

# 中國文化大學機械工程學系學習地圖

新生入學

學系  
教育目標

- 一、培養學生機械工程專業理論基礎
- 二、培養學生應用電腦於設計分析之能力
- 三、培養學生系統整合及實作能力
- 四、培養學生團隊合作精神與擴展國際視野

通識科目

- 國文
- 外文類
- 外語實習
- 人文學科領域
- 社會科學領域
- 自然科學與數學領域
- 跨域專長

共同科目

- 體育
- 全民國防教育軍事訓練
- 工程倫理
- 中華文化專題
- 服務學習

基礎必修科目

- 微積分
- 普通物理學
- 普通物理實驗
- 應用力學
- 工程數學

專業必修科目

- 工廠實習
- 機械製造
- 電輔工程圖學
- 熱力學
- 材料力學
- 電路學
- 應用電子學
- 機動學
- 機械材料
- 電工實驗
- 機械設計原理
- 電機機械
- 自動控制
- 流體力學
- 機械材料實驗
- 熱傳學
- 熱流實驗
- 專題研究與實作I
- 專題研究與實作II

專業選修科目 - 共同

- 品質管制
- 數值分析
- 線性代數與應用
- 程式設計
- Matlab程式設計與實務
- 工程資料分析(企業實習)
- 專利寫作
- 產業機械
- 微分方程與應用

專業選修科目 - 群組

機械設計

- 創新設計
- 3D繪圖列印與實務
- 中等動力學
- 振動學
- 電腦輔助設計
- CAD與NC程式設計
- 電腦輔助工程
- 電腦輔助產品設計
- 有限元素分析
- 車輛結構設計與製造
- 船舶結構設計與強度分析
- 結構分析
- 數位精密加工與實務

能源科技

- 原動力廠
- 流體機械
- 氬能科技概論
- 電腦輔助熱流分析
- 冷凍空調原理
- 燃料電池
- 綠能與燃燒技術概論
- 葉片空氣動力學概論
- 航太工程技術與原理
- 真空技術與產業
- 超低溫科技
- 能源工程

數位機電

- 虛擬儀控設計
- 線性規劃
- 感測原理與應用
- 機電整合概論
- 微機電系統
- 影像處理
- CPLD邏輯電路設計與實作
- 教育機器人教學實務與應用
- 機器學習概論
- Matlab深度學習
- 智慧與協作式機器人
- 永續發展與節能機電

選修課程以當學年度開課為主

Capstone 課程：專題研究與實作

學生畢業時  
須具備之  
核心能力

- 1、運用數學、科學及工程知識的能力。
- 2、設計與執行實驗，以及分析與解釋數據的能力。
- 3、執行工程實務所需技術、技巧及使用工具之能力。
- 4、設計工程系統、元件或製程之能力。
- 5、有效溝通與團隊合作的能力。
- 6、發掘、分析及處理問題的能力。
- 7、認識時事議題，了解工程技術對環境、社會及全球的影響，並培養持續學習的習慣與能力。
- 8、理解專業倫理及社會責任。

未來  
就業  
產業

光電半導體產業

精密機械業

運輸工具業

微電子機械業

能源科技業

自動化工業

醫療輔具業

製造業

資訊電子業

創意設計業

金屬機械業

服務業

# Freshman Admission



|                              |                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Educational Objective</b> | <ol style="list-style-type: none"> <li>1. Develop a solid mechanical engineering foundation for students.</li> <li>2. Acquire the computer skill in mechanical design and analysis for students.</li> <li>3. Cultivate the implementation ability of system integration for students.</li> <li>4. Expand the broad vision of teamwork and international perspective for students.</li> </ol> |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



| <p><b>General Courses</b></p> <ul style="list-style-type: none"> <li>• Chinese</li> <li>• Foreign Language</li> <li>• Foreign Language Internship</li> <li>• Humanities Field</li> <li>• Social Sciences Field</li> <li>• Natural Sciences and Mathematics Fields</li> <li>• Cross-Disciplinary Specialty</li> </ul>                                                                                                                                                                                                                                               | <p><b>Basic Required Course</b></p> <ul style="list-style-type: none"> <li>• Calculus</li> <li>• General Physics</li> <li>• General Physics Lab.</li> <li>• Applied Mechanics</li> <li>• Engineering Mathematics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p><b>Professional Electives Courses–Common</b></p> <ul style="list-style-type: none"> <li>• Quality Control</li> <li>• Programming</li> <li>• Patent Drafting</li> <li>• Numerical Analysis</li> <li>• Matlab Program Design and Practice</li> <li>• Production Machines</li> <li>• Linear Algebra and Applications</li> <li>• Engineering Data Analysis in Enterprise Practice</li> <li>• Differential Equations and applications</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |                   |                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-------------------|-------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Common Courses</b></p> <ul style="list-style-type: none"> <li>• Physical Education</li> <li>• All-Out Defense Education Military Training (I)</li> <li>• Engineering</li> <li>• Professional Ethics</li> <li>• Services Learning</li> </ul>                                                                                                                                                                                                                                                                                                                  | <p><b>Major Required Course</b></p> <ul style="list-style-type: none"> <li>• Machine Shop Practice</li> <li>• Manufacturing Processes</li> <li>• Computer Aided Engineering Graphics</li> <li>• Thermodynamics</li> <li>• Mechanics of Materials</li> <li>• Electrical Circuit Theory</li> <li>• Applied Electronics</li> <li>• Kinematics</li> <li>• Engineering Materials for Mechanical Engineers</li> <li>• Electrical Engineering Lab.</li> <li>• Elements of Machine Design</li> <li>• Electrical Machinery</li> <li>• Automatic Control Theory</li> <li>• Fluid Mechanics</li> <li>• Materials Testing Lab. for Mechanical Engineers</li> <li>• Heat Transfer</li> <li>• Thermal and Fluid Experiments</li> <li>• Research Project and Implementation (I)</li> <li>• Research Project and Implementation (II)</li> </ul> | <p><b>Professional Electives Courses – Field</b></p> <table border="1" style="width: 100%;"> <tr> <th style="width: 33%;">Mechanical Design</th> <th style="width: 33%;">Energy Technology</th> <th style="width: 33%;">Digital Mechatronic</th> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• Innovation Design</li> <li>• 3D Graphics Printing and Practice</li> <li>• Intermediate Dynamics</li> <li>• Vibration</li> <li>• Computer Aided Design</li> <li>• CAD and NC Programming</li> <li>• Computer Aided Engineering</li> <li>• Computer Aided Product Design</li> <li>• Finite Element Method</li> <li>• Design and Manufacturing of Vehicle Structure</li> <li>• Design and Strength Analysis of Ship Structure</li> <li>• Structure Analysis</li> <li>• Digital Precision Fabrication and Practice</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Power Plants</li> <li>• Fluid Machinery</li> <li>• Introduction to Hydrogen Energy Technologies</li> <li>• Computer Aided Engineering-Heat Transfer and Fluid Flow</li> <li>• Principles of Refrigeration and Air-Conditioning</li> <li>• Fuel Cells</li> <li>• Foundations of Green Energy and Combustion Technology</li> <li>• Introduction to Bland Aerodynamics</li> <li>• Technologies and Fundamentals of Aerospace Engineering</li> <li>• Vacuum Industry and Technology</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Virtual Instrument Desing</li> <li>• Linear Planning</li> <li>• The Principles and Application of Sensors</li> <li>• Introduction to Mechatronics</li> <li>• Micro-Electro-Mechanical System</li> <li>• Image Processing</li> <li>• CPLD Logic Circuit Design</li> <li>• Robotics</li> <li>• Educational Robot Teaching Practice and Application</li> <li>• Introduction to Machine Learning</li> <li>• Maltab Deep Learning</li> <li>• Mobile Robotics and Cobots</li> </ul> </td> </tr> </table> |  |  | Mechanical Design | Energy Technology | Digital Mechatronic | <ul style="list-style-type: none"> <li>• Innovation Design</li> <li>• 3D Graphics Printing and Practice</li> <li>• Intermediate Dynamics</li> <li>• Vibration</li> <li>• Computer Aided Design</li> <li>• CAD and NC Programming</li> <li>• Computer Aided Engineering</li> <li>• Computer Aided Product Design</li> <li>• Finite Element Method</li> <li>• Design and Manufacturing of Vehicle Structure</li> <li>• Design and Strength Analysis of Ship Structure</li> <li>• Structure Analysis</li> <li>• Digital Precision Fabrication and Practice</li> </ul> | <ul style="list-style-type: none"> <li>• Power Plants</li> <li>• Fluid Machinery</li> <li>• Introduction to Hydrogen Energy Technologies</li> <li>• Computer Aided Engineering-Heat Transfer and Fluid Flow</li> <li>• Principles of Refrigeration and Air-Conditioning</li> <li>• Fuel Cells</li> <li>• Foundations of Green Energy and Combustion Technology</li> <li>• Introduction to Bland Aerodynamics</li> <li>• Technologies and Fundamentals of Aerospace Engineering</li> <li>• Vacuum Industry and Technology</li> </ul> | <ul style="list-style-type: none"> <li>• Virtual Instrument Desing</li> <li>• Linear Planning</li> <li>• The Principles and Application of Sensors</li> <li>• Introduction to Mechatronics</li> <li>• Micro-Electro-Mechanical System</li> <li>• Image Processing</li> <li>• CPLD Logic Circuit Design</li> <li>• Robotics</li> <li>• Educational Robot Teaching Practice and Application</li> <li>• Introduction to Machine Learning</li> <li>• Maltab Deep Learning</li> <li>• Mobile Robotics and Cobots</li> </ul> |
| Mechanical Design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Energy Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Digital Mechatronic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |  |                   |                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>• Innovation Design</li> <li>• 3D Graphics Printing and Practice</li> <li>• Intermediate Dynamics</li> <li>• Vibration</li> <li>• Computer Aided Design</li> <li>• CAD and NC Programming</li> <li>• Computer Aided Engineering</li> <li>• Computer Aided Product Design</li> <li>• Finite Element Method</li> <li>• Design and Manufacturing of Vehicle Structure</li> <li>• Design and Strength Analysis of Ship Structure</li> <li>• Structure Analysis</li> <li>• Digital Precision Fabrication and Practice</li> </ul> | <ul style="list-style-type: none"> <li>• Power Plants</li> <li>• Fluid Machinery</li> <li>• Introduction to Hydrogen Energy Technologies</li> <li>• Computer Aided Engineering-Heat Transfer and Fluid Flow</li> <li>• Principles of Refrigeration and Air-Conditioning</li> <li>• Fuel Cells</li> <li>• Foundations of Green Energy and Combustion Technology</li> <li>• Introduction to Bland Aerodynamics</li> <li>• Technologies and Fundamentals of Aerospace Engineering</li> <li>• Vacuum Industry and Technology</li> </ul>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Virtual Instrument Desing</li> <li>• Linear Planning</li> <li>• The Principles and Application of Sensors</li> <li>• Introduction to Mechatronics</li> <li>• Micro-Electro-Mechanical System</li> <li>• Image Processing</li> <li>• CPLD Logic Circuit Design</li> <li>• Robotics</li> <li>• Educational Robot Teaching Practice and Application</li> <li>• Introduction to Machine Learning</li> <li>• Maltab Deep Learning</li> <li>• Mobile Robotics and Cobots</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |  |                   |                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



## Capstone Courses : Research Project and Implementation



|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Core Abilities</b> | <ol style="list-style-type: none"> <li>1. Develop competency in mathematical, scientific, and engineering knowledge.</li> <li>2. Design and perform experiments, data analysis and interpretation.</li> <li>3. Possess technological knowledge, skills, and tools for engineering implementation.</li> <li>4. Execute engineering component, system, and process Designs.</li> <li>5. Communicate effectively and collaborative teamwork.</li> <li>6. Explore, analyze and solve problems.</li> <li>7. Recognize current issues of engineering technology impacts on the environment, society, and the world, and pursuit sustainable learning.</li> <li>8. Comply with professional ethics and social responsibility.</li> </ol> |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



| <b>Future Employment</b>              |                              |                          |                                     |
|---------------------------------------|------------------------------|--------------------------|-------------------------------------|
| Optoelectronic Semiconductor Industry | Precision Machinery Industry | Transportation industry  | Microelectronics Machinery Industry |
| Energy Technology Industry            | Automation Industry          | Medical Aids Industry    | Manufacturing industry              |
| Information and Electronics Industry  | Creative Design Industry     | Metal machinery industry | Service Industry                    |