

Department of Mechanical Engineering  
 Industry-Academia Collaboration Program Course Outlines  
 機械工程系機械工程專班課程大綱

<b>Subject code</b> 科目代碼	C1001	<b>Subject</b> 課程名稱	Chinese 華語文
<b>Common / Profession</b> 通識/專業	Common 通識	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	5	Theory: 5 hours Practice: 0 hours Internship: 0 hours 理論：5 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Language 語文能力

## Course outlines

### 課程綱要：

Focus on university campus activities and daily life topics, strengthen the expression skills of various topics. The teaching content gradually progresses to the corpus of modern life information and increases the teaching of written language. Professor in the written language of the grammatical structure. In pragmatics, students are familiar with the common social language in modern times. Topics including: illness, asking for directions, ordering, leaving messages, comparisons, moving, leisure activities, celebrations, etc. The target of the Chinese Character from the Chinese elementary course such as : 303 Vocabulary , 481 grammer Sentence Patterns , 39 criteria .

著重大學校園活動與日常生活話題，加強各種話題表達技巧。教學內容漸進到現代生活資訊方面的語料，並增加書面語教學。教授書面語中的文法結構。在語用上使學生熟識現代各地通用的社會語言。主題涵蓋：生病、問路、點餐、留言、比較、搬家、休閒活動、慶祝等。課程初級華語 目標漢字：303 個詞彙量：481 條句型語法：39 則。

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<b>Subject code</b> 科目代碼	C1002	<b>Subject</b> 課程名稱	Introduction to Taiwan regulations 台灣法規概論
<b>Common / Profession</b> 通識/專業	Common 通識	<b>Required / Elective</b> 必選修	必修 Required
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Society 社會

## Course outlines

### 課程綱要：

In addition to the understanding of mechanical theory and technology, students also need basic legal knowledge, and all the required regulations are taught in this course, including Mechanical equipment safety regulations, Labor Standards Act, Labor Inspection Act, Intellectual property rights.... This course also involves basic legal knowledge of daily life as well.

配合機械工程系學生所需之各項法規，讓學生學習與了解，學生除了對於機械理論與技術需有所了解外，同時也需要基本的法律常識，其所需之各項法規皆於本課程進行學習。包含機械設備安全規章、勞動基準法、勞動檢查法、智慧財產權等相關法規；同時也對於日常生活之基本法律常識也會有所涉獵。

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<b>Subject code</b> 科目代碼	C1003	<b>Subject</b> 課程名稱	Profession foreign language 專業外文
<b>Common / Profession</b> 通識/專業	通識 Common	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	二年級下學期 Sophomore year 2nd semester	<b>Category</b> 課程類別	Language 語文能力

## **Course outlines**

### **課程綱要：**

In concern to meet the needs of students, this course is designed to teach professional English or Japanese language skills related to Department of Mechanical engineering, including foreign language vocabulary and proper nouns required for students to study professional manuals or professional technical materials, enabling the abilities of application, communication and writing.

配合學生需要教授機械工程系相關專業英語或日語能力，其中學生在研讀專業手冊或專業技術資料時，所需之各項外語詞彙及專有名詞，其各項應用、溝通與撰寫文章之能力。

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<b>Subject code</b> 科目代碼	J1001	<b>Subject</b> 課程名稱	Introduction to Industry 產業概論
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 3 hours Practice: 0 hours Internship: 0 hours 理論：3 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Mechanical basic 機械基礎

## Course outlines

### 課程綱要：

To keep up with the development trend of various industries of the Mechanical Engineering Department, industry experts are invited to school to carry out various keynote speeches and the development of the current situation of the industry, such as smart machinery, development of materials science, overview of precision machining, mechanical design applications and new trends in 3D printing...

配合機械工程系之各項產業發展趨勢，邀請業界專家到校進行各項專題演講與產業現況之發展，包含智慧機械、材料科學的發展、精密加工的概況、機械設計應用及 3D 列印新趨勢等。



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<b>Subject code</b> 科目代碼	J1002	<b>Subject</b> <b>課程名稱</b>	電腦輔助機械製圖 Computer-aided mechanical drawing
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

1. Familiarize students with how to apply computer-aided drawing software (AutoCAD) in mechanical drawing.
2. Make students familiar with the drawing and marking of engineering drawings in the mechanical field.

- 一、使修習學生熟悉如何應用電腦輔助繪圖軟體(AutoCAD)在機械製圖之應用。
- 二、使修習學生熟悉機械領域工程圖之繪製與標示。

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<b>Subject code</b> 科目代碼	J1003	<b>Subject</b> <b>課程名稱</b>	機械加工實習 Machining internship
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

1. Machining internship is mainly based on practicing, training students to be able to master various machine tools, read working diagrams correctly, plan and arrange working procedure, be familiar with all kinds of tools and their correct use, achieving the goal of machining as expected.
2. Students carry out machining practices by reading diagrams and operating basic machine tools such as lathes, milling machines, grinding machines, etc.

- 一、機械加工實習主要以實際動手做為主，訓練學生期能達到在安全情況下熟練各種工具機操控，工作圖正確判讀，工作程序規劃、安排且能熟悉各式機具、工具、刀具、量具計算及正確使用，達到預期機械加工之目標。
- 二、同學需透過識圖，並利用車床、銑床、磨床等各項基礎機械工具機之操作，並進行總和機械加工實作。

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<b>Subject code</b> 科目代碼	J1004	<b>Subject</b> 課程名稱	CNC machine tools and internship 數控工具機與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	<b>理論：1 小時 實作：2 小時 實習：0 小時</b> Theory: 1 hours Practice: 2 hours Internship: 0 hours	
<b>Study time</b> 開課年級	Freshman year 2 <sup>nd</sup> semester 一年級下學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

1. Enable students to understand the meaning of numerical control as well as the construction and basic maintenance knowledge of CNC machine tools.
2. Equip students with the abilities of tools selecting, machining planning and CNC machine tool programming, also making students get used to using NC lathes.
3. Equip students with the professional attitude of CNC machine tool technician.
4. Enable students to understand the market trends of machining industry and the development of CNC machine tools.

- 一、使學生了解數值控制之意義，認識 CNC 工具機之構造及基本維護知識。
- 二、能具備刀具之選用及加工程序之規劃及 CNC 工具機之程式設計能力。並可熟悉 NC 車床之使用方法與操作技能。
- 三、能具備 CNC 工具機從業人員之專業態度。
- 四、能了解機械加工產業市場脈動與 CNC 工具機發展狀況。

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<b>Subject code</b> 科目代碼	J1005	<b>Subject</b> 課程名稱	Computer-aided design 1 電腦輔助設計(一)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2nd semester 一年級下學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

The main content of this course is 3D model design applied on mechanical components by 3D software, including 2D section drawing, extension entities, rotating entities, mixed entities. 3D models are converted into 2D drawings by using the engineering drawing module at the same time. Finally, the components are combined and used to form the moving mechanism and perform motion simulation.

本課程主要教學內容為 3D 軟體應用在機械零件的 3D 模型設計，包含 2D 截面繪製、引伸實體、旋轉實體、混合實體。同時利用工程圖模組將 3D 模型轉換成 2D 工程圖，最後再利用組合模組將所設計零組件組成運動機構並進行運動模擬。



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<b>Subject code</b> 科目代碼	J1006	<b>Subject</b> 課程名稱	Automated manufacturing and internship 自動化製造與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 1 hours Practice: 2 hours Internship: 0 hours 理論：1 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

This course is mainly for four major teaching spindles for hardware component recognition, logic concept establishment and practice panel implementation in the "Pneumatic Circuit" teaching, such as : (1) pneumatic circuit (2) electrical circuit (3) PLC programmable control (4) motor precision positioning etc . First we introduce the various concepts of pneumatic source, three-point combination, pneumatic valve, pneumatic cylinder, etc., as well as understanding the operating principle of the intuitive sequential pneumatic circuit and the cascade pneumatic circuit; teaching in the "electrical circuit" First, introduce the concept of relays, normally open contacts, long closed contacts, and then introduce the sequential logic of various electrical circuits; in the "PLC programmable controller" teaching, students can learn the basic PLC instructions, from The principle of maintaining and interlocking, practicing the conversion between PLC commands, ladder diagrams and sequential flowcharts with various examples; teaching how to distinguish stepping motors, induction motors and servo motors, etc. in the "motor precision positioning" and other method for using the equipment.

本課程主要針對(1)氣壓迴路(2)電氣迴路(3)PLC 可程式控制(4)馬達精密定位...等四大教學主軸進行硬體元件認識、邏輯觀念建立以及實習面板實作；在「氣壓迴路」教學中，首先介紹各式氣壓源、三點組合、氣壓閥、氣壓缸等硬體概念，以及了解直覺順序氣壓迴路、串級氣壓迴路之運作原理；在「電氣迴路」教學中，先介紹繼電器、常開接點、長閉接點之觀念，再介紹各式各樣電氣迴路之順序邏輯；在「PLC 可程式控制器」教學中，學生可以學習到基本 PLC 指令、自保持、互鎖之原理，以各種範例來練習 PLC 指令、階梯圖及順序流程圖之間的轉換；在「馬達精密定位」教學中，教導如何分辨步進馬達、感應馬達及伺服馬達，等設備之使用。

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<b>Subject code</b> 科目代碼	J1007	<b>Subject</b> 課程名稱	數控加工實務 CNC machining practice
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>必選修</b> <b>Required /</b> <b>Elective</b>	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

The course is for students who are pursuing PRO/ENGINEER basic skills or drawing skills with 3D physical design. The content includes the design drawing, analysis and modification of the components, the machining path simulation and the generation of the NC program. Finally, the designed components are machined and manufactured by the actual CNC machine tool. In this course there are two sets of software, such as PRO/ENGINEER and Master CAM, which will be used as the teaching software, and the CNC machine tool of the CNC training room of this department, also will be used for processing and manufacturing. This course will teach you the following abilities including: 1. the component assembly and interference analysis and transformation. 2. the parts transfer method. 3. the use and setting of various construction methods. 4. the setting and method of generating NC programs. 5. Operation and physical processing technology of CNC machine tools.

本課程係為以修習PRO/ENGINEER基礎能力或具有3D實體設計繪圖能力之同學所修之課程。其內容包含零組件之設計繪製、分析與修改、加工路徑模擬及NC程式的產生，最後並以實際操作CNC工具機將所設計之零組件加工製造完成。本課程將以PRO/ENGINEER及Master CAM等兩套軟體為授課軟體，同時以本系CNC實習室之CNC工具機為操作加工之機具，進行實物加工製造。本課程將就教授同學以下之能力：

- 一、零件組立與干涉分析及設變。
- 二、零件轉檔方法。
- 三、各種工法的運用與設定。
- 四、產生NC程式的設定與方法。
- 五、CNC工具機的操作與實物加工技術。

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<b>Subject code</b> 科目代碼	J1008	<b>Subject</b> 課程名稱	Off-campus internship 1 校外實習(一)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Sophomore year 2nd semester 二年級下學期	<b>Category</b> 課程類別	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practice, the course has reached the goal of training professionals.

This course will carry out the practice and internship of each unit in the intern institution. Through the rotation, the students will be able to understand the division of labor and work of each unit of the internship company as well as the corporate system and related product concepts.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程將於實習單位進行各單位的實作與實習，透過輪調的方式，讓學生了解實習公司各單位的分工與工作概況。並了解企業制度與相關產品概念。

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<b>Subject code</b> 科目代碼	J1009	<b>Subject</b> 課程名稱	Off-campus internship 2 校外實習(二)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Sophomore year 2nd semester 二年級下學期	<b>Category</b> 課程類別	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practices, the course has reached the goal of training professionals.

This course will carry out the practice and internship of each unit in the intern institution. Through the rotation, the students will be able to understand the division of labor and work of each unit of the internship company as well as the corporate system and related product concepts.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程將於實習單位進行各單位的實作與實習，透過輪調的方式，讓學生了解實習公司各單位的分工與工作概況。並了解企業制度與相關產品概念。



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<b>Subject code</b> 科目代碼	J1010	<b>Subject</b> 課程名稱	Off-campus internship 3 校外實習(三)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Required 必修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>Category</b> 課程類別	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practices, the course has reached the goal of training professionals.

This course not only allows students to learn the machining practices of the industry through actual product processing internship, but also lets students discuss each other and improve learning efficiency through group discussions in the study.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程透過實際產品加工的實習，讓學生學習產業界機械加工的作法，也透過小組討論於研習，讓學生相互討論激盪，提高學習效率。

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 機械工程系機械工程專班課程大綱

<b>Subject code</b> 科目代碼	J2001	<b>Subject</b> 課程名稱	Introduction to Materials science 材料科學導論
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 3 hours Practice: 0 hours Internship: 0 hours 理論：3 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Engineering materials 工程材料

## Course outlines

### 課程綱要：

This course is designed to enable students to have a broad and basic understanding of the research fields of materials science and engineering, laying the foundation for future study of various professional courses.

1. Equip students with basic understanding and relevant theoretical basis for engineering materials.
2. Enable students to understand the basic structure and characteristics of engineering materials, such as atomic bonding, crystal structure, crystal defects and solid defects, phase diagrams, phase transitions and so on.
3. Enable students to understand the types of engineering materials, such as metals and alloys, ceramic materials, polymer materials, composite materials and so on.
4. Enable students to understand the physical properties of engineering materials, such as optical, magnetic, photoelectric properties, deformation, damage and so on.
5. Enable students to understand the processing procedures of engineering materials, such as heat treatment, hardening, strengthening, toughening and so on.
6. Inspire students' interest in learning and gaining knowledge of engineering materials.

使修習同學對材料科學與工程之研究領域有廣泛及基本的認識，奠定日後研習各專業學程之基礎

- 一、針對工程材料具有基本認識及相關理論基礎。
- 二、了解工程材料之基本構造與特性，諸如原子鍵結、晶體構造、結晶缺陷與固體缺陷、相圖、相變態等。
- 三、了解工程材料之種類，諸如金屬及合金、陶瓷材料、高分子材料、複合材料等。
- 四、了解工程材料之物理特性，諸如光學、磁性、光電特性、變形、破壞等。
- 五、了解工程材料之處理程序，諸如熱處理、硬化、強化、韌化等。
- 六、引發學生學習興趣，並獲得工程材料之知識。

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<b>Subject code</b> 科目代碼	J2002	<b>Subject</b> 課程名稱	Manufacturing 製造學
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 3 hours Practice: 0 hours Internship: 0 hours 理論：3 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 1st semester 一年級上學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

The method of manufacturing constantly evolves, developing cutting and non-cutting processing. The processes of manufacturing such as design, material selection, production planning, manufacturing processing and quality assurance – all the mechanical industry has developed to be more professional, computerized, automated, diversified and flexible. This course is designed to cultivate students to have the basic abilities to understand and choose various mechanical manufactures. The main content of the course includes the evolution of manufacturing, materials and processing, casting, plastic processing, welding surface treatment, etc.

製造的方法不斷的推陳出新，發展出切削性加工與非切削性加工，製造過程從設計、選材、生產計畫、製造加工到品質保證，整個機械產業朝專業化、電腦化、自動化、多元化及彈性化發展邁進；本課程在培養學生瞭解及選用各種機械製造的基礎能力，主要內容包括製造的演進、材料與加工、鑄造、塑性加工、鍍表面處理等。

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<b>Subject code</b> 科目代碼	J2003	<b>Subject</b> 課程名稱	Mechanics of machinery 機械力學
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 3 hours Practice: 0 hours Internship: 0 hours 理論：3 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2 <sup>nd</sup> semester 一年級下學期	<b>Category</b> 課程類別	Mechanical basic 機械基礎

## Course outlines

### 課程綱要：

Mechanics of machinery mainly includes two major spindles - statics and dynamics. The main teaching goal of this course is to develop students' ability to predict or evaluate the relationship between force and object motion when engaging in relevant engineering design and analysis. By learning the mechanics and kinematics of solid particles and rigid body systems subjected to external forces, To achieve this goal.

Explain as follows:

I. Statics: Introduce the basic laws of statics (health balance and torque balance), and establish the basic concepts of students' force system, and then apply it to the analysis of mechanical systems (structures and rods).

II. the dynamics: (1) to establish the basic concepts and analytical abilities of students and Newton's laws of motion and equations of motion. (2) Introduce the basic concepts of kinematics, functional principles, impulses, and momentum.

Enable students to integrate and apply to life.

機械力學主要包含靜力學、動力學等二大主軸。本課程主要教學目標乃在培養學生在從事相關工程設計與分析時，能具有預測或評估作用力與物體運動關係之能力，藉由學習固體質點及剛體系統受外力作用之力學與運動學原理，來達成此目標。分別說明如下：

- 一、靜力學：介紹靜力學基本定律(合力平衡和合力矩平衡)，並建立學生對力系之基本觀念，再將之應用於機械系統(結構與桿件)分析上。
- 二、動力學：(1)建立學生的基本觀念及分析能力及牛頓之運動定律與運動方程式。(2)介紹運動學、功能原理、衝量、動量之基本概念。使學生可以融會貫通並應用於生活上。



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<b>Subject code</b> 科目代碼	J2004	<b>Subject</b> 課程名稱	Programming practice 程式設計實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2 <sup>nd</sup> semester 一年級下學期	<b>Category</b> 課程類別	Automatic control 自動控制

## Course outlines

### 課程綱要：

This course is designed to help students understand the concept of using computer and programming so that they can use computers to solve engineering problems. The main points of learning programming in this course are :

1. Visual programming.
2. Basic skills of Visual Basic software and VB programming.
3. Basic control components and application discussion.

本課程主要是要讓學生了解電腦之使用概念及程式之撰寫，並進而使學生能利用電腦解決工程上之問題；程式方面主要需完成以下之重要學習要點：

- 一、視覺化程式設計。
- 二、Visual Basic 程式及 VB 程式設計的基本技巧。
- 三、基礎控制項元件及應用程式討論

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<b>Subject code</b> 科目代碼	J2005	<b>Subject</b> 課程名稱	Material experiment 材料實驗
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2 <sup>nd</sup> semester 一年級下學期	<b>Category</b> 課程類別	Engineering materials 工程材料

## Course outlines

### 課程綱要：

Introduce the experimental principles and methods of engineering materials, verify the principle rotation of related courses by actual operation, and lead the students to actually recognize the experiments; the contents include: engineering materials - tensile, hardness, spark, impact, fatigue test, Heat treatment experiment.

介紹工程材料之實驗原理及方法，藉由實際操作驗證相關課程之原理期輪換，帶領修課學生實際體認各項實驗；內容包括：工程材料—拉伸、硬度、火花、衝擊、疲勞實驗、熱處理實驗。

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<b>Subject code</b> 科目代碼	J2006	<b>Subject</b> 課程名稱	Precision measurement technology and internship 精密量測技術與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2nd semester 一年級下學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

This course is designed to introduce a variety of precision measuring instrument use, measurement data analysis and processing methods, including: accuracy concept, length measurement, angle measurement, shape measurement, surface rough measurement, optical instrument measurement application, three-dimensional coordinate measuring instrument, etc. These enable students understand the concept of precision, the principle of measurement, the selection and use of familiar measuring tools, training students to have the ability to design, analyze and implement with the main direction of teaching various traditional, emerging precision measurement principles and applications.

本課程旨在介紹各種精密量測儀器使用及量測數據分析與處理方法，其內容包含：精度觀念、長度量測、角度量測、形狀量測、表面粗度量測、光學儀器在量測上之應用、三次元座標量測儀...等。使學生了解精度觀念、量測原理、熟習量具之選用與使用，並以教導各種傳統及新興精密量測原理及應用為主要方向，訓練學生具有設計、分析及實作能力。

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<b>Subject code</b> 科目代碼	J2007	<b>Subject</b> 課程名稱	Electrical engineering and internship 電機學與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 1 hours Practice: 2 hours Internship: 0 hours 理論：1 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2nd semester 一年級下學期	<b>Category</b> 課程類別	Automatic control 自動控制

## Course outlines

### 課程綱要：

1. Enable students to understand the basic characteristics and physical meaning of electrical engineering.
2. Equip students with the principles and applications of electrical engineering.
3. Equip students with the professional attitude of electrical engineering technician.
4. Enable students to understand the market trends of electrical engineering industry.

- 一、使學生了解電機之基本特性及物理意義。
- 二、能具備電機學之原理及應用。
- 三、能具備電機從業人員之專業態度。
- 四、能瞭解電機產業之市場及其發展情形。



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<b>Subject code</b> 科目代碼	J2008	<b>Subject</b> 課程名稱	Liquid pressure and internship 液氣壓學與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 1 hours Practice: 2 hours Internship: 0 hours 理論：1 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Freshman year 2nd semester 一年級下學期	<b>Category</b> 課程類別	Automatic control 自動控制

## Course outlines

### 課程綱要：

To enable students to understand the operating principle and actual operation of automated equipment, this course is mainly coordinated with actual liquid pressure components. It can be a great help to support the students to enter the industry in the future.

The main learning contents are as follows:

First, the design and application of the basic control loop of the gas hydraulic supply system.

Second, combined with automated manufacturing and experimental courses, to accomplish the complete gas hydraulic automation learning foundation.

Third, the symbolic components and operating principles of the gas hydraulic control components.

本課程主要配合實際液氣壓元件,使學生了解自動化機具之動作原理與實際操作情形.對學生未來進入產業界進行實務工作有莫大的幫助.其主要學習內容有：

- 一、氣液壓供給系統基本控制迴路之設計與應用。
- 二、結合自動化製造與實驗課程，以完成完整之氣液壓自動化學習基礎。
- 三、氣液壓控制組件之符號構件與動作原理。

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<b>Subject code</b> 科目代碼	J2009	<b>Subject</b> 課程名稱	Quality control 品質管制
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>課程類別</b> <b>Category</b>	Factory management 工廠管理

## Course outlines

### 課程綱要：

Due to the progress of the era, consumer's awareness of quality has prompted the production and sales styles to change from the "production-oriented" to the consumption-oriented. Consumer satisfaction and affirmation of product quality, has become the key to the success of a business. Therefore, how to actively improved the "quality control" and quality level has become the goal that every enterprise strives every day. By providing modern, systematic concepts and technologies, it is expected that learners will have the basic concepts of quality management. The main teaching objectives are as follows:

First, assist students in establishing basic concepts of quality control and management.

Second, understand the basic theory of quality control, drawing and interpretation of various control charts.

Third, to have the ability of quality control, the professional attitude of modern and systematic concept and technical.

Fourth, to possess the basis of quality management.

由於時代的進步，消費者對於品質意識的提高，促使各行各業的產銷型態由過去的「生產導向」轉變為消費導向，消費者對產品品質的滿意與肯定，成為企業經營成功與否的關鍵。因此，如何積極徹底的「品質管制」提升品質水準成為各企業每天所努力追求的目標。提供現代化、系統化之觀念與技術，期望學習者能夠具有品質管理的基礎之基本概念。主要教學目標如下：

- 一、建立學生對品質管制、管理之基本概念。
- 二、瞭解品質管制之基本理論、各類管制圖之繪製和判讀。
- 三、能具備品質管制，現代化、系統化之觀念與技術的專業態度。
- 四、能進而具有品質管理的基礎。

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<b>Subject code</b> 科目代碼	J2010	<b>Subject</b> 課程名稱	Industrial safety 工業安全
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Factory management 工廠管理

## Course outlines

### 課程綱要：

The main purpose of this course is provide students understanding of two tasks of industrial safety and health, namely, “protecting life” and “protecting assets”, students can apply in the laboratory on campus or into the workplace, and achieve zero disaster. The content includes industrial safety hygiene, and health organizations, safety and hygiene inspections, stimulating interest in safety work, accident prevention, safety and health education training, work safety analysis and safety operation standards, fire explosion prevention, mechanical hazards and protection, electrical Safety, fall disaster prevention, safety machinery and equipment, tool safety, hazardous substance management and hazard communication system, noise control, radiation safety, hypoxia prevention and personal protective work clothing, occupational disease prevention, establishment of safe and healthy working environment, safety and health laws and regulations and other units.

本課程主要的目的是讓學生瞭解工業安全與衛生之兩大任務，即「保護生命」與「保護資財」，使學生在校內實習實驗室或爾後進入工作職場時得以應用，而達成零災害之目標。內容含蓋工業安全衛生概論、工業安全衛生組織、安全衛生檢查、激發參與安全工作的興趣、安全衛生教育訓練、事故的預防、工作安全分析與安全作業標準、火災爆炸防止、機械危害與防護、電氣安全、墜落災害預防、安全性機械設備、工具安全、有害物質管理與危害通識制度、噪音控制、輻射安全缺氧預防及個人防護作業服裝、職業病預防、建立安全衛生工作環境、安全衛生法令規章等單元。

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<b>Subject code</b> 科目代碼	J2011	<b>Subject</b> 課程名稱	Computer-aided design 2 電腦輔助設計(二)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

Continue computer aided design (1) 3D software is applied to mechanical parts and design, advanced learning high-level 3D software production skills, teaching students to use computer-aided design software to build a solid model, using the color to form a display surface. Students can express their product design concepts through 3D printers and computer output.

延續電腦輔助設計(一)之 3D 軟體應用於機械零件與設計，進階學習高階 3D 軟體製作技巧，教導學生運用電腦輔助設計軟體建立實體模型、運用外觀彩現構成展示圖面。學生透過 3D 列印機及電腦成果輸出，得以表達產品產品設計理念。



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<b>Subject code</b> 科目代碼	J2012	<b>Subject</b> 課程名稱	Mechatronics and internship 機電整合與實習
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Automatic control 自動控制

## Course outlines

### 課程綱要：

Electromechanical integration is based on the theory of automatic control, using computer control technology to integrate the integrated technology of machinery, motor, electronics and computer control in industrial product manufacturing and production procedures. Therefore, electromechanical integration can be said to be a systematic engineering technology that combines control, computer, electronics, sensing, mechanical and other technologies to achieve automatic control through signal transmission and feedback control methods. The course includes: relay, circuit ladder design and sequence control methods and techniques, and through the learning programming of the programmable software Gx work2, Train students to obtain electromechanical integration professional certification.

機電整合是一門以自動控制理論為基礎，以電腦控制技術為方法來整合機械、電機、電子、電腦控制的整合性技術於工業產品製造與生產程序作業上。因此機電整合可以說是藉由信號的傳遞與回授控制方法將控制、電腦、電子、感測、機械等技術結合為完成自動控制目的而發展出的一種系統化工程技術。此課程所涵蓋的內容包括：繼電器、電路階梯圖設計與順序控制之方法與技術，並藉由可程式階梯軟體 Gx work2 的學習使用及程式設計，並進行學生在機電整合專業檢定訓練。

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<b>Subject code</b> 科目代碼	J2013	<b>Subject</b> 課程名稱	Intelligent manufacturing practice 智能製造實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

After practicing the digital machining (CNC) series of CNC machine tool internships and CNC machining practice, this course mainly integrates the previously learned skills through the design of the students through the digital processing skills (CNC lathe, CNC milling machine). In order to integrate, students need to plan the process of intelligent processing, and carry out processing and manufacturing, while reviewing the advantages and disadvantages of processing results to meet the requirement of industrial processing.

修習數控工具機實習與數控加工實務的數位加工(CNC)系列課程後，本課程主要透過學生先前所學之數位加工技能，透過教學的設計讓學生整合先前所學之技術(CNC 車床、CNC 銑床)進行整合，同學需要規畫智慧加工的程序，並進行加工製造，同時檢討加工成效的優劣，以契合產業界加工的需求。

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<b>Subject code</b> 科目代碼	J2014	<b>Subject</b> 課程名稱	Mechanical design practice 機械設計實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

Through the design of the overall mechanical components, students through mechanical design, engineering analysis and computer-aided drafting and 3D model implementation, and finally digital processing, students will learn the various courses previously learned to integrate the internship, so that student can learn machinery concept of design.

透過生有整體機械元件設計，由學生透過機械設計、工程分析並進行電腦輔助繪圖及 3D 立體模型實作，最後進行數位加工，將學生先前所學知各項課程進行整合實習，使學生可以學習到機械設計的概念。

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<b>Subject code</b> 科目代碼	J2015	<b>Subject</b> 課程名稱	Skill test practice tutor 1 專業證照實作輔導一
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 1st semester 二年級上學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

Computer-aided mechanical drawing professional licenses are used for practical counseling. The accredited projects include computer-aided mechanical drawing and computer-assisted three-dimensional mapping. Through professional certification, students have their learning objectives and license requirements. In addition to obtaining professional licenses, students are encouraged. In addition to employment, he also has self-confidence and professionalism in computer-aided drafting.

電腦輔助機械製圖專業證照實作輔導，檢定之項目有電腦輔助機械製圖及電腦輔助立體製圖，透過專業證照實作輔導，學生有其學習目標及證照之要求，除了可獲得專業證照的認可有利學生就業之外，也對電腦輔助製圖有了自信心及專業。



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<b>Subject code</b> 科目代碼	J2016	<b>Subject</b> 課程名稱	Non-traditional manufacturing technology 非傳統製造技術
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 2nd semester 二年級下學期	<b>課程類別</b> <b>Category</b>	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

The course focuses on the teaching of non-traditional processing methods using current, light, chemical solvents, abrasives, gases and even water as processing media. so that students understand the functions of non-traditional processing and its design principles, manufacturing processes and methods and can be advanced in precision manufacturing technology.

This course mainly introduce the processing method which has mechanical energy, electrical energy, thermal energy, chemical energy, for example:

- 1) Mechanical Processing : ultrasonic, abrasive fluid, waterjet.
- 2) Electrical Energy Processing : electrochemical.
- 3) Thermal Energy Processing: e-Beam , laser, plasma, discharge processing.
- 4) Chemical Energy Processing: milling, etching.

本課程著重於利用電流、光、化學溶劑、磨料、氣體、甚至是水等為加工介質的非傳統加工法之講授，使學生能對非傳統加工之功能及其設計原則、製造過程與方法有深刻的瞭解，期能於精密製造技術上有進階之基礎。

主要介紹之加工法有機械能、電能、熱能、化學能等，說明如下：

- 一、機械能加工：超音波、磨料流、水刀。
- 二、電能加工：電化學。
- 三、熱能加工：電子束、雷射、電漿、放電加工。
- 四、化學能加工：銑削、蝕刻。

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<b>Subject code</b> 科目代碼	J2017	<b>Subject</b> 課程名稱	Engineering analysis 工程分析
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Sophomore year 2nd semester 二年級下學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

Studying Mechanics of Materials based on mechanical mechanics, "the curriculum design is mainly to learn the theory of material mechanics through mechanical mechanics and material mechanics analysis ability for integrated learning, and carry out the overall engineering analysis.

The main learning items of material mechanics are balancing, deformation, and material strength requirements, for students to understand the normal stress or shear stress and the principle of strain and stress.

以機械力學為基礎進而修習材料力學，並透過機械力學及材料力學之分析能力進行整合學習，課程之設計主要先學習材料力學的理論，最後進而進行整體之工程分析。

材料力學主要學習項目有，平衡、變形、和材料受力強度需求，為使學生瞭解正向或剪向之應力與應變之原理。

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<b>Subject code</b> 科目代碼	J2018	<b>Subject</b> 課程名稱	Introduction to Energy 能源概論
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>課程類別</b> <b>Category</b>	Energy application 能源應用

## **Course outlines**

### **課程綱要：**

The course explores the history of human energy source, the forms of energy, petro chemical fuels, nuclear energy, solar energy, wind energy, hydropower, biomass energy and understand the difference between green and non green energy resources to increase the usage of green energy and develop green energy for further progression.

本課程探討人類使用能源的歷史，能源的形式，石化燃料、核能、太陽能、風能、水力、生質能源等，進而了解綠色能源與非綠色的差異，從而試圖提高綠色能源的使用量，更進一步研發綠色能源。

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<b>Subject code</b> 科目代碼	J2019	<b>Subject</b> 課程名稱	Product design 產品設計
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

This course mainly develops students' design concepts and patent-related regulations, using 3D computer softwares to carry out product design and implementation, so that students can understand product design, product aesthetics, design methods, patent regulations, and product design drawing, thereby improving students' perception of the necessity and importance of applying CAD/CAM software on product development in the current competitive environment.

本課程主要培養學生設計概念及專利相關法規,並使用 3D 電腦軟體進行產品設計實作,使學生認識產品設計、產品美學、設計方法、專利法規、及產品造型設計繪製,進而提高學生認知對 CAD/CAM 軟體應用在當前競爭環境下產品開發的必要性及其重要性。



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<b>Subject code</b> 科目代碼	J2020	<b>Subject</b> 課程名稱	Mechanical workshop 機械專題講座
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 2 hours Practice: 0 hours Internship: 0 hours 理論：2 小時 實作：0 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>Category</b> 課程類別	機械基礎 Mechanical basic

## Course outlines

### 課程綱要：

This course is in line with the industry forum of the first semester of the first semester. The Industry Forum gives students a holistic view of mechanical engineering and has an understanding of future learning. This course is planned for the third semester, which means that the students have already reached the high level. After learning a series of knowledge and skills in mechanical design, manufacturing and automation, the mechanical lectures will enable students to learn more about the industry profile and technical expertise, through the lectures of industry experts on this topic. Study and discuss with each other to improve students' professional knowledge and vision of machinery.

本課程與一年級上學期之產業論壇相輝映，產業論壇讓學生對機械工程有了整體的概念，並對於未來的學習有所了解，本課程規劃於三年級上學期，即讓學生已經到了高年級並學習了一系列機械設計、製造與自動化的知識與技能後，透過機械專題講座課程可以讓學生了解更升入的產業概況與專業技術概論，透過這種主題的業界專家的講座，同學的研習與互相討論，來提高學生對於機械的專業知識與視野。

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<b>Subject code</b> 科目代碼	J2021	<b>Subject</b> 課程名稱	Off-campus internship 4 校外實習(四)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>Category</b> 課程類別	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practices, the course has reached the goal of training professionals.

This course not only allows students to learn the machining practices of the industry through actual product processing internship, but also lets students discuss each other and improve learning efficiency through group discussions in the study.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程透過實際產品加工的實習，讓學生學習產業界機械加工的作法，也透過小組討論於研習，讓學生相互討論激盪，提高學習效率。

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<b>Subject code</b> 科目代碼	J2022	<b>Subject</b> 課程名稱	Fluid solidity experiment 流固力實驗
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>Category</b> 課程類別	Energy application 能源應用

## Course outlines

### 課程綱要：

The experimental instruments are used to introduce the basic formulas of fluid mechanics and solid mechanics. Each experiment includes the purpose of the experiment and the essentials of the test, the basic theory of use, the equipment of the experiment and the method of operation and precautions. The project includes pump experiment, air compressor test, Reynolds number test, valve characteristic test, strain gauge test, deflection test and so on.

運用實驗儀器來介紹流體力學及固體力學之基本公式應用,各實驗包括說明實驗之目的及測定之要項、使用基本理論、實驗之設備和操作實驗之方法及注意事項。項目包含泵實驗、空氣壓縮機實驗、雷諾數實驗、閥特性實驗、應變計實驗、撓度實驗等。

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<b>Subject code</b> 科目代碼	J2023	<b>Subject</b> 課程名稱	Skill test practice tutor 2 專業證照實作輔導二
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級上學期	<b>課程類別</b> Category	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

The mechanical processing professional license is used for practical counseling. The verified items include lathe work, mechanical processing and digital processing. Through professional certification, students have their learning objectives and license requirements. In addition to obtaining professional licenses, students are encouraged to work. It also has self-confidence and professionalism in machining manufacturing.

機械加工專業證照實作輔導，檢定之項目有車床工、機械加工及數位加工，透過專業證照實作輔導，學生有其學習目標及證照之要求，除了可獲得專業證照的認可有利學生就業之外，也對機械加工製造有了自信心及專業。



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<b>Subject code</b> 科目代碼	J2024	<b>Subject</b> <b>課程名稱</b>	Mechanical repair practice 機械修護實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 0 hours Practice: 2 hours Internship: 0 hours 理論：0 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 1st semester 三年級下學期	<b>課程類別</b> <b>Category</b>	Mechanical manufacturing 機械製造

## Course outlines

### 課程綱要：

This course is mainly designed to study the specifications and maintenance practices of mechanical equipment related components, as well as understand the operating principle, fault identification, maintenance and practical repair of mechanical components, also practicing maintenance of mechanical manufacturing equipment and various related working machines. Reinforce the importance of correct mechanical maintenance, learn mechanical repair methods, and learn mechanical maintenance and reconstruction techniques.

本課程主要學習機械設備相關零件規格及檢修實務，並了解機械組件之作動原理、故障判別與保養維護及實務修護。並對機械相關製造設備及各式相關工作母機之維護及保養實務練習。強化學習正確機械保養維護重要性，認識機械結構機械修護方法，學習機械維修重建技術。

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<b>Subject code</b> 科目代碼	J2025	<b>Subject</b> 課程名稱	Mold design practice 模具設計實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 0 hours Practice: 2 hours Internship: 0 hours 理論：0 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

Cultivate students to have relevant knowledge and training in mold design. Students are familiar with CAD/CAM software-assisted mold design and analysis. The main learning objectives are as follows:

First, let students understand the theory of mold structure, process theory and design specifications.

Second, can have the practical technology and application of computer-aided mold design.

Third, can have the professional design and product analysis of mold engineers.

Fourth, can understand the mold market

培養學生在模具設計時應具備相關知識及訓練學生熟悉 CAD/CAM 軟體輔助模具設計及分析主要學習目標如下：

- 一、使學生了解模具結構、製程原理之理論及設計規範。
- 二、能具備電腦輔助模具設計之實作技術及應用。
- 三、能具備模具工程師之專業設計與產品分析。
- 四、能瞭解模具市場

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<b>Subject code</b> 科目代碼	J2026	<b>Subject</b> <b>課程名稱</b>	Arduino program control practice Arduino 程式控制實務
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	2	Theory: 0 hours Practice: 2 hours Internship: 0 hours 理論：0 小時 實作：2 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>課程類別</b> <b>Category</b>	Automatic control 自動控制

## Course outlines

### 課程綱要：

Using Arduino single-chip C language lively and interesting hardware experience, re-engage students' attention in class, in order to subvert the boring and boring program of grammar teaching, the course gradually changed to "implementation, experience, explanation, thinking, innovation In other ways, the students are guided to learn the logical thinking of programming.

利用 Arduino 單晶片 C 語言活潑有趣之硬體實作體驗，重新將學生上課注意力吸引過來，為了顛覆無趣枯燥的程式語法教學方式，本課程逐步改採「實作、體驗、講解、思考、創新」等方式，導引同學漸次學會程式設計之邏輯思考觀念。

Department of Mechanical Engineering  
 Industry-Academia Collaboration Program Course Outlines  
 機械工程系機械工程專班課程大綱

<b>Subject code</b> 科目代碼	J2027	<b>Subject</b> 課程名稱	Off-campus internship 5 校外實習(五)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>Category</b> 課程類別	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practices, the course has reached the goal of training professionals.

This course not only allows students to learn the design, assembly and quality control practices of the industry through the internship of actual product design and assembly, but also lets students discuss each other and improve learning efficiency through group discussions in the study.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程透過實際產品設計與組裝的實習，讓學生學習產業界設計、組裝及品質管制的做法，並透過小組討論於研習，讓學生相互討論激盪，提高學習效率。



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<b>Subject code</b> 科目代碼	J2028	<b>Subject</b> 課程名稱	Off-campus internship 6 校外實習(六)
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 0 hours Internship: 3 hours 理論：0 小時 實作：0 小時 實習：3 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>課程類別</b> <b>Category</b>	Industrial internship 產業實習

## Course outlines

### 課程綱要：

This course assists students in preparing for off-campus internships, including psychological level, professional ability, interpersonal relationship and communication. The enterprises that help students prepare in class will give students a deeper understanding of the future intern institution. With the implementation and project practices, the course has reached the goal of training professionals.

This course not only allows students to learn the design, assembly and quality control practices of the industry through the internship of actual product design and assembly, but also lets students discuss each other and improve learning efficiency through group discussions in the study.

藉由本課程協助學生校外實習前之各項準備，包含心理層面、專業能力、人際關係與溝通等，搭配學生上課分組準備之企業讓學生對未來實習機構有更深一層的瞭解。搭配實作與專案練習已達到訓練專業人才的目的。

本課程透過實際產品設計與組裝的實習，讓學生學習產業界設計、組裝及品質管制的做法，並透過小組討論於研習，讓學生相互討論激盪，提高學習效率。

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<b>Subject code</b> 科目代碼	J2029	<b>Subject</b> 課程名稱	Computer-aided machining design 電腦輔助機構設計
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

This course mainly uses CAE analysis and simulation mechanism design. In this course, we use PRO/E mechanism simulation to construct various linkage mechanism, cam group, gear set, planetary gear set and various mutual support mechanism groups. Simulate various actual mechanisms, and analyze the kinematics and external forces of position, velocity and acceleration, and the dynamics of position, velocity and acceleration, and let students understand the relationship between motion trajectory, position, speed and acceleration and force and power input.

本課程主要係利用 CAE 分析模擬機構設計,在本課程中利用 PRO/E 的機構模擬,建構各種連桿組機構,凸輪組,齒輪組,行星齒輪組及各種相互配合支機構組等,再進一步模擬各種實際機構,並分別分析位置、速度及加速度之運動學及外力與位置、速度、加速度之動力學,並使學生了解運動軌跡、位置、速度、加速度等與力、動力輸入之關係。

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<b>Subject code</b> 科目代碼	J2030	<b>Subject</b> 課程名稱	3D model design 3D 模型設計
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>Category</b> 課程類別	Mechanical design 機械設計

## Course outlines

### 課程綱要：

3D printing is an important key technology for Industry 4.0, so it has a place in the international manufacturing chain; therefore, mechanical design and 3D printing technology have a very important position. Therefore, this course focuses on the design of 3D models, through the design and production of various mechanical models through 3D printers, and understands the implementation techniques of 3D printing, and is applied to the design of mechanical design.

3D 列印為工業 4.0 重要關鍵技術，因此於國際生產製造鏈上占有一席之地；因此，機械設計與 3D 列印技術具有很重要的地位。因此本課程專注於 3D 模型設計上，透過 3D 列印機進行各項機械模型之設計與製作，並了解 3D 列印的各項實作技術，並應用於機械設計的模型設計之用。

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<b>Subject code</b> 科目代碼	J2031	<b>Subject</b> 課程名稱	Skill test practice tutor 3 專業證照實作輔導三
<b>Common / Profession</b> 通識/專業	<b>Profession</b> 專業	<b>Required / Elective</b> 必選修	Elective 選修
<b>Credits</b> 學分數	3	Theory: 0 hours Practice: 3 hours Internship: 0 hours 理論：0 小時 實作：3 小時 實習：0 小時	
<b>Study time</b> 開課年級	Junior year 2nd semester 三年級下學期	<b>Category</b> 課程類別	Automatic control 自動控制

## Course outlines

### 課程綱要：

Electromechanical integration automation professional license implementation counseling, verification of the project tangible identification and transmission, color identification and posture adjustment, posture discrimination and reversal, material sorting and processing, weight discrimination and alignment, through professional certification for practical counseling, students have The requirements of learning objectives and licenses, in addition to the recognition of professional licenses to benefit students' employment, also have confidence and professionalism in electromechanical integration automation.

機電整合自動化專業證照實作輔導，檢定之項目有形狀判別與傳送、顏色辨別與姿勢調整、姿勢判別與換向、材質分揀與加工、重量判別與整列，透過專業證照實作輔導，學生有其學習目標及證照之要求，除了可獲得專業證照的認可有利學生就業之外，也對機電整合自動化有了自信心及專業。