

機械系 必/選修 課程簡介－01基礎必修與共同選修

年級/代號 名稱/學分	中文簡介	英文簡介
一年級 2021 微積分 3/3學分	讓學生熟知微積分的起源，微分、積分的概念和演算及其在科學、工程、幾何等各方面的應用，建立以後在專業課程的學習和更深入的應用數學的紮實基礎。	This course is aimed at students who will use calculus as a "tool" in their future academic life. Topics studied include : basic limits and continuity theories, derivatives and its applications, integrations and its applications and , calculus of several variables and problems with infinite sequences and series.
一年級 2026 普通物理學 3/3學分	本課程將介紹物理學的基本觀念。第二學期內容包含電磁學與近代物理學部分。第二學期介紹電磁學與近代物理學部分，內容包含：電荷、電場與高斯定律、電位、電容、電流與電阻、電路、感應磁場、電磁震盪與交流電、磁性材料、Maxwell 方程、電磁波、光學成像、干涉與繞射、相對論簡介、光子與物質波、核子物理簡介，基本粒子簡介與大霹靂理論等等。	This course will introduce the basic concepts of physics. The topics to be covered are electromagnetism and modern physics, including electric charge, electric fields, Gauss' law, electric potential, capacitance, current and Resistance, circuits, magnetic fields, magnetic fields due to currents, induction and inductance, electromagnetic oscillations and alternating current, magnetism of matter, Maxwell's equation, electromagnetic waves, images, interference, diffraction, Relativity, photons and matter waves, all about atoms, conduction of electricity in solids, nuclear physics, energy from the nucleus, quarks, leptons, and the Big Bang.
一年級 2027 普通物理實驗 1/1學分	在本課程中，學生將透過動手做實驗的方式來學習驗證基本物理定律及現象，並從實驗過程中尋找誤差的成因及改進的方法，下學期內容包含：三用電表的原理及應用、邏輯電路、示波器的原理及應用、R-L-C電路實驗、伏特計與安培計的原理及應用、歐姆定律實驗、惠斯登電橋、光波的干涉—牛頓環、科希荷夫定律、電位的測定、正切電流計、光電效應等等。	In this course, students will learn basic physics laws and phenomena by experiments.
一年級 J636 VB程式設計 3學分	本課程針對Visual Basic 語言作廣泛的介紹,循序漸進。學好 Visual Basic 語言，可培養學生程式設計之基礎，進而發展學生開發及建立資訊系統之能力。內容包含：(1) Basic 語言基本概念(2) 變數與運算子(3) 條件判斷與迴圈(4) 陣列與函數(5) 發生錯誤的處理方法	This course is to introduce Visual Basic programming language and to make learning Visual Basic language as painless as possible. The course includes : (1) Visua basic fundamental concept (2) variables and operators (3) if and loop (4) array and function (5) pointer and structure (6) files(7)structured

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	(6) 檔案處理(7)結構化程式。	
<p>二年級 6003 工程數學 3/3學分</p>	<p>本課程旨在教授學生工程數學定理及應用，培養學生工程問題之數學描述、分析和求解能力。上學期之主要內容為(1)1階及2階常微分方程式的定理與解析方法及其工程應用；(2)拉普拉斯轉換定理與工程應用及(3)級數解。下學期課程內容包含線性代數(包含矩陣、向量、行列式、線性系統、和矩陣特徵值問題)、向量微分分析(包含內積、叉積、向量微分、方向導數、梯度、散度、和旋度)，及向量積分分析(包含線積分、面積分、體積分、Green's 定理、Divergence定理、和Stokes's 定理)。</p>	<p>This course introduces theorems of mathematical methods and stresses the applications of these methods on solving practical problems. In the 1st semester, ordinary differential equations, Laplace transforms and series solutions are introduced, and in the 2nd semester the subjects include vectors, matrices, systems of linear equations, eigenvalues, vector differential calculus and vector integral calculus.</p>
<p>三年級 C650 專題研究 與實作 1/1學分</p>	<p>本課程主要介紹專題製作時所需的理論基礎與各層面的呈現技巧，讓學習者對於專題研究與實作有一明確且完整的認識。藉由本課程可強化學生專題研究與實作能力，同學依自己興趣選擇指導老師與專題題目，研究領域大致分為機械固力、機械流力、機械材料及製造、機電及自動控制，使同學具備專題研究與實作之基本知識及能力。本課程也注重各分組進度報告，以敦促同學能及時完成期末專題報告。</p>	<p>The present course mainly strengthens the capability of student on the project research and hand working. Students select the research subject and instructor based upon their interests. The research subjects can be classified as solid mechanics, fluid mechanics, material and manufacturing and electro mechanics and automatic control. After study of this course the students should have the basic knowledge on project research and hand working.</p>
<p>二年級 4077 品質管制 3學分</p>	<p>本課程介紹品質的重要與管理方法，電腦與製程品管為實務應用的重點，本課程從討論品質的責任，然後討論計量與計數的管制法、允收抽樣與標準抽樣計畫，最後以品質成本、自動檢測、品質改善技術、品質改善管理等主題終</p>	<p>Quality is the key to surviving in the manufacturing and service industries. This course starts with the introduction of the philosophy and fundamentals of quality control. Secondly, the statistical quality control aspects are presented with computer tools. Finally, the procedures of acceptance sampling are discussed. Standardized plans such as ASQC Z1.4 and ASQCZ</p>

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	結。	1.9 are emphasized with several case studies.
二年級 4372 產業機械 2學分	從機械基礎理論如何應用到實際之產業，再根據產業別，從農工與新科技各行各業介紹使用之產業機械。	The objectives of the course result from the importance started how to use the foundation of machinery science th actual industrial machinery from agricultural machinery to IC foundry. So that the goal of raising capable and qualified manufacturing engineers will be reached.
二年級 F348 機械產業 分析 2學分	<p>機械產業分析</p> <p>Part I：序論</p> <p>1、機械產業資料蒐集與範疇</p> <p>2、產業體系分析課程概論</p> <p>Part II：個論</p> <p>1、工具機產業分析</p> <p>2、模具產業分析</p> <p>3、自動化產業分析</p> <p>4、機械零組件產業分析</p> <p>5、其他產業分析</p>	<p>Machinery Industry Analysis</p> <p>Part I：The Introductory of Machinery Industry Analysis</p> <p>1、Data Collection and Areas of Machinery Industry</p> <p>2、Overview of Industry Analysis Theory Curriculum</p> <p>Part II：The Chapters of Machinery Industry Analysis</p> <p>1、The Machine Tool Industry Analysis</p> <p>2、The Mold Industry Analysis</p> <p>3、The Automated Industry Analysis</p> <p>4、Mechanical Components Industry Analysis</p> <p>5、Other Industry Analysis</p>
三年級 A834 微分方程 與應用 2學分	繼本系工程數學課程對微分方程的基本介紹後，本課將更廣泛與深入介紹其他各式微分方程式類型、解法、與應用。包含簡短回顧一二階常微分方程式種類、解法、與應用。認識高階常微分方程式、線性常微分方程系統、變係數常微分方程式之種類、解法及應用，非線性系統與現象，問題描述及完整數理模式建構。課程中亦將以國科會大專生參與研究計畫所完成之數個工程問題之理論與實測比較研究為案例，讓學生實際體會微分方程在分析問題上的	A real-world system obeys natural laws. According to these natural laws we can think of setting up a mathematical model to predict its behavior. Differential equations play a major role on mathematical modeling and are central to many topics in engineering. To teach students to derive models and to solve differential equations of these models are primary goals of this course. Cases adopted from student projects granted by NSC (National Science Council) will be shared to give students a working knowledge of how to use the problem-solving capabilities of differential equations.

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<p>三年級 2188 數值分析 3學分</p>	<p>對於現代工程問題來說，絕大部分是需要靠電腦來進行工程分析，而熟悉電腦程式語言及數值分析工具，是工程科系學生必備的知識。對於現代科學和工程的實踐來說數值分析是不可缺的，他的目的十分明確：描述解決科學和工程問題的演算法，以及討論演算的數學基礎。在本課程裡，Matlab被用在演算法的解說，也用來作為學生作業之平台。</p>	<p>numerical analysis is introductory text for student of engineering, mathematics, science ,and computer science .Its goals are straightforward: to describe the mathematical underpinnings of the algorithms. In this course Matlab is used both for exposition of algorithms and as a suggested platform for student assignment.</p>
<p>三年級 J638 專利寫作 2學分</p>	<p>本課程將介紹智慧財產權、專利權、我國專利法規、案例解析、專利檢索、專利說明要點、專利申請範圍要點、及重要專利實務知識。並導引學生實際進行專利寫作練習。</p>	<p>This course will cover topics on: intellectual property rights, patent right, ROC patent law, case analysis, patent search, highlights for patent description and patent claim, and patent knowledge. Additionally, students will learn to draft patent specifications.</p>
<p>三年級 J153 航太工程 技術與原理 3學分</p>	<p>航空太空工程是航空工程與太空工程的總稱，航太工程之進展縮短世界的距離，在民生軍事應用皆佔有重要角色。本課程預計針對航太工程技術發展、飛行載具種類、空氣動力學、飛行原理、飛機零組件與作用、推進系統及飛行姿態與穩定性等議題介紹航太工程技術與工作原理，另外也將介紹火箭推進與衛星等太空科技技術。</p>	<p>Aerospace engineering is a collective term of aeronautical engineering and astronautical engineering. The progress of aerospace engineering shortens the distance of worlds. It plays an important role in civil and military applications. In this course, the development progress of aerospace engineering, types of aerial vehicle, aerodynamics, principle of flight, components of corresponding functions of aircraft, propulsion systems, flight stability and flight control will be introduced. In addition, the aeronautical technologies, including the rocket science and satellite technologies will be illustrated.</p>

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<p>四年級 A835 線性代數 與應用 3學分</p>	<p>本課程旨在教導學生應用數學方法處理工程問題，本課程簡單而詳盡地介紹線性代數之基本概念及在工程上的應用。主題包括:介紹線性方程式系統的定義和應用，講授矩陣表達方式、基本運算和應用，講授行列式的基本運算和應用，何謂向量空間，介紹內積空間的定義和應用，講授線性轉換的定義和應用，講授特徵值和特徵向量的定義和應用，加強應用實例的介紹。</p>	<p>This course aims at teaching students how to apply Linear Algebra to deal with engineering problems. Thus, this course offers a simple, comprehensive, and methodical presentation of the basic concepts in the Linear Algebra and its applications. The topics include Systems of Linear Equations, Matrices, Determinants, Vector Space, Inner Product Spaces, Linear Transformation, Eigenvalues and Eigenvectors. Examples on applications of Linear Algebra are emphasized.</p>
<p>四年級 I882 工程資料 分析(企業 實習) 3學分</p>	<p>本系為提升學生理論與實務驗證的機會、提升學生職場適應力與就業競爭力，開設「企業實習」課程。藉由學生於實習期間的親身體驗，讓同學了解產業界之生產實務；培育學生之設計、製造、組裝、及管理能力的提高學生的就業能力與就業機會。課程時間至少14週，第15週學生需返校繳交實習相關資料。</p>	<p>To provide students a chance for theoretical and empirical verifications, and promote their adaptability and competitive ability, a course of “Enterprise practice” is offered in our department. According to the actual work experience during the practical training, students could realize the production tasks in industry and learn the knowledge in design, manufacture, assembly, and management. Therefore, they would have a great advance in occupation capacity and employment opportunity. The practice time of this course should be conducted more than 14 weeks, and students must go back to school to hand over the practical reports and documents during the fifteenth week in the semester.</p>