repair methods of the master General, mastering WJ5 route maintenance and overhaul.

**Requirements for courses; ability and knowledge in advance**

The student should learn the following courses:

Aero-Engine principle

Theory of machines

Principles of aircraft systems

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

**Module 1 Introduction to turbine fan engine (3 days)**

Introduction; description of the working and underlying principles of the aero gas turbine engine; structure of turbine fan engine, compressors, combustion chambers, turbines, exhaust system, accessory drives, Controls and instrumentation, Manufacture, Power plant installation, Maintenance, Overhaul.

**Module 2 study about CFM56-3/5 turbine fan engine (1 days)**

Component of the engine. (fan, compressors, combustion, turbines, exhaust system, accessory drives and so on) system of the engine (Electronic Engine Control Fuel System, Oil System, Heat Management System Compressor Airflow Control System Secondary Air System Engine Anti-Ice System Engine Indicating Starting and Ignition System Nacelle and so on.)

**Module 3 study about V2500 turbine fan engine (1 days)**

Component of the engine. (fan, compressors, combustion, turbines, exhaust system, accessory drives and so on) system of the engine (Electronic Engine Control Fuel System, Oil System, Heat Management System Compressor Airflow Control System Secondary Air System Engine Anti-Ice System Engine Indicating Starting and Ignition System Nacelle and so on.)

**Module 4 study about PW4000 turbine fan engine -CBT (2 days)**

Component of the engine. (fan, compressors, combustion, turbines, exhaust system, accessory drives and so on) system of the engine (Electronic Engine Control Fuel System, Oil System, Heat Management System Compressor Airflow Control System Secondary Air System Engine Anti-Ice System Engine Indicating Starting and Ignition System Nacelle and so on.)

**Module 5 Disassembly and Assembly practice on WJ5 (5 days)**

- Study about WJ-5 engine

- Inspection practice (Visual Inspection of Transportation Damage; Support Engine on the Pedestals; Send Engine Cover for Cleaning; Incoming Inspection; Bore scope Inspection)
- Disassemble practice
  - Removal of Inlet Cowl
  - Removal of Electrical Components
  - Removal of the Starter, Starter Valve and Duct System
  - Removal of Hydraulic Pump and Plumbing
  - Removal of Fuel Pump and Plumbing
  - Removal of reducer
  - Removal of Accessory Gearbox
  - Preparation for LPT Removal
  - LPT Removal
  - Bearing Compartment Removal
  - HPT Rotor Module Removal
  - Remove LPT Shaft
  - Preparation for HPC Removal
  - HPC Removal
  - Removal Combustion Chamber
- Assemble practice
  - Preliminary Inspection
  - Installation of Combustion Chamber
  - Installation of HPC
  - Installation of Accessory Gearbox
  - Preparation for HPT Installation
  - Bearing Compartment Installation
  - Installation of HPT
  - Installation of reducer
  - Installation of Fuel Pump and Plumbing
  - Installation of Hydraulic Pump and Plumbing

- Installation of the Starter, Starter Valve and Duct System
- Installation of Electrical Components
- Installation of Inlet Cowl

**Module 6 WJ5 route maintenance in Y7 Aircraft (3 days)**

- Cognitive various types of instrument and the main function of WJ5 engine on Y7 aircraft.
- Mastering WJ5 major maintenance cover.
- Line maintenance work for WJ5 engine

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

Final result consists of the following parts：

1、final report

2、test of engine

3、oral test

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|---|---|
| **Course Code** | 0120301W |
| **Course Name** | Fundamentals of CATIA 3D Design |
| **Study Hour** | 24 |
| **Credit** | 2 |

This course is a course on design software for undergraduate students of engineering majors. The course mainly aims to develop practical skills of students on CATIA for design activities, including sketch design, part design, generative shape design and assembly design. And the course also covers fundamental knowledge of engineering computer graphics.

| | |
|---|---|
| **Course Code** | 0930320W |
| **Course Name** | Human Resource Management |
| **Study Hour** | 32 |
| **Credit** | 2 |

**Course structure (Table of contents)**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions

**Chapter 1: Introduction to Human Resource Management**

Defining human resource management & describing the functions of human resource management

**Chapter 2: Strategic Human Resource Management**

Identifying human resource's strategic challenge and summarizing the strategic management process; & describing the human resource scorecard approach

**Chapter 3: The Manager and Department of HR**

Summarizing the types of assistance provided by the human resource department; explaining relationship between human resource managers and operating managers & discussing the role of human resource managers in the future

**Chapter 4: The Environment of Human Resource Management**

Describing the basic human factors that affect human resource managing; Explaining the meaning of motivation & describing the various theories of motivation and their strengths and weaknesses

**Chapter 5: Job Analysis**

Discussing the nature of job analysis, including what it is and how it's used; Using at least three methods of collecting job analysis information, including interviews, questionnaires, and observation; Writing job descriptions, including summaries and job functions, using the internetand traditional methods & writing job specifications using the internet as well as your judgment.

**Chapter 6 Human Resource Planning**

Defining human resource planning (HRP); Summarizing the relationship between HRP and organizational planning; Explaining strategy-linked HRP; Identifying the steps in the HRP process & describing the different methods used for forecasting human resource needs

**Chapter 7 Recruitment and Employment**

Defining recruitment; outlining the steps in the selection process & describing aptitude, psychomotor, job knowledge, proficiency, interest, and personality tests.

**Chapter 8 Training and Development**

Defining training and development; Describing needs assessment & Outlining three categories of training objectives

**Chapter 9 Performance Management**

Describing the appraisal process; Developing and evaluating at least four performance appraisal tools; List and discuss the pros and cons of six appraisal methods; Explaining and illustrating the problems to avoid in appraising performance & discussing the pros and cons of using different taters to appraise a person's performance

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|---|---|
| **Course Code** | 0710301W |
| **Course Name** | Fault Diagnosis & Monitoring |
| **Study Hour** | 56 |
| **Credit** | 3.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Aircraft detection and diagnosis techniques play an important pole in ensuring the safety, reliability and economy of aircraft. However, for a long time, the teaching materials which comprehensively state the techniques of aircraft detection and diagnosis are very lack. At present, though many teaching materials and books about “condition monitoring and fault diagnosis” have already been published, they are all lack of aeronautic and civil aviation characteristics, and they cannot form a complete techniques system and frameworks, because they discuss only some aspects of state diagnosis of aero-engine, or wear diagnosis of aero-engine, or vibration diagnosis of aero-engine, or nondestructive testing of aircraft structure, or maintenance theory, and so on.

2. Course aims (theory, ability and technique)

The purpose of this course is to let students know about the complete system and framework of aircraft fault monitoring and diagnosis, and comprehensively understand the common detection and diagnosis techniques. The main features of this course include:

(1) To stand out the aeronautic and civil aviation characteristics

(2) To emphasize the complete and detailed content

(3) To emphasize theory and stand out application

**Requirements for courses; ability and knowledge in advance**

Students need know about the aircraft, especial the engine, structure and work theory before the course. The basic conception and knowledge of signal analysis, image processing, pattern recognition, and artificial intelligent are helpful for students to understand the mathematics models of monitoring and diagnosis technologies.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

The course structure and relevant requirements are as following:

Chapter 1 Introduction 2 hours

Chapter 2 Fault Signal Analysis and Processing 10 hours

Chapter 3 Theories for Fault Recognition 12 hours

Chapter 4 Aero-engine Condition Monitoring and Trend analysis 12 hours

Chapter 5 Aero-Engine Fault Diagnosis 10 hours

Chapter 6 Nondestructive Testing Techniques for Aircraft Structural Inspection 5 hours

Chapter 7 Civil aircraft leakage detection techniques 5 hours

Experiments: Vibration Test and Fault Diagnosis of Rotor 10hours

Grasp the principle of vibration test, actual signal sampling and analysis principle, theory of spectrum analysis. Do three experiments: Rotor imbalance Experiment, Rotor Misalignment Experiment, and Rotor-stator Rubbing Experiment.

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

The total score is 100

Presence and class performance occupy 30%

Final exam occupies 60%

Experiments and report 10%

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|---|---|
| **Course Code** | 0920305W |
| **Course Name** | An Introduction to E-Business |
| **Study Hour** | 32 |
| **Credit** | 2 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

**1. Course nature and academic status**

E-Business provides a balanced coverage of the key business and technology elements of electronic commerce. This course introduces students both the theory and practice of conducting business over the Internet and World Wide Web. Our course is organized into four sections: an introduction, business strategies, technologies, and integration.

. This course should enable students to:

1. Develop an understanding of the elements of the E-Business
2. Learn the natures of the first and second wave of electronic commerce.
3. Know the technology infrastructure of the electronic commerce.
4. Know how to manage e-business both in strategic and static levels.
5. Train students to work with other people in teams;
6. Offer opportunities for students to develop both oral and written communication abilities;
7. Provide knowledge and skills for students to conduct effective organizational research.

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

Chapter 1 Introduction to Electronic Commerce (necessary, 4 hours)

Chapter 2 Technology Infrastructure: The Internet and the World Wide Web (necessary, 4 hours)

Chapter 3 Selling on the Web: Revenue Models and Building a Web Presence (necessary, 4 hours)

Chapter 4 Marketing on the Web (necessary, 4 hours)

Chapter 5 Business-to-Business Online Strategies (necessary, 4 hours)

Chapter 6 Online Auctions, Virtual Communities, and Web Portals (necessary, 4 hours)

Chapter 7 Electronic Commerce Software (optional, 4 hours)

Chapter 8 Electronic Commerce Security (necessary, 4 hours)

Chapter 9 Payment Systems for Electronic Commerce (optional, 4 hours)

Chapter 10 Planning for Electronic Commerce (optional, 4 hours)

Presentation of group project (necessary, 4 hours)

**Forms of examination and requirements**

**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**

Attendance (10%)

Homework (15%)

Class discussion and presentations (15%)

Final exam (test)60%

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|---|---|
| **Course Code** | 0110402W |
| **Course Name** | Aircraft Preliminary Design |
| **Study Hour** | 40 |
| **Credit** | 2.5 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

Aircraft design is a separate discipline of aeronautical engineering. In this course, the design layout techniques for modern aircraft design are introduced, and the process used to develop a credible aircraft conceptual design from a given set of requirements are primarily discussed. In addition, the analysis and optimization methods for dynamics, weight estimation, stability and control, performances and so on are presented from the conceptual sketch to the desirable aircraft.

**Chapter 1 Design--A Separate Discipline**

§1.1 What is design?

§1.2 Introduction to the textbook

**Chapter 2 Overview of the Design Process**

§2.1 Introduction

§2.2 Phases of Aircraft Design

§2.3 Aircraft Conceptual Design Process

**Chapter 3 Sizing from a Conceptual Sketch**

§3.1 Introduction

§3.2 Takeoff-Weight Buildup

§3.3 Empty-Weight Estimation

§10.3 Statistical Group Weights Method

§10.4 Additional Considerations in Weights Estimation

**Chapter 11 Stability, Control, and Handling Qualities**

§11.1 Introduction

§11.2 Coordinate Systems and Definitions

§11.3 Longitudinal Static Stability and control

§11.4 Lateral Directional Static Stability and Control

§11.5 Stick-Free Stability

§11.6 Effects of Flexibility

§11.7 Dynamic Stability

§11.8 Quasi-Steady State

§11.9 Inertia Coupling

§11.10 Handling Qualities

**Chapter 12 Performance and Flight Mechanics**

§12.1 Introduction

§12.2 Steady Level Flight

§12.3 Steady Climbing and Descending Flight

§12.4 Level Turning Flight

§12.5 Gliding Flight

§12.6 Energy Maneuverability Methods

§12.7 Operating Envelope

§12.8 Takeoff Analysis

§12.9 Landing Analysis

§12.10 Other Flight Performance Measures of Merit

| | |
|---|---|
| **Course Code** | 0140303W |
| **Course Name** | Aircraft Environment Control |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course Description:**

The aircraft environmental control is vital to modern aircraft because of increasingly comfort level for commercial airliners and intensively avionics cooling for military aircraft. This course mainly focuses on fundamentals of aircraft environmental control and aircraft control systems and components. Fundamentals of aircraft environmental control mainly include atmosphere, aviation physiology, psychometrics and air conditioning processes. An aircraft environmental control system consists of various subsystems such as refrigeration subsystem, heating subsystem, bleed air subsystem, ventilation subsystem, temperature control subsystem, and so on, among which the emphasis is placed on aircraft air cycle refrigeration subsystems and aircraft vapor cycle refrigeration subsystems because of the difficulty and importance of aircraft cooling requirements. Aircraft environmental control components mainly includes heat exchangers, turbines, compressors, fans, ducts, and ram air scoops. Students are required not only to firmly master in-course knowledge, but also to have practical engineering experience in experiments and system designs for them to be prepared for their future study and professional career.

Prerequisites; Thermodynamics; Heat transfer; Fluid mechanics.

**Chapter 1 Atmosphere and Aviation Physiology** (6 hrs)

Structures of atmosphere; Composition of atmosphere; Dalton's law and ideal gas law; Standard atmosphere; Environmental design conditions; Anoxia; Decompression disorders; Effect performance times. (Lab: Atmosphere and Aviation Physiology, including relationships of altitude and pressure, relationships of water saturation pressure and temperature, reactions of animals to pressure changes)

**Chapter 2 Psychometrics and Air Conditioning Processes** (8 hrs)

Properties of moist air (Partial pressure, saturation pressure, moist content, dry-bulb temperature, wet-bulb temperature, dew-point temperature, relative humidity); American psychometrics; Mollier diagram; Heating processes; Dry cooling and wet cooling processes; Adiabatic humidification processes; Dehumidification processes; Adiabatic mixing processes.

**Chapter 3 Air Cycle Refrigeration Systems and Design** (8 hrs)

Scopes; Heat sinks; Carnot cycles; Simple air cycle refrigeration systems (ACRS); Bootstrap ACRS; Three-wheel ACRS; High pressure water separation ACRS; Regeneration ACRS; Closed loop ACRS; Reverse bootstrap ACRS (Lab: Simple air cycle environmental control system; Project: An ACRS design.)

**Chapter 4 Vapor Cycle Refrigeration Systems and Design** (10 hrs)

Refrigerants; p-h diagrams; Ideal vapor cycle refrigeration systems (VCRS); Factors affecting VCRS performances; Two stage VCRS; Cascade VCRS; Other variations of VCRS; Combinations of ACRS and VCRS.

**Chapter 5 Refrigeration Components** (10 hrs)

Heat exchangers (principles; structures, effectiveness, design methods); Turbines (principles; structures, efficiency performances, mass flow performances, design methods); Compressors (principles; structures, efficiency performances, mass flow performances, design methods); Fans (principles; structures, efficiency performances, similarities, design methods); Air ducts; Air scoops. (Project: Heat exchanger design)

**Chapter 6 Ch.6 Vapor cycle refrigeration systems** (6hrs)

Thermodynamic properties of refrigerants, Simple vapor cycle refrigeration systems, Vapor cycle systems variants, Combined VC-AC systems

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|---|---|
| **Course Code** | 0110403W |
| **Course Name** | Aircraft Structural Design |
| **Study Hour** | 56 |
| **Credit** | 3.5 |

**Course Description:**

Design of aircraft structures is one of the most important courses for specialty for undergraduate students of aircraft design majors. This course's outstanding character is integrating theory with practice. It not only introduces various kinds of aircraft structures configurations, but also emphasizes on fundamental theory and method of aircraft structure design, including the mechanical analyze method of force transmission, classical design principles of wing, fuselage, and landing gear. It requires that students should master the fundamental method of analysis and design of aircraft structure, be able to proper analysis of components layout of aircraft structure and proper analysis and design of key components of aircraft structure.

Course Outline：

**Chapter 1 General** (4hrs)

General introduction of station of structure design. Initial conditions and basic requirements for structural design. Development progress of airframe design concepts. Computer aid design.

**Chapter 2 Aircraft Loads** (8hrs)

Classification of aircraft loads. Calculating load factors at different prescribed maneuvers. Structural design criteria.

**Chapter 3 Structural Material** (4hrs)

Characters of structural material, material selection criteria, aluminum alloys, titanium alloys, steels alloys, composite materials.

**Chapter 4 Structural Analysis** (4hrs)

Fundamental mechanical relations, determinate structures, indeterminate structures, finite element modeling.

**Chapter 5 Buckling** (2hrs)

Introduction, Columns buckling, fail modes of columns, Failure modes of beam-columns, Local instability of columns, Crippling Stress, Johnson-Euler curves, buckling of thin sheets, Compression Panels, Factors of selection of a stringer configuration, Inter-rivet buckling, Skin-stringer panels

**Chapter 6 Wing box structure design** (22hrs)

Mechanical property of wing box structure, wing box design method, wing covers, spars, ribs and bulkheads, wing root joints, finite element analyze method for wing box structure. (10 computer hours)

**Chapter 7 Fuselage** (6hrs)

Fuselage configurations, fuselage detail design method, forward fuselage, wing and fuselage intersection, stabilizer and aft fuselage intersection, fuselage opening. (2hrs scene hours)

**Chapter 8 Landing gear** (6hrs)

Landing gear development, arrangement, stowage and retraction. Selection of shock absorbers. Wheels and Brakes Detail Design. (2hrs scene hours)

| | |
|---|---|
| **Course Code** | 0610402W |
| **Course Name** | Structure and Maintenance of Composite Materials |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

This professional course is designed for undergraduate students that are going to use composite materials in aerospace and military applications. It provides a broad overview of the essential knowledge of composite materials and the processes involved in manufacture & basic repair of composite materials.

2. Course aims (theory, ability and technique)

The objective of the course is to introduce the material content and manufacturing techniques of composite materials, and to teach the mechanical behavior of composite materials, as well as the design and repair of composite materials. The main goal is to equip the students with the relevant theoretical and practical information, and educate the student so that the acquired knowledge can be effectively used by the students in the design and analysis of composite aerospace structures.

**Requirements for courses, ability and knowledge in advance**

Fundamental of Material Science, mechanics of materials, Basic knowledge of material science and engineering,

**Course structure (Table of contents)**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hour's needed, content, scheme and functions.

**Chapter 1 Introduction to Composite Materials** (4 hrs)

Definition of Composite Materials, Constituents of Composite Materials, Classification of Composite materials, Properties of Composite Materials, Advantages of Composite Materials, Applications of Composites

**Chapter 2 Reinforcements (**4 hrs)

Fibers in Composite Materials, General Properties of Fibers, Fabrication Processes of Fibers, Comparison of fibers

**Chapter 3 Matrix** (6 hrs)

Role of Matrix in Composites, Classification of Matrices, Metal Matrices, Ceramic Matrices, Polymer Matrices (Thermoset Polymers and Thermoplastic Polymers)

**Chapter 4 Interface** (4hrs)

Definition of Interface, Interfaces in Composites, Wetting and Bonding at Interface, Characterization of Wettability, Characterization of Interfacial Bond Strength, Control of Interface in Composites

**Chapter 5 Fabrication Processes of Composites** (10hrs)

Fabrication Processes of Metal Matrix Composites, Fabrication Processes of Ceramic Matrix Composites, Fabrication Processes of Polymer Matrix Composites (Hand Layup Process, Bag Molding Process, Filament Winding Process, Pultrusion, Compression Molding Process, SMC Process, BMC Process, RTM Process, Injection Molding Process)

**Chapter 6 Micromechanics of Composite Materials** (4hrs)

Rule of Mixture, Micromechanical approach on mechanical behavior of composites, Micromechanical technique for predicting elastic constants of composites, Transverse stresses in composites, Thermal properties of composites, Mechanics of load transfer from matrix to fiber.

**Chapter 7 Micromechanics of Composites** (4hrs)

Stress-Strain relations in orthotropic lamina, Variation of laminated properties with orientation, Analysis of laminated composites, Stresses and strains in laminated composites, Interlaminar stresses and edge effects

**Chapter 8 Mechanical Behavior of Composite** (4hrs)

Tensile strength of unidirectional fiber reinforced composites, compressive strength of unidirectional fiber reinforced composites, Fracture modes in composites, Statistical analysis of fiber strength, Failure criteria of an orthotropic lamina, Fatigue of composite materials

**Chapter 9 Design of Composite Materials** (4hrs)

Advantages of composite materials in structural design, Designing with composite materials

**Chapter 10 Composite Repair** (4hrs)

Introduction, Basic Types of Repair, Key stages of composite repair, Typical damage, Typical laminate repairs, Typical sandwich panel repairs, Videos for composite repair.

| | |
|---|---|
| **Course Code** | 0130401W |
| **Course Name** | Mechanical Vibration |
| **Study Hour** | 48 |
| **Credit** | 3 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

The study of vibration is concerned with the oscillatory motions of bodies and the forces associated with them. Most engineering machines and structures experience vibration to some degree, and their design generally requires consideration of their oscillatory behavior.

2. Course aims (theory, ability and technique)

After the course learning,

(1) Students should know the basic concepts of vibration theory, such as vibrating frequency, damping, resonance, normal mode, etc.

(2) Students should have the ability to set up the motion equations of some simple systems suchas single degree of freedom system, 2 degrees of freedom system, etc.

(3) Students should master the techniques to obtain the responses of some simple systems for free vibration, forced vibration and transient vibration.

**Requirements for courses; ability and knowledge in advance**

Linear Algebra or Matrix Theory

**Course structure explanation**:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions.

Necessary section

**Chapter 01**

1.1 Harmonic Motion (2 hrs)

1.2 Periodic Motion (2 hrs)

1.3 Vibration Terminology (2 hrs.)

**Chapter 02**

2.1 Equation of Motion-Natural Frequency (2 hrs.)

2.2 Energy Method (2 hrs)

2.3 Viscously Damped Free Vibration (2 hrs.)

2.4 Logarithmic Decrement (2 hrs.)

2.5 Coulomb Damping (2 hrs.)

**Chapter 03**

3.1 Forced Harmonic Vibration (2 hrs.)

3.2 Rotating Unbalance (2 hrs.)

3.5 Support Motion (2 hrs.)

3.6 Vibration Isolation (2 hrs.)

3.7 Energy Dissipated by Damping (1 hr.)

3.8 Equivalent Viscous Damping (1 hr.)

3.9 Structural Damping (1 hr.)

3.10 Sharpness of Resonance (2 hrs.)

3.11 Response to Periodic Forces (1 hr.)

3.12 Vibration Measuring Instruments (1 hr.)

**Chapter 04**

4.1 Impulse Excitation (1 hr.)

4.2 Arbitrary Excitation (2 hrs.)

4.3 Laplace Transform Formulation (1 hr.)

4.4 Response Spectrum (1 hr.)

4.5 Finite Difference Numerical Computation (1 hr.)

4.6 Runge-Kutta Method (1 hr.)

**Chapter 05**

5.1 Normal Mode Vibration (1 hr.)

5.2 Coordinate Coupling (2 hrs.)

5.3 Forced Harmonic Vibration (2 hrs.)

5.5 Vibration Absorber (1 hr.)

5.7 Vibration Damper (2 hrs.)

**Chapter 06**

6.1Flexibility and Stiffness Matrix (1 hr.)

6.3Eigenvalues and Eigenvectors (1 hr.)

6.5 Orthogonal Properties of Eigenvectors (1 hr.)

6.9 Normal Mode Summation (1 hr.)

Forms of examination and requirements

Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)

Structure of the final grade: 50% presence 50% exam
Form of exam: test

| | |
|---|---|
| **Course Code** | 0110499W |
| **Course Name** | Graduation Project |
| **Study Hour** | 17 (Weeks) |
| **Credit** | 17 |

**Course description** Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status
This course is an important practice part of the whole Aerospace Engineering undergraduate degree programs. Students will have the graduation project in the whole eighth term.
2. Course aims (theory, ability and technique)
The course objectives map to a set of four (first-level) program student learning outcomes. The students
(1) develop a refined ability of Aerospace Engineering work and/or further research to discover knowledge, solve problems, think about systems, and master other personal and professional attributes.
(2) develop skills to look up the related references, computer, devices and engineering drawing。
(3) lead in the creation and operation of new products and systems
(4) understand the importance and strategic impact of research and technological development in society.

**Requirements for courses; ability and knowledge in advance**
All students must complete the General Institute Requirements and all other specify courses. The GIRs include courses in physics, math, chemistry, language, the humanities, and social sciences.

**Course structure explanation**:
Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain hours needed, content, scheme and functions
All students choose thesis title in the seventh term and do the work according to assignment letter which may need 17 weeks.

**Forms of examination and requirements**
**Structure of the final grade (including presence, class performance,), focus of exam, forms of exam (test, interview, final report, etc.)**
An essay should be submitted and every student should give an oral defense.