

# 國立雲林科技大學113學年度工程科技研究所博士班 必修 課程流程圖

## The curriculum flow diagrams of required course

112.04.21 第2次所課程委員會議通過

(講授時數-實習時數-學分數)

| 第一學年(博一) 1 <sup>st</sup> session                         |                                    | 第二學年(博二) 2 <sup>nd</sup> session                                              |                                                                              | (Lecture hours - Laboratory hours - Credit) |
|----------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                            | 第二學期 2 <sup>nd</sup> semester      | 第一學期 1 <sup>st</sup> semester                                                 | 第二學期 2 <sup>nd</sup> semester                                                |                                             |
| <b>必修課程(計 10 學分) Required Courses (Total 10 credits)</b> |                                    |                                                                               |                                                                              |                                             |
| 專題研討(一)<br>Seminar ( I )<br>0-2-1                        | 專題研討(二)<br>Seminar ( II )<br>0-2-1 | 專題研討(三)<br>Seminar ( III )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 | 專題研討(四)<br>Seminar ( IV )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 |                                             |

選修課程(至少應修 18 學分) / Elective credits (at least 18 credits should be taken)

合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)

28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.

備註：本流程圖適用本所「工程科技組」及「產業實務組」之博生。

Notes: This is applicable to the Ph.D. students in Graduate School of Engineering Science and Technology.

國立雲林科技大學113學年度工程科技研究所博士班 **核心選修課程**

The curriculum flow diagrams of professional core elective

112.11.07第1次所課程委員會議通過

**專業必修課程 Professional Required Electives**

(講授時數-實習時數-學分數)

| 第一學年(博一) 1 <sup>st</sup> session                                               |                                                                                 | 第二學年(博二) 2 <sup>nd</sup> session |  |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------|--|
| 第一學期 1 <sup>st</sup> semester                                                  |                                                                                 | 第二學期 2 <sup>nd</sup> semester    |  |
| 工程科技英文寫作與簡報(一)<br>Technical Writing and Presentation in English ( I )<br>3-0-3 | 工程科技英文寫作與簡報(二)<br>Technical Writing and Presentation in English ( II )<br>3-0-3 |                                  |  |

**核心選修課程 Core Electives**

**※電機與自動化領域(至少應修 6 學分) (student in EE take at least 6 credits)**

|                                                                 |                                                                               |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------|
| 電力電子特論(一)<br>Special Topics on Power Electronics ( I )<br>3-0-3 | 機器人學<br>Robotics<br>3-0-3                                                     |
| 電力品質<br>Electric Power Quality<br>3-0-3                         | 電磁相容理論與實務<br>Theory and Engineering of Electromagnetic Compatibility<br>3-0-3 |
| 數位通訊<br>Digital Communication<br>3-0-3                          |                                                                               |
| 隨機程序<br>Stochastic Processes<br>3-0-3                           |                                                                               |
| 即時信號處理<br>Real-time Signal Processing<br>3-0-3                  |                                                                               |
| 線性系統理論<br>Linear Systems<br>3-0-3                               |                                                                               |

**※綠能與智慧生活領域(至少應修 6 學分) (student in SOE and CSIE take at least 6 credits)**

|                                                                   |                                                                                                               |                                                                     |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 電子材料<br>Electronic Materials<br>3-0-3                             | 軟性電子與影像應用<br>Flexible Electronics and Applications for Image<br>3-0-3                                         | 固態物理學<br>Solid State Physics<br>3-0-3                               |
| 物理光學<br>Physical Optics<br>3-0-3                                  | 半導體元件模擬與量測<br>Simulation and Measurement of Semiconductor Devices<br>3-0-3                                    |                                                                     |
|                                                                   | 光學設計模擬與實務<br>Optical System Design: Simulation and Practice<br>2-2-3                                          |                                                                     |
| 高等資料庫系統<br>Advanced Database System<br>3-0-3                      | 人工智慧<br>Artificial Intelligence<br>3-0-3                                                                      | 機器人學<br>Robotics<br>3-0-3                                           |
| 高等計算機演算法<br>Advanced Computer Algorithm<br>3-0-3                  | 基於嵌入式系統設計之生理訊號擷取與分析<br>Physiological Signal Acquisition and Analysis Based on Embedded System Design<br>3-0-3 | 網路與最佳化應用<br>Computer network and optimization applications<br>3-0-3 |
| 雲端計算與行動邊緣計算<br>Cloud Computing and Mobile Edge Computing<br>3-0-3 |                                                                                                               |                                                                     |
| 行動通訊技術<br>Principle of mobile communications<br>3-0-3             |                                                                                                               |                                                                     |

**※防災與營建領域(防災至少應修 12 學分；營建至少應修 6 學分)**

**(students in DPPE take at least 12 credits, students in CE take at least 6 credits)**

|                                                         |                                                          |                                                    |                                                              |
|---------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|
| 物化處理<br>Physic chemical treatment processes<br>3-0-3    | 生物處理<br>Biological Process<br>3-0-3                      | 應用工程數學<br>Applied engineering mathematics<br>3-0-3 | 空氣污染控制理論<br>Theory of Air Pollution Control<br>3-0-3         |
| 工程熱力學<br>Engineering Thermodynamics<br>3-0-3            | 統計分析<br>Statistical Analysis<br>3-0-3                    | 綠色工程材料<br>Material of Green Engineering<br>3-0-3   | 氣膠學<br>Aerosol Science and technology<br>3-0-3               |
| 應用數值分析<br>Applied Numerical Analysis<br>3-0-3           |                                                          |                                                    |                                                              |
| 結構動力學<br>Dynamics of Structures<br>3-0-3                | 地震工程與耐震設計<br>Earthquake Engineering and Seismic<br>3-0-3 |                                                    | *決策分析與風險管理<br>Decision Analysis and Risk Management<br>3-0-3 |
| *高等土壤力學<br>Advanced Soil Mechanics<br>3-0-3             | *高等基礎工程<br>Advanced Foundation Engineering<br>3-0-3      |                                                    |                                                              |
| *管理科學<br>Management Science<br>3-0-3                    | 計量經濟學<br>Econometrics<br>3-0-3                           |                                                    |                                                              |
| 專案管理特論<br>Special Topics in Project Management<br>3-0-3 |                                                          |                                                    |                                                              |

備註：1. 工程科技英文寫作與簡報(一)、工程科技英文寫作與簡報(二)為「工程科技組」必修，且不予計入畢業學分。  
2. 核心選修課程請務必修習該領域課程 6 學分(含)以上；防災領域博士生須選修 12 學分以上核心選修課程。  
3. 「\*」為若選課學生中含外籍生，該課程以英文授課。

Notes: 1. Technical Writing and Presentation in English ( I ) ( II ) are the required elective courses for the Ph.D. Students of Graduate School of Engineering Science and Technology. These credits will not be included in graduation credits.  
2. Students in DPPE must take at least 12 credits of core electives, students in other fields must take at least 6 credits.  
3. The sign “\*” means if the course has international students, this course will be taught in English.

# 國立雲林科技大學113學年度工程科技研究所博士班 **選修** 課程流程圖

## The curriculum flow diagrams of elective course

**工程科技研究所 電資領域全英文課程流程圖**

112.11.07第1次所課程委員會議通過

### The curriculum flow diagrams in electrical engineering and computer science field

(講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                         |                                    | 第二學年(博二) 2 <sup>nd</sup> session                                              |                                                                              |
|----------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                            | 第二學期 2 <sup>nd</sup> semester      | 第一學期 1 <sup>st</sup> semester                                                 | 第二學期 2 <sup>nd</sup> semester                                                |
| <b>必修課程(計 10 學分) Required Courses (Total 10 credits)</b> |                                    |                                                                               |                                                                              |
| 專題研討(一)<br>Seminar ( I )<br>0-2-1                        | 專題研討(二)<br>Seminar ( II )<br>0-2-1 | 專題研討(三)<br>Seminar ( III )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 | 專題研討(四)<br>Seminar ( IV )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 |

### 專業必修課程 Professional Required Electives

|                                                                                                 |                                                                                                  |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 工程科技英文寫作與簡報(一)<br>Technical Writing and Presentation in<br>English ( I ) * <b>英語授課</b><br>3-0-3 | 工程科技英文寫作與簡報(二)<br>Technical Writing and Presentation in<br>English ( II ) * <b>英語授課</b><br>3-0-3 |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|

### 專業選修課程 Professional Electives (at least 12 credits)

|                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                     |                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| 無線網路 <b>英語授課</b><br>Wireless Networks<br>3-0-3<br>傅氏光學 <b>英語授課</b><br>Fourier Optics<br>3-0-3<br>數位影像處理 <b>英語授課</b><br>Digital Image Processing<br>3-0-3<br>類神經網路 <b>英語授課</b><br>Neural Network<br>3-0-3                                  | 光信號處理 <b>英語授課</b><br>Optical Signal Processing<br>3-0-3                                                                                                                                                                             | 數值方法 <b>英語授課</b><br>Numerical Methods<br>3-0-3 |
| 自然語言處理與深度學習<br>Natural language processing with deep<br>learning <b>英語授課</b><br>3-0-3<br>智慧聯網互動產品設計<br>Design of Intelligent, Networked and<br>Interactive Products <b>英語授課</b><br>3-0-3                                                  | 即時嵌入式系統 <b>英語授課</b><br>Real-Time Embedded Systems<br>3-0-3                                                                                                                                                                          |                                                |
| 高光譜影像處理技術與應用<br>Hyperspectral image processing and<br>applications * <b>英語授課</b><br>3-0-3<br>雲端計算與行動邊緣計算<br>Cloud Computing and Mobile Edge<br>Computing <b>英語授課</b><br>3-0-3<br>數位訊號處理 <b>英語授課</b><br>Digital Signal Processing<br>3-0-3 | 資料探勘 <b>英語授課</b><br>Data Mining<br>3-0-3<br>圖形識別 <b>英語授課</b><br>Pattern Recognition<br>3-0-3<br>基於嵌入式系統設計之生理訊<br>號擷取與分析 <b>英語授課</b><br>Physiological Signal Acquisition and<br>Analysis Based on Embedded System<br>Design<br>3-0-3 |                                                |

- 備註：1. 最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)  
2. 工程科技英文寫作與簡報(一)、工程科技英文寫作與簡報(二)為工程科技組必修，且不予計入畢業學分。  
3. 專業選修課程請務必修習該領域課程 12 學分(含)以上。

- Notes: 1. 28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.  
2. Technical Writing and Presentation in English ( I ) ( II ) are the required elective courses for the Ph.D. Students of Graduate School of Engineering Science and Technology. These credits will not be included in graduation credits.  
3. Professional electives are required to take at least 12 credits in electrical engineering and computer science field.

# 國立雲林科技大學113學年度工程科技研究所博士班 **選修** 課程流程圖

## The curriculum flow diagrams of elective course

**工程科技研究所數據科學與人工智慧應用領域全英文課程流程圖** 112.11.07 第1次所課程委員會議通過

**The curriculum flow diagrams for International student in Data Science & AI Application field** (講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session |                               | 第二學年(博二) 2 <sup>nd</sup> session |                               |
|----------------------------------|-------------------------------|----------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester | 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester |

### 必修課程(計 10 學分) Required Courses (Total 10 credits)

|                                   |                                    |                                                                               |                                                                              |
|-----------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 專題研討(一)<br>Seminar ( I )<br>0-2-1 | 專題研討(二)<br>Seminar ( II )<br>0-2-1 | 專題研討(三)<br>Seminar ( III )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 | 專題研討(四)<br>Seminar ( IV )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 |
|-----------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|

### 專業必修課程 Professional Required Electives

|                                                                                              |                                                                                               |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 工程科技英文寫作與簡報(一)<br>Technical Writing and Presentation in English ( I ) * <b>英語授課</b><br>3-0-3 | 工程科技英文寫作與簡報(二)<br>Technical Writing and Presentation in English ( II ) * <b>英語授課</b><br>3-0-3 |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|

### 專業選修課程 Professional Electives (at least 12 credits)

|                                                                     |                                                                               |                                                                                                |                                                                             |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 機器學習 <b>英語授課</b><br>Machine Learning<br>3-0-3(工程所主開)                | 深度學習 <b>英語授課</b><br>Deep Learning<br>3-0-3                                    | 人工智慧於時間序列 <b>英語授課</b><br>Artificial Intelligence in Time Series<br>3-0-3                       | 物聯網應用 <b>英語授課</b><br>Applications of Internet of Things<br>3-0-3            |
| 數據驅動最佳化 <b>英語授課</b><br>Data-driven Optimization<br>3-0-3            | 自然語言處理 <b>英語授課</b><br>Natural Language Processing<br>3-0-3                    | 人工智慧於財務金融 <b>英語授課</b><br>Artificial Intelligence in Finance<br>3-0-3(工程所主開)                    | 線性代數工程應用 <b>英語授課</b><br>Engineering Applications of Linear Algebra<br>3-0-3 |
| 數位影像處理 <b>英語授課</b><br>Digital Image Processing<br>3-0-3(國智所主開與本所合開) | 智慧型計算研究及分析<br>Intelligent Computation Study and Analysis <b>英語授課</b><br>3-0-3 | 人工智慧於資訊安全<br>Artificial Intelligence in Computer Security <b>英語授課</b><br>3-0-3<br>(國智所主開與本所合開) |                                                                             |
| 最佳化演算法 <b>英語授課</b><br>Optimization Algorithms<br>3-0-3(工程所主開)       | 人工智慧邊緣運算 <b>英語授課</b><br>Artificial Intelligence Edge Computing<br>3-0-3       |                                                                                                |                                                                             |
| 應用統計分析 <b>英語授課</b><br>Applied Statistical Analysis<br>3-0-3         | 數值方法 <b>英語授課</b><br>Numerical Methods<br>3-0-3                                |                                                                                                |                                                                             |
|                                                                     | 智慧物聯網 <b>英語授課</b><br>Intelligent Internet of Things<br>3-0-3                  |                                                                                                |                                                                             |
|                                                                     | 進化演算法 <b>英語授課</b><br>Evolutionary Computation<br>3-0-3                        |                                                                                                |                                                                             |

- 備註：1. 最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)  
2. 工程科技英文寫作與簡報(一)、工程科技英文寫作與簡報(二)為工程科技組必修，且不予計入畢業學分。  
3. 專業選修課程請務必修習該領域課程 12 學分(含)以上。

- Notes: 1. 28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.  
2. Technical Writing and Presentation in English ( I ) ( II ) are the required elective courses for the Ph.D. Students of Graduate School of Engineering Science and Technology. These credits will not be included in graduation credits.  
3. Professional electives are required to take at least 12 credits in Data Science & AI Application field.

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

### 工程科技研究所永續能源領域全英文課程流程圖

112.11.07 第1次所課程委員會議通過

### The curriculum flow diagrams for International student in Sustainable Energy field

(講授時數-實習時數-學分數)

(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session |                               | 第二學年(博二) 2 <sup>nd</sup> session |                               |
|----------------------------------|-------------------------------|----------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester | 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester |

#### 必修課程(計 10 學分) Required Courses (Total 10 credits)

|                                   |                                    |                                                                               |                                                                              |
|-----------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 專題研討(一)<br>Seminar ( I )<br>0-2-1 | 專題研討(二)<br>Seminar ( II )<br>0-2-1 | 專題研討(三)<br>Seminar ( III )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 | 專題研討(四)<br>Seminar ( IV )<br>0-2-1<br>博士論文<br>Doctoral Dissertation<br>3-0-3 |
|-----------------------------------|------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------|

#### 專業必修課程 Professional Required Electives

|                                                                                                 |                                                                                                  |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 工程科技英文寫作與簡報(一)<br>Technical Writing and Presentation in<br>English ( I ) * <b>英語授課</b><br>3-0-3 | 工程科技英文寫作與簡報(二)<br>Technical Writing and Presentation in<br>English ( II ) * <b>英語授課</b><br>3-0-3 |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|

#### 專業選修課程 Professional Electives (at least 12 credits)

|                                                                                   |                                                                                   |                                                                         |                                                                          |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 燃料電池 <b>英語授課</b><br>Fuel Cells<br>3-0-3                                           | 電池材料與技術 <b>英語授課</b><br>Materials and Techniques for Batteries<br>3-0-3            | 生物燃料電池 <b>英語授課</b><br>Microbial Fuel Cells<br>3-0-3(工程所主開)              | 能源轉換與綠色技術 <b>英語授課</b><br>Energy Conversion and Green Technology<br>3-0-3 |
| 材料化學分析技術 <b>英語授課</b><br>Analytical Techniques for Materials<br>Chemistry<br>3-0-3 | 生物精煉技術 <b>英語授課</b><br>Biorefinery Technology<br>3-0-3                             | 再生能源與燃料 <b>英語授課</b><br>Renewable Energy and Fuel<br>3-0-3(工程所主開)        | 電化學能源儲存系統 <b>英語授課</b><br>Electrochemical Energy Storage Systems<br>3-0-3 |
| 生物電化學 <b>英語授課</b><br>Bioelectrochemistry<br>3-0-3(工程所主開)                          | 電極材料開發 <b>英語授課</b><br>Electrode Materials Fabrication and<br>Development<br>3-0-3 | 生質能源與生物製品 <b>英語授課</b><br>Biomass Energy and Bioproducts<br>3-0-3(工程所主開) | 永續發展概論 <b>英語授課</b><br>Introduction to Sustainable Development<br>3-0-3   |
| 食品廢棄物轉化能源 <b>英語授課</b><br>Food Waste and Energy<br>3-0-3                           |                                                                                   |                                                                         | 氫能源 <b>英語授課</b><br>Hydrogen Energy<br>3-0-3                              |

備註：1. 最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)

2. 工程科技英文寫作與簡報(一)、工程科技英文寫作與簡報(二)為工程科技組必修，且不予計入畢業學分。

3. 專業選修課程請務必修習該領域課程 12 學分(含)以上。

Notes: 1. 28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.

2. Technical Writing and Presentation in English ( I ) ( II ) are the required elective courses for the Ph.D. Students of Graduate School of Engineering Science and Technology. These credits will not be included in graduation credits.

3. Professional electives are required to take at least 12 credits in Sustainable Energy field.

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

工程科技組電機工程與通訊工程領域 選修課流圖

產業實務組電機工程與通訊工程領域 選修課流圖

112.11.07 第 1 次所課程委員會會議通過

### Electrical Engineering and Communications Engineering

(講授時數-實習時數-學分數)

(Lecture hours - Laboratory hours - Credit)

第一學年(博一) 1<sup>st</sup> session

第二學年(博二) 2<sup>nd</sup> session

(講授時數-實習時數-學分數)

(Lecture hours -Laboratory hours -Credit)

第一學期 1<sup>st</sup> semester

第二學期 2<sup>nd</sup> semester

第一學期 1<sup>st</sup> semester

第二學期 2<sup>nd</sup> semester

#### 選修課程(至少應修 18 學分) Electives(at least 18 credits)

|                                                                          |                                                                               |                                                                                            |                                       |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------|
| 電力品質<br>Electric Power Quality<br>3-0-3                                  | 電力電子特論(二)<br>Special Topics on Power Electronics ( II )<br>3-0-3              | 切換式電源轉換器(二)<br>Switching Mode Power Supplies ( II )<br>3-0-3                               | 數值方法<br>Numerical Methods<br>3-0-3    |
| 電力電子特論(一)<br>Special Topics on Power Electronics ( I )<br>3-0-3          | 電力系統分析<br>Power System Analysis<br>3-0-3                                      | 行動通信<br>Mobile Communications<br>3-0-3                                                     | 智慧型控制<br>Intelligent Control<br>3-0-3 |
| 計算機在電力系統之應用<br>Computer Methods in Power Systems<br><del>3-0-3(刪除)</del> | 交直流轉換器設計<br>AC-DC Converter Design<br>3-0-3                                   | 智慧型機器人<br>Intelligent Robot<br>3-0-3                                                       | 網路程式<br>Network Programming<br>3-0-3  |
| 隨機程序<br>Stochastic Processes<br>3-0-3                                    | 機器人學<br>Robotics<br>3-0-3                                                     | 馬達控制<br>Motor Control<br>3-0-3                                                             |                                       |
| 共振式轉換器<br>Resonant Converters<br>3-0-3                                   | 切換式電源轉換器(一)<br>Switching Mode Power Supplies ( I )<br>3-0-3                   | 最佳狀態預測與控制<br>Optimal State Estimation and Control<br>3-0-3                                 |                                       |
| 排隊理論<br>Queuing Theory<br>3-0-3                                          | 數位視訊通訊<br>Digital Video/Image Communication<br>3-0-3                          | 電源轉換器小訊號分析與回授控制<br>Small Signal Analysis and Feedback Control of Power Converters<br>3-0-3 |                                       |
| 最佳控制<br>Optimal Control<br>3-0-3                                         | 通信協定工程<br>Communication Protocols Engineering<br>3-0-3                        |                                                                                            |                                       |
| 數位影像處理<br>Digital Image Processing<br>3-0-3                              | 換流器控制技術<br>Inverter Control Techniques<br>3-0-3                               | 電源變壓器與電感器設計<br>Design of Power Transformers and Inductors<br>3-0-3                         |                                       |
| 高等數位信號處理<br>Advanced Digital Signal Processing<br>3-0-3                  | 光信號處理<br>Optical Signal Processing<br>3-0-3                                   |                                                                                            |                                       |
| 電力系統特論 (一)<br>Special topics on power systems ( I )<br>3-0-3             | 電磁相容理論與實務<br>Theory and Engineering of Electromagnetic Compatibility<br>3-0-3 |                                                                                            |                                       |
| 線性系統理論<br>Linear Systems<br>3-0-3                                        | 高等電力電子 (二)<br>Advanced Power Electronics ( II )<br>3-0-3                      |                                                                                            |                                       |
| 模糊控制專論<br>Fuzzy control<br>3-0-3                                         | 圖形辨識<br>Pattern Recognition<br>3-0-3                                          |                                                                                            |                                       |
| 影像分析<br>Image Analysis<br>3-0-3                                          | 適應控制<br>Adaptive Control<br>3-0-3                                             |                                                                                            |                                       |
| 工程電磁理論<br>Engineering Electromagnetic Theory<br>3-0-3                    | 高等積體電路設計與實作<br>Advanced Integrated Circuit Design and Implementation<br>3-0-3 |                                                                                            |                                       |
| 射頻積體電路設計<br>Radio Frequency Integrated Circuits Design<br>3-0-3          | 電腦視覺<br>Computer Vision<br>3-0-3                                              |                                                                                            |                                       |
| 高等電力電子 (一)<br>Advanced Power Electronics ( I )<br>3-0-3                  | 醫學影像處理<br>Medical Image Processing<br>3-0-3                                   |                                                                                            |                                       |
| 天線理論與實務<br>Antenna Theory and Techniques<br>3-0-3                        | 數位控制<br>Digital Control<br>3-0-3                                              |                                                                                            |                                       |
| 數位通訊<br>Digital Communication<br>3-0-3                                   | 即時作業系統及應用<br>Real-Time Operating Systems and Its Applications<br>3-0-3        |                                                                                            |                                       |
| 矽智產電路設計<br>Silicon Intellectual Property Design<br>3-0-3                 | 嵌入式處理器及韌體設計<br>Embedded Processor and Firmware Design<br>3-0-3                |                                                                                            |                                       |

| 第一學年(博一) 1 <sup>st</sup> session                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 第二學年(博二) 2 <sup>nd</sup> session |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester |
| C 語言程式設計<br>C language program design<br>3-0-3<br>車載網路技術<br>Vehicular Networks<br>3-0-3<br>軌道電力技術<br>Power Supply Technology for Railway System<br>3-0-3<br>無線網路<br>Wireless Networks<br>3-0-3<br>生物資訊<br>Bioinformatics<br>3-0-3<br>智慧型機器視覺系統應用專題<br>Applications of Intelligent Machine Vision system<br>3-0-3<br>智慧型手機系統設計<br>Introduction to Mobile Handset Design<br>3-0-3<br>傅氏光學<br>Fourier Optics<br>3-0-3<br>太陽能光伏電子系統<br>Solar-Energy Photovoltaic Electronic System<br>3-0-3<br>電波與微波工程<br>Electromagnetic-wave and Microwave Engineering<br>3-0-3<br>計算機組織與結構<br>Computer Organization and Architecture<br>3-0-3<br>即時信號處理<br>Real-time Signal Processing<br>3-0-3<br>資料結構與演算法<br>Data Structures and Algorithms<br>3-0-3<br>類神經網路<br>Neural Network<br>3-0-3<br>高速數位電路訊號完整度<br>Signal Integrity for High-Speed Digital Circuits<br>3-0-3<br>智慧系統之軟硬體共同設計與驗證<br>Hardware-Software Co-Design and Verification for Intelligent System<br>3-0-3<br>適應性信號處理導論<br>Introduction for Adaptive Signal Processing<br>3-0-3<br>創新電子學分析及其硬體實務<br>Innovative Analysis of Electronics and Hardware Practices<br>3-0-3 (新增) | 電力品質特論<br>Special topics on power quality<br>3-0-3<br>高效率零電壓切換電源供應器之設計<br>Design of High efficiency ZVS Power Converter<br>3-0-3<br>微波電路設計<br>Microwave Circuit Design<br>3-0-3<br>磁浮技術<br>Magnetical Levitation Technology<br>3-0-3<br>再生能源發電技術<br>Power Generation Techniques for Renewable Energy Resources<br>3-0-3<br>微波濾波器理論與設計<br>Theory and Design of Microwave Filters<br>3-0-3<br>嵌入式系統實作<br>Design and Implementation of Embedded Operating System<br>3-0-3<br>研究方法與論文寫作<br>Research Methods and Paper Preparation<br>3-0-3<br>計算機輔助控制系統設計<br>Computer-Aided Control System Design<br>3-0-3<br>智慧型手機設計實務<br>Design Projects of Mobile Handsets<br>3-0-3<br><del>無線區域網路特論</del><br><del>Special Topics on Wireless Local Area Networks</del><br><del>3-0-3(刪除)</del><br>光電轉換導論<br>Introduction to Photovoltaic Power Conversion<br>3-0-3<br>嵌入式電腦視覺系統<br>Embedded Computer Vision Systems<br>3-0-3<br>機器學習<br>Machine Learning<br>3-0-3<br>射頻積體電路特論<br>Special Topics in Radio Frequency Integrated Circuits<br>3-0-3<br>運動控制系統專論<br>Special Topics on Motion Control System<br>3-0-3<br>非線性系統分析<br>Nonlinear Control Systems Design<br>3-0-3<br>機器人技術及應用<br>Robotic Technology and Application<br>3-0-3<br>人工智慧<br>Artificial Intelligence<br>3-0-3(學期異動)<br>創新電子學設計及其硬體實務<br>Innovative Design of Electronics and Hardware Practices<br>3-0-3 (新增) |                                  |                               |

| 第一學年(博一) 1 <sup>st</sup> session |                                                                                                                                                                                    | 第二學年(博二) 2 <sup>nd</sup> session |                               |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                      | 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester |
|                                  | 智慧製造<br>Intelligent Manufacturing<br>3-0-3 (新增)<br>網路安全應用<br>Network Security Applications<br>3-0-3 (新增)<br>軟體元件技術<br>Component-based Software Development<br>Technique 3-0-3 (新增) |                                  |                               |

合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)

28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.

備註：本流程圖適用本所「工程科技組」及「產業實務組」之博生。

Notes: This is applicable to the Ph.D. students in Graduate School of Engineering Science and Technology.

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

工程科技組半導體與光電工程領域 選修課流圖

產業實務組半導體與光電工程領域 選修課流圖

112.11.07 第 1 次所課程委員會會議通過

(講授時數-實習時數-學分數)

### Semiconductor and Optoelectronic Engineering

(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                                                       |                                                                                                  | 第二學年(博二) 2 <sup>nd</sup> session                                               |                                                                                                    |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                          | 第二學期 2 <sup>nd</sup> semester                                                                    | 第一學期 1 <sup>st</sup> semester                                                  | 第二學期 2 <sup>nd</sup> semester                                                                      |
| <b>選修課程(至少應修 18 學分) Electives(at least 18 credits)</b>                                 |                                                                                                  |                                                                                |                                                                                                    |
| 射頻積體電路概論<br>Introduction of Radio Frequency Integrated Circuits<br>3-0-3               | 射頻積體電路設計<br>Radio Frequency Integrated Circuits Design<br>3-0-3                                  | 類比通訊積體電路設計<br>Design of Analog Integrated Circuits for Communications<br>3-0-3 | 微波電路設計<br>Microwave Circuit Design<br>3-0-3                                                        |
| 類比積體電路設計<br>Analog Integrated Circuit Design<br>3-0-3                                  | 混合訊號積體電路設計<br>Mixed-Signal Integrated Circuits Design<br>3-0-3                                   | 固態物理學<br>Solid State Physics<br>3-0-3                                          | 類比積體電路設計專論<br>High-performance Analog IC design<br>3-0-3                                           |
| 科技論文導讀(一)<br>Introduction to English for Technology <I><br>3-0-3                       | 半導體製程設備<br>Semiconductor Fabrication and Instruments<br>3-0-3                                    | 薄膜技術<br>Thin Film Techniques<br>3-0-3                                          | 電子材料特論<br>3-0-3                                                                                    |
| 電子材料<br>Electronic Materials<br>3-0-3                                                  | 科技論文導讀(二)<br>Introduction to English for Technology <II><br>3-0-3                                | 半導體光電元件<br>Semiconductor Optoelectronic Devices<br>3-0-3                       | 微系統技術特論<br>Special Topics On Micro Systems<br>3-0-3                                                |
| 半導體製程與奈米技術特論<br>Special Topics on Semiconductor Processing and Nanotechnology<br>3-0-3 | 高臨場顯示技術特論<br>Special Topics on Stereoscopic Display Technology<br>3-0-3                          | 光學薄膜<br>Thin Film Optics<br>3-0-3                                              | 光電系統與元件特論<br>Special topics on optoelectronic systems and devices<br>3-0-3                         |
| 半導體實驗<br>3-0-1                                                                         | 光電材料<br>Photo-Electronic Materials<br>3-0-3                                                      | 金屬氧化半導體特論<br>Special Topics on Metal Oxide Semiconductor<br>3-0-3              | 綠能產業與技術特論<br>Special Topics on Green Energy Industries and Technology<br>3-0-3                     |
| 薄膜特性與元件分析<br>Characterization of thin film properties and devices<br>3-0-3             | 量子力學<br>Quantum Mechanics<br>3-0-3                                                               | 太陽能電池原理與製造技術<br>Principle and Fabrication Technology of Solar Cells<br>3-0-3   | 光電積體電路<br>3-0-3                                                                                    |
| 影像顯示科技導論<br>Introduction to Display Technologies<br>3-0-3                              | 材料分析技術<br>3-0-3                                                                                  |                                                                                | 半導體光學特性<br>Semiconductor Optical Characteristics<br>3-0-3                                          |
| 半導體元件物理<br>Physics of Semiconductor Devices<br>3-0-3                                   | 真空系統與薄膜技術<br>The Vacuum System and Thin Film Technology<br>3-0-3                                 |                                                                                | 積體光學<br>Integrated Optics<br>3-0-3                                                                 |
| 機電資通系統特論<br>Special topics on mechatronics, information, and communication<br>3-0-3    | 軟性電子與影像應用<br>Flexible Electronics and Applications for Image<br>3-0-3                            |                                                                                | <b>微波材料與元件特論</b><br>Special Topics on Microwave Materials and Devices Applications<br>3-0-3 (新增課程) |
| 雷射工程<br>Laser Engineering<br>3-0-3                                                     | 感測器元件<br>Sensor Devices<br>3-0-3                                                                 |                                                                                |                                                                                                    |
| 微光學<br>Micro-optics<br>3-0-3                                                           | 化合物半導體元件<br>Compound Semiconductor Devices<br>3-0-3                                              |                                                                                |                                                                                                    |
| 物理光學<br>Physical Optics<br>3-0-3                                                       | 智能光學檢測特論<br>Special Topics on System and Applications of Intelligent Optical Inspection<br>3-0-3 |                                                                                |                                                                                                    |
| 電力電子積體電路設計<br>Power Integrated Circuit Design<br>3-0-3                                 | 傅氏光學<br>Fourier Optics<br>3-0-3                                                                  |                                                                                |                                                                                                    |
| 微波材料與元件應用<br>Microwave materials and devices applications<br>3-0-3                     | 半導體元件模擬與量測<br>Simulation and Measurement of Semiconductor Devices<br>3-0-3                       |                                                                                |                                                                                                    |
|                                                                                        | 線性光學<br>Linear Optics<br>3-0-3                                                                   |                                                                                |                                                                                                    |
|                                                                                        | 光電電磁學<br>Optoelectronic Electromagnetics<br>3-0-3                                                |                                                                                |                                                                                                    |

| 第一學年(博一) 1 <sup>st</sup> session                                                                                                                 |                                                                                                                                                                                                                                                                                           | 第二學年(博二) 2 <sup>nd</sup> session |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                                                    | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                                                                                                                             | 第一學期 1 <sup>st</sup> semester    | 第二學期 2 <sup>nd</sup> semester |
|                                                                                                                                                  | 半導體應用光學<br>Applied Optics for Semiconductors<br>3-0-3<br>幾何光學<br>Geometrical Optics<br>3-0-3<br>光學設計模擬與實務<br>Optical System Design: Simulation<br>and Practice<br>2-2-3<br>高等視光儀器專論<br>Special Topics on Advanced Optical Devices<br>in Ophthalmology and Optometry<br>3-0-3(學期異動、學分組合異動) |                                  |                               |
| 合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)<br>28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar. |                                                                                                                                                                                                                                                                                           |                                  |                               |
| 備註：本流程圖適用本所「工程科技組」及「產業實務組」之博生。<br>Notes: This is applicable to the Ph.D. students in Graduate School of Engineering Science and Technology.      |                                                                                                                                                                                                                                                                                           |                                  |                               |

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

工程科技組資訊工程領域 選修課流圖

產業實務組資訊工程領域 選修課流圖

112.11.07 第 1 次所課程委員會議通過

### Computer Science and Information Engineering

(講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                                            |                                                                                                                                                                                                                                                                                                                                | 第二學年(博二) 2 <sup>nd</sup> session                           |                                                                                                                                                                       |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                               | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                                                                                                                                                                  | 第一學期 1 <sup>st</sup> semester                              | 第二學期 2 <sup>nd</sup> semester                                                                                                                                         |
| 選修課程(至少應修 18 學分) Electives(at least 18 credits)                             |                                                                                                                                                                                                                                                                                                                                |                                                            |                                                                                                                                                                       |
| 高速網路<br>High Speed Computer Network<br>3-0-3                                | 資料探勘<br>Data Mining<br>3-0-3<br>人工智慧<br>Artificial Intelligence<br>3-0-3                                                                                                                                                                                                                                                       | 人工智慧數位語音助理系統<br>AI Digital Voice Assistant System<br>3-0-3 | 機器人學<br>Robotics<br>3-0-3<br>網路與最佳化應用<br>Computer network and optimization applications<br>3-0-3<br>嵌入式多核心程式語言<br>Programming for Embedded Multi Core System<br>3-0-3 |
| 高等計算機演算法<br>Advanced Computer Algorithm<br>3-0-3                            | 圖形識別<br>Pattern Recognition<br>3-0-3                                                                                                                                                                                                                                                                                           |                                                            |                                                                                                                                                                       |
| 高等資料庫系統<br>Advanced Database System<br>3-0-3                                | 計算理論<br>Computational Theory<br>3-0-3                                                                                                                                                                                                                                                                                          |                                                            |                                                                                                                                                                       |
| 高光譜影像處理技術與應用<br>Hyperspectral image processing and applications<br>3-0-3    | 資訊隱藏學<br>Steganography and Information Hiding<br>3-0-3                                                                                                                                                                                                                                                                         |                                                            |                                                                                                                                                                       |
| 雲端計算與行動邊緣計算<br>Cloud Computing and Mobile Edge Computing<br>3-0-3           | 醫學影像處理<br>Medical Image Processing<br>3-0-3                                                                                                                                                                                                                                                                                    |                                                            |                                                                                                                                                                       |
| 無線網路與車聯網技術<br>Wireless Network and Internet of Vehicles Technology<br>3-0-3 | 學術論文寫作<br>Queueing Network Theory<br>3-0-3                                                                                                                                                                                                                                                                                     |                                                            |                                                                                                                                                                       |
| 多媒體安全<br>Multimedia Security<br>3-0-3                                       | 排隊網路理論<br>Queueing Network Theory<br>3-0-3                                                                                                                                                                                                                                                                                     |                                                            |                                                                                                                                                                       |
| 機器學習<br>Machine Learning<br>3-0-3                                           | 高等計算機網路<br>Advanced Computer Network Technology<br>3-0-3                                                                                                                                                                                                                                                                       |                                                            |                                                                                                                                                                       |
| 嵌入式作業系統<br>Embedded Operating Systems<br>3-0-3                              | <del>分散式資料庫<br/>Distributed Database<br/>3-0-3(刪除)</del>                                                                                                                                                                                                                                                                       |                                                            |                                                                                                                                                                       |
| 行動通訊技術<br>Principle of mobile communications<br>3-0-3                       | 基於嵌入式系統設計之生理訊號擷取與分析<br>Physiological Signal Acquisition and Analysis Based on Embedded System Design<br>3-0-3                                                                                                                                                                                                                  |                                                            |                                                                                                                                                                       |
| 非地面網路<br>Non-Terrestrial Networks<br>3-0-3                                  | 室內定位技術與應用<br>Indoor Positioning Technologies and Applications<br>3-0-3                                                                                                                                                                                                                                                         |                                                            |                                                                                                                                                                       |
| 嵌入式系統應用專題實作<br>Embedded System Design Project<br>3-0-3                      | 資料科學<br>Data Science<br>3-0-3<br>5G 行動網路<br>5G Cellular Networking<br>3-0-3<br>演算法設計與分析專論<br>Advanced Topics in the Design and Analysis of Algorithms<br>3-0-3<br><del>B5G 核心網路計算與新無線<br/>資源虛擬化<br/>3-0-3(刪除)</del><br>B5G 核心網路計算虛擬化與MDP 強化學習<br>B5G Core Network Computing, Virtualizing and MDP RL Machine Learning3-0-3(新增) |                                                            |                                                                                                                                                                       |

| 第一學年(博一) 1 <sup>st</sup> session                                                                                                                 |                                                                                                                                                                                          | 第二學年(博二) 2 <sup>nd</sup> session                                                       |                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                                                    | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                            | 第一學期 1 <sup>st</sup> semester                                                          | 第二學期 2 <sup>nd</sup> semester                     |
| 高等計算機圖學<br>Advanced Computer Graphics<br>3-0-3                                                                                                   | 行動計算<br>Mobile Computing<br>3-0-3                                                                                                                                                        | 電腦視覺<br>Computer Vision<br>3-0-3                                                       | 醫學影像分析<br>Medical Image Analysis<br>3-0-3         |
| 行動雲端運算<br>Introduction to Mobile Cloud Computing<br>3-0-3                                                                                        | 通訊協定<br>Communication Protocol<br>3-0-3                                                                                                                                                  | 移動規劃<br>Motion Planning<br>3-0-3                                                       | 檢測與估計<br>Detection and Estimation Theory<br>3-0-3 |
| 雲端運算與物聯網<br>Cloud Computing and Internet of Things<br>3-0-3                                                                                      | 數位通訊<br>Digital Communication<br>3-0-3                                                                                                                                                   | 光通訊網路<br>Optical Communications Network<br>3-0-3                                       |                                                   |
| 無線網路<br>Wireless Networks<br>3-0-3                                                                                                               | 圖形理論<br>Graph Theory<br>3-0-3                                                                                                                                                            | 高等類神經網路<br>Advanced Neural Networks<br>3-0-3                                           |                                                   |
| 企業網路安全技術<br>Enterprise Network Security<br>3-0-3                                                                                                 | 多媒體系統<br>Multi-Media Systems<br>3-0-3                                                                                                                                                    | 正交分頻多工技術<br>Orthogonal Frequency-Division<br>Multiplexing, OFDM<br>3-0-3               |                                                   |
| 即時作業系統<br>Real-time Operating System<br>3-0-3                                                                                                    | 類神經網路<br>Neural Network<br>3-0-3                                                                                                                                                         | 網路效能分析模擬<br>Network Performance Analysis and<br>Simulation<br>3-0-3                    |                                                   |
| 人機介面設計<br>Design of Human Computer Interface<br>3-0-3                                                                                            | <del>空間時間編碼理論</del><br><del>Space-Time Coding</del><br><del>3-0-3(刪除)</del>                                                                                                              | 網路資訊檢索與搜尋引擎<br>Web Information Retrieval and Search<br>Engine<br>3-0-3                 |                                                   |
| 數位訊號處理<br>Digital Signal Processing<br>3-0-3                                                                                                     | 資通訊技術於災害管理之應用<br>Information and Communication<br>Technology for Disaster Management<br>3-0-3                                                                                            | 健康與照護管理之資訊應用<br>The informative applications of health and<br>care management<br>3-0-3 |                                                   |
| 智慧型手持裝置效能分析與調<br>校工具設計<br>Benchmark and Profiling Tool Deign for<br>Handheld Device<br>3-0-3                                                     | 嵌入式微處理器系統<br>Embedded Microprocessor System<br>3-0-3                                                                                                                                     |                                                                                        |                                                   |
| 微型感測裝置嵌入式系統與軟<br>體實作<br>Micro-Sensor Based Embedded System<br>& Software Implementation<br>3-0-3                                                 | 最佳化計算<br>Optimization<br>3-0-3                                                                                                                                                           |                                                                                        |                                                   |
|                                                                                                                                                  | 零信任網路安全<br>Zero Trust Network Security<br>3-0-3                                                                                                                                          |                                                                                        |                                                   |
|                                                                                                                                                  | <del>進階高光譜數據開發</del><br><del>Advances in Hyperspectral Data</del><br><del>Exploitation(3-0-3)(新增)</del><br><del>高等密碼學</del><br><del>Advance Cryptography</del><br><del>3-0-3(學期異動)</del> |                                                                                        |                                                   |
| 合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)<br>28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar. |                                                                                                                                                                                          |                                                                                        |                                                   |
| 備註：本流程圖適用本所「工程科技組」及「產業實務組」之博生。                                                                                                                   |                                                                                                                                                                                          |                                                                                        |                                                   |
| Notes: This is applicable to the Ph.D. students in Graduate School of Engineering Science and Technology.                                        |                                                                                                                                                                                          |                                                                                        |                                                   |

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

工程科技組防災與環境資源工程領域 選修課流圖

產業實務組防災與環境資源工程領域 選修課流圖

112.11.07 第 1 次所課程委員會議通過

### Disaster Prevention and Environmental Engineering

(講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

第一學年(博一) 1<sup>st</sup> session

第二學年(博二) 2<sup>nd</sup> session

第一學期 1<sup>st</sup> semester

第二學期 2<sup>nd</sup> semester

第一學期 1<sup>st</sup> semester

第二學期 2<sup>nd</sup> semester

#### 選修課程(至少應修 18 學分) Electives(at least 18 credits)

#### 核心課程(至少應修 12 學分) Core Electives(at least 12 credits)

|                                                      |                                                      |                                                    |                                                      |
|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------|------------------------------------------------------|
| 物化處理<br>Physic chemical treatment processes<br>3-0-3 | 生物處理<br>Physic chemical treatment processes<br>3-0-3 | 應用工程數學<br>Applied engineering mathematics<br>3-0-3 | 空氣污染控制理論<br>Theory of Air Pollution Control<br>3-0-3 |
| 工程熱力學<br>Engineering Thermodynamics<br>3-0-3         | 統計分析<br>Statistical Analysis<br>3-0-3                | 綠色工程材料<br>Material of Green Engineering<br>3-0-3   | 氣膠學<br>Aerosol Science and technology<br>3-0-3       |
| 應用數值分析<br>Numerical Analysis<br>3-0-3                |                                                      |                                                    |                                                      |

#### 核心實驗課程(至少應修 3 學分) Core Experimental Courses(at least 3 credits)

|                                                            |                                 |                                                    |
|------------------------------------------------------------|---------------------------------|----------------------------------------------------|
| 空氣污染物採樣分析<br>Air Pollutants Sampling and Analysis<br>2-3-3 | 水質分析<br>water analysis<br>2-3-3 | 防災與安全實驗<br>Disaster Prevention and Safety<br>2-3-3 |
|------------------------------------------------------------|---------------------------------|----------------------------------------------------|

#### 選修課程 Electives

|                                                                                   |                                                                      |                                                               |                                                                         |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------|
| 廢棄物處理及資源化<br>The wastes handles and recycling<br>3-0-3                            | 環工實驗設計<br>Experimental Design for Environmental Engineering<br>3-0-3 | 環境系統分析<br>Environmental Systems Analysis<br>3-0-3             | 下水道工程設計<br>Sewer design<br>3-0-3                                        |
| 火災爆炸模擬<br>Fire and Explosion Simulation<br>3-0-3                                  | 環境經濟學<br>Environmental Economics<br>3-0-3                            | 製程安全設計<br>Process Safety Design<br>3-0-3                      | 土壤污染整治<br>Soil Remediation<br>3-0-3                                     |
| 地下水文學<br>Groundwater Hydrology<br>3-0-3                                           | 系統安全分析<br>System safety Analysis<br>3-0-3                            | 電氣安全<br>Electric Safety<br>3-0-3                              | 失控反應<br>Runaway Reaction Hazard<br>3-0-3                                |
| 安全科學原理<br>Principles of Safety Science<br>3-0-3                                   | 製程安全控制<br>Control of Process Safety<br>3-0-3                         | 水處理工程與設計<br>Water Treatment Engineering and Design<br>3-0-3   | 清潔製程特論<br>Special Topics on Cleaner Manufacturing Process<br>3-0-3      |
| 水資源系統與工程<br>Water Resources Engineering System<br>3-0-3                           | 跨介質傳輸理論<br>Multi-media Transport Theory<br>3-0-3                     | 半導體製程安全<br>Semiconductor Process Safety<br>3-0-3              | 河川流域管理<br>Management of River Basin<br>3-0-3                            |
| 化工製程危害評估<br>Evaluating the Hazards of chemical process<br>3-0-3                   | 地下水污染防治<br>Groundwater pollution<br>3-0-3                            | 輻射防護學<br>Radiation Protection<br>3-0-3                        | 製程安全評估<br>Process Safety Evaluation<br>3-0-3                            |
| 生物統計<br>Biostatistics<br>3-0-3                                                    | 損失防阻<br>Loss Prevention<br>3-0-3                                     | 水文分析<br>Hydrological Analysis<br>3-0-3                        | 大氣化學與傳輸<br>Atmospheric Chemistry and transport<br>3-0-3                 |
| 卡計分析與應用<br>Calorimetric Analyses and Applications<br>2-3-3                        | 熱危害控制<br>Controlling the Thermal Hazards<br>3-0-3                    | 空氣品質模式分析<br>Air Quality modeling<br>3-0-3                     | 空氣品質管理<br>Air Quality Management<br>3-0-3                               |
| 職業衛生<br>Occupational Hygiene<br>3-0-3                                             | 科技論文寫作<br>Scientific Reports Writing<br>2-0-2                        | 環境化學特論<br>Advanced Environmental Chemistry<br>3-0-3           | 儲運安全<br>Storage and Transportation Safety<br>3-0-3                      |
| 環境科技及全球變遷<br>Environmental Technology and Global Change<br>3-0-3                  | 災害風險評估<br>Risk Assessment<br>3-0-3                                   | 應變技術特論<br>Emergency Response<br>3-0-3                         | 生物技術特論<br>Special Topics in Biotechnology<br>3-0-3                      |
| 生物燃料電池<br>Microbial fuel cells<br>3-0-3                                           | 室內環境品質特論<br>Special Topics on Indoor Environmental Quality<br>3-0-3  | 生物綠色能源開發與應用<br>Bioenergy development and application<br>3-0-3 | 水土資源防災特論<br>Special Topics of Soil & Water Disaster Prevention<br>3-0-3 |
| 工業與環境毒物學<br>Industrial & Environmental Toxicology<br>3-0-3                        | 暴露評估<br>Exposure Assessment<br>3-0-3                                 | 環境規劃與管理實務<br>Environmental Planning and Management<br>3-0-3   | 有害空氣污染物控制<br>Control of Hazardous Air Pollutants<br>3-0-3               |
| 水資源再生處理技術<br>The Reclamation and Treatment Technology of Water Resources<br>3-0-3 | 生物復育原理與應用<br>Bioremediation principles applications<br>3-0-3         | 空氣污染控制設備設計<br>Air Pollution Control and Design<br>3-0-3       |                                                                         |

| 第一學年(博一) 1 <sup>st</sup> session                                                                                                                                                                                                                                                                                                                                                |                                                                                            | 第二學年(博二) 2 <sup>nd</sup> session            |                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                                                                                                                                                                                                                                                                                   | 第二學期 2 <sup>nd</sup> semester                                                              | 第一學期 1 <sup>st</sup> semester               | 第二學期 2 <sup>nd</sup> semester |
| 化學安全與防護<br>Chemical Safety and Security<br>3-0-3                                                                                                                                                                                                                                                                                                                                | 國土安全與防護<br>Homeland Security<br>3-0-3                                                      | 職業病防治<br>Professional Epidemiology<br>3-0-3 |                               |
| 防災特論<br>Special Topics on Disaster Mitigation and Prevention<br>3-0-3                                                                                                                                                                                                                                                                                                           | 水土保持<br>Soil and Water Conservation<br>3-0-3                                               |                                             |                               |
| 水文地質學<br>Hydrogeology<br>3-0-3                                                                                                                                                                                                                                                                                                                                                  | 健康風險評估<br>Health Risk Assessment<br>3-0-3                                                  |                                             |                               |
| 水質模式分析<br>Water Quality Modeling<br>3-0-3                                                                                                                                                                                                                                                                                                                                       | 材料破損分析<br>Failure Analysis<br>3-0-3                                                        |                                             |                               |
| 機械安全設計<br>Mechanical Safety Design<br>3-0-3                                                                                                                                                                                                                                                                                                                                     | 科技英文論文導讀<br>Scientific English Reports and Papers Reading<br>2-0-2                         |                                             |                               |
|                                                                                                                                                                                                                                                                                                                                                                                 | 人因工程<br>Human Factor Engineering<br>3-0-3                                                  |                                             |                               |
|                                                                                                                                                                                                                                                                                                                                                                                 | 工業衛生管理實務<br>Industrial Hygiene Management<br>3-0-3                                         |                                             |                               |
|                                                                                                                                                                                                                                                                                                                                                                                 | 人工智慧在環境工程之應用<br>Artificial Intelligence Applications in Environmental Engineering<br>3-0-3 |                                             |                               |
| 合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)<br>28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.                                                                                                                                                                                                                                |                                                                                            |                                             |                               |
| 備註：1. 本流程圖適用本所工程科技組及產業實務組之博生。<br>2. 核心及實驗課程：（選修前須經指導教授同意或指定）<br>本領域博士生須選修十二學分核心選修課程及三學分核心選修實驗課程（選修前須經指導教授同意或指定）。博士生為本校環安系碩士班（一般生）畢業生時，可申請抵修核心課程，但不採計其為畢業學分。<br>(1). 核心課程：至少選修四科，學期成績須及格<br>物化處理、應用工程數學、生物處理、空氣污染控制理論、綠色工程材料<br>應用數值分析、工程熱力學、氣膠學、統計分析<br>(2). 實驗課程：至少選修一科，學期成績須及格<br>水質分析、空氣污染物採樣分析、防災與安全實驗<br>3. 非本校環安系碩士班（一般生）畢業生時，須依本校環境與安全衛生工程系碩士班修業及學位考試細則第十一條規定，補修相關大學部科目。 |                                                                                            |                                             |                               |

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

工程科技組營建工程領域 選修課流圖

產業實務組營建工程領域

112.11.07 第 1 次所課程委員會議通過

### Construction Engineering

(講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                                    |                                                                                                           | 第二學年(博二) 2 <sup>nd</sup> session                                              |                                                                                |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                       | 第二學期 2 <sup>nd</sup> semester                                                                             | 第一學期 1 <sup>st</sup> semester                                                 | 第二學期 2 <sup>nd</sup> semester                                                  |
| <b>選修課程(至少應修 18 學分) Electives(at least 18 credits)</b>              |                                                                                                           |                                                                               |                                                                                |
| <b>結構工程</b>                                                         |                                                                                                           |                                                                               |                                                                                |
| 基本結構力學<br>Fundamentals of Structural Mechanics<br>3-0-3             | 有限元素法<br>Finite Element Method<br>3-0-3                                                                   | *電腦在結構工程上之應用<br>Computer Applications in Structural Engineering<br>3-0-3      | 土壤-結構互制分析<br>Soil-structure Interaction Analysis<br>3-0-3                      |
| 高等結構學<br>Advanced Structures Analysis<br>3-0-3                      | 地震工程與耐震設計<br>Earthquake Engineering and Seismic<br>3-0-3                                                  |                                                                               | 結構控制<br>Structural Control<br>3-0-3                                            |
| *結構動力學<br>Dynamics of Structures<br>3-0-3                           | *結構系統量測與識別<br>Measurement and Identification for Structural Systems<br>3-0-3                              |                                                                               |                                                                                |
| *混凝土構件行為學<br>Concrete Member Behavior<br>3-0-3                      | 鋼結構塑性設計<br>Plastic Design of Steel Structures<br>3-0-3                                                    |                                                                               |                                                                                |
| 數值分析<br>Applied Numerical Analysis<br>3-0-3(學期異動)                   | *結構穩定學<br>Stability of Structures<br>3-0-3(學期異動)                                                          |                                                                               |                                                                                |
| 橋樑工程特論<br>Special Topics of Bridge Engineering<br>3-0-3             | 高等工程數學<br>Advanced Engineering Mathematics<br>3-0-3(學期異動)                                                 |                                                                               |                                                                                |
| <b>營建材料</b>                                                         |                                                                                                           |                                                                               |                                                                                |
| 高等混凝土學<br>Advanced Concrete Theory<br>3-0-3                         | 混凝土構造物維修與補強<br>Repair and Retrofitting of Concrete Structure<br>3-0-3                                     | 土木防災專題<br>Special Topics of Disaster Prevention on Civil Engineering<br>3-0-3 | 結構防火工程<br>Fire Protection of Structural Engineering<br>3-0-3                   |
| *瀝青混凝土與配比設計<br>Asphalt Concrete and Mix Design<br>3-0-3             | 鋪面分析與設計<br>Pavement Analysis and Design<br>3-0-3                                                          |                                                                               |                                                                                |
| 數據分析方法<br>Data Analysis<br>3-0-3                                    | 彈性力學<br>Elasticity<br>3-0-3                                                                               |                                                                               |                                                                                |
| 滲透理論<br>Theory of Diffusion<br>3-0-3(刪除)                            |                                                                                                           |                                                                               |                                                                                |
| <b>大地工程</b>                                                         |                                                                                                           |                                                                               |                                                                                |
| *土壤動力學<br>Soil Dynamics<br>3-0-3                                    | *動力基礎設計<br>Dynamic Foundation Design<br>3-0-3                                                             | *應用大地工程<br>Applied Geotechnical Engineering<br>3-0-3                          | 高等地工試驗<br>Advanced Geotechnical Engineering Testing<br>3-0-3                   |
| *大地工程數值方法<br>Numerical Methods in Geotechnical Engineering<br>3-0-3 | *高等基礎工程<br>Advanced Foundation Engineering<br>3-0-3                                                       |                                                                               |                                                                                |
| *高等土壤力學<br>Advanced Soil Mechanics<br>3-0-3                         | *邊坡穩定分析與個案討論<br>Slope Stability Analysis and Case Study<br>3-0-3                                          |                                                                               |                                                                                |
| <b>管理建築</b>                                                         |                                                                                                           |                                                                               |                                                                                |
| *價值管理<br>Value Management<br>3-0-3                                  | 統計分析<br>Statistical Analysis<br>3-0-3                                                                     | 專案管理<br>Project Management<br>3-0-3                                           | 營建電子化特論<br>Special Topics in Constructions e-Business<br>3-0-3                 |
| 建築構造特論<br>Advanced Topics in Building Production<br>3-0-3           | 管理科學技術應用於營建與物業管理領域<br>Applications of Management Science in Construction and Property Management<br>3-0-3 | 資產管理<br>Property management<br>3-0-3                                          | 建築環境與設備特論<br>Advanced Architectural Environment and service equipment<br>3-0-3 |

| 第一學年(博一) 1 <sup>st</sup> session                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                               | 第二學年(博二) 2 <sup>nd</sup> session                            |                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                                                                                                                                                                                                                     | 第二學期 2 <sup>nd</sup> semester                                                                                                                                                                                                                                                                                                                                                                                                                 | 第一學期 1 <sup>st</sup> semester                               | 第二學期 2 <sup>nd</sup> semester                                 |
| *管理科學<br>Management Science<br>3-0-3                                                                                                                                                                                                                                                                              | 最佳化技術於營建管理資訊系統開發之應用<br>Optimization Application for Construction Management Information<br>3-0-3                                                                                                                                                                                                                                                                                                                                              | 智慧型建築特論<br>Advanced Topics in Intelligent Building<br>3-0-3 | *決策分析與風險管理<br>Decision Analysis and Risk Management<br>3-0-3  |
| 專案管理特論<br>Special Topics in Project Management<br>3-0-3                                                                                                                                                                                                                                                           | 人工智慧於管理決策上之應用<br>Artificial Intelligence Application in Management<br>3-0-3<br>營建管理特論<br>Advanced Topics for Construction Management<br>3-0-3<br>社區開發與總體營造<br>Residence Development and Community Build<br>3-0-3<br>*不動產投資<br>Investment And Decision Analysis of Property<br>3-0-3<br>物業管理特論<br>Advanced Topics in Property Management<br>3-0-3<br>公共工程管理<br>Management of Infrastructure Systems<br>3-0-3<br>計量經濟學<br>Econometrics<br>3-0-3 |                                                             | *設施維護管理<br>Facility maintenance and management<br>3-0-3(學期異動) |
| 合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)<br>28 credits are required for graduation of Ph.D. degree, including Doctoral Dissertation and Seminar.                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |                                                               |
| 備註：1. 本流程圖適用本所工程科技組及產業實務組之博生。<br>2. 「高等地工試驗」先修課程「高等土壤力學」。<br>3. 「*」為若選課學生中含外籍生，該課程以英文授課。                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |                                                               |
| Notes: 1. This is applicable to the Ph.D. Students of Engineering Science and Technology.<br>2. The prerequisite course of " Advanced Geotechnical Engineering Testing " is "Advanced Soil Mechanics ".<br>3. The sign ”*” means if the course has international students, this course will be taught in English. |                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                             |                                                               |

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

### 產業實務組機械工程領域 選修課流圖

112.11.07 第1次所課程委員會議通過

(講授時數-實習時數-學分數)

### Mechanical Engineering in Industry Practice Program

(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                                                 |                                                                                                | 第二學年(博二) 2 <sup>nd</sup> session            |                                                              |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                    | 第二學期 2 <sup>nd</sup> semester                                                                  | 第一學期 1 <sup>st</sup> semester               | 第二學期 2 <sup>nd</sup> semester                                |
| <b>共同選修課程</b>                                                                    |                                                                                                |                                             |                                                              |
| 科技英文(三)<br>Technology English Reading ( III )<br>2-0-2                           | 科技英文(四)<br>Technology English Reading ( IV )<br>2-0-2                                          |                                             |                                                              |
| 專利寫作理論與實務<br>Theories and Practices in Drafting Patent Specification<br>3-0-3    | 專利說明書撰寫<br>Drafting of Patent Specification<br>3-0-3                                           |                                             |                                                              |
| 專利法概論<br>The Introduction of Patent Laws<br>3-0-3                                | 專利侵權鑑定理論與實務<br>Theories and Practices in Patent Infringe<br>3-0-3                              |                                             |                                                              |
| <b>機電整合與自動控制</b>                                                                 |                                                                                                |                                             |                                                              |
| 微電腦介面與控制<br>Microcomputer interfacing and control<br>3-0-3                       | 隨機過程<br>Random process<br>3-0-3                                                                | 微機電系統設計<br>Micro System Technology<br>3-0-3 | 進階圖控程式應用<br>Advanced Applications of the G Language<br>3-0-3 |
| 線性系統<br>Linear System<br>3-0-3                                                   | 液壓控制特論(一)<br>3-0-3                                                                             |                                             |                                                              |
| 伺服液氣壓學與實務<br>Servo-Hydraulics and Servo-Pneumatics, Theory and Practice<br>3-0-3 | 控制系統導論<br>Introduction to Control Systems<br>3-0-3                                             |                                             |                                                              |
| 最佳控制<br>Optimal Control<br>3-0-3                                                 | 智慧工業技術與應用<br>Application of Smart Industrial Control Technology<br>3-0-3                       |                                             |                                                              |
| 硬體描述語言與伺服晶片設計<br>Hardware Description Language and Servo Chip Design<br>3-0-3    | 智慧型控制<br>Intelligent Control<br>3-0-3                                                          |                                             |                                                              |
| 訊號與系統<br>Signals and Systems<br>3-0-3                                            | 奈米工程技術<br>Nanotechnology<br>3-0-3                                                              |                                             |                                                              |
| 機器視覺<br>Machine Vision<br>3-0-3                                                  | 田口方法<br>Taguchi Methods<br>3-0-3                                                               |                                             |                                                              |
| 數位控制系統<br>Sampled-Data and Digital Control Systems<br>3-0-3                      | 機器深度學習基本原理與程式實現<br>Fundamental Principle and Implementation for Machine Deep Learning<br>3-2-4 |                                             |                                                              |
| 電力電子在電動車的應用<br>Power Electronics for Electric Drive Vehicles<br>3-0-3            |                                                                                                |                                             |                                                              |
| 控制系統設計<br>Control System Design<br>3-0-3                                         |                                                                                                |                                             |                                                              |
| 感測器應用<br>Application of Sensors<br>3-0-3                                         |                                                                                                |                                             |                                                              |
| 單板電腦應用於控制系統<br>Application of Single Board Computer in Control System<br>3-0-3   |                                                                                                |                                             |                                                              |
| 系統動態量測<br>Measurement of System Dynamics<br>3-0-3                                |                                                                                                |                                             |                                                              |
| <b>機械製造與材料力學</b>                                                                 |                                                                                                |                                             |                                                              |
| 金屬切削學<br>Metal Cutting<br>3-0-3                                                  | 塑性力學<br>Plasticity<br>3-0-3                                                                    | 相變態<br>Phase Transformation<br>3-0-3        |                                                              |
| 彈性力學<br>Elasticity<br>3-0-3                                                      | 物理冶金<br>Physical Metallurgy<br>3-0-3                                                           |                                             |                                                              |
| 潤滑技術<br>Lubrication Technology<br>3-0-3                                          | 金屬加工成形技術<br>Technology of Metal Working and Forming<br>3-0-3                                   |                                             |                                                              |
| 微噴嘴製造及控制系統<br>Manufacture and Control System for Micro Nozzles<br>3-0-3          | 高分子製品製程模擬<br>Computational Polymer Processing<br>3-0-3                                         |                                             |                                                              |
| 半導體製程技術<br>Semiconductor Manufacture Technology<br>3-0-3                         | 日本技術特論(二)<br>Special Topics of Japan Technology ( II )<br>3-0-3                                |                                             |                                                              |
| 高分子材料製品設計與製造<br>Design and Manufacturing of Polymer Products<br>3-0-3            | 精微加工技術特論(二)<br>Special Topics of Micro Precision Machining Technology ( II )<br>3-0-3          |                                             |                                                              |

| 第一學年(博一) 1 <sup>st</sup> session                                                                             |                                                                          | 第二學年(博二) 2 <sup>nd</sup> session     |                               |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------|-------------------------------|
| 第一學期 1 <sup>st</sup> semester                                                                                | 第二學期 2 <sup>nd</sup> semester                                            | 第一學期 1 <sup>st</sup> semester        | 第二學期 2 <sup>nd</sup> semester |
| 材料機械性質<br>Mechanical Properties of Materials<br>3-0-3                                                        | 分子系統模擬<br>Simulation of Molecular Systems<br>3-0-3                       |                                      |                               |
| 日本技術特論(一)<br>Special Topics of Japan Technology ( I )<br>3-0-3                                               |                                                                          |                                      |                               |
| 精微加工技術特論(一)<br>Special Topics of Micro Precision<br>Machining Technology (I)<br>3-0-3                        |                                                                          |                                      |                               |
| <b>機械設計與固體力學</b>                                                                                             |                                                                          |                                      |                               |
| 彈性力學<br>Elasticity<br>3-0-3                                                                                  | 機械與結構系統動力學<br>Dynamics of Mechanical and Structural Systems<br>3-0-3     |                                      |                               |
| 精密機器設計<br>Precision Machine Design<br>3-0-3                                                                  | 破壞力學<br>Fracture Mechanics<br>3-0-3                                      |                                      |                               |
| 有限元素方法<br>Introduction to Finite Element Method<br>3-0-3                                                     | 高等機構學<br>Advanced Kinematics of Mechanism<br>3-0-3                       |                                      |                               |
| 技術光學<br>Technical Optics<br>3-0-3                                                                            | 光學式工程計量<br>Optical Inspection Technique<br>3-0-3                         |                                      |                               |
| 創意性機構設計<br>Creative Mechanism Design<br>3-0-3                                                                | 機器人學<br>Robotics<br>3-0-3                                                |                                      |                               |
| 高等動力學<br>Advanced Dynamics<br>3-0-3                                                                          | 最佳化設計<br>Optimal Design<br>3-0-3                                         |                                      |                               |
| 尺寸鏈設計<br>Dimension Chain Design<br>3-0-3                                                                     | 超音波工程<br>Ultrasonic Engineering<br>3-0-3                                 |                                      |                               |
|                                                                                                              | 複合材料力學<br>Mechanics of Composite Materials<br>3-0-3                      |                                      |                               |
|                                                                                                              | 機臺檢測工程<br>Measurement Engineering for Machine Tools<br>3-0-3             |                                      |                               |
| <b>能源工程與熱流科技</b>                                                                                             |                                                                          |                                      |                               |
| 建築物煙控系統設計<br>Smoke Control Systems Design of Building<br>3-0-3                                               | 熱系統分析<br>Analysis of Thermal systems<br>3-0-3                            | 生物流體力學<br>Biofluidmechanics<br>3-0-3 |                               |
| 能源管理系統分析<br>3-0-3                                                                                            | 沸騰、冷凝兩相流學<br>Boiling and Condensation Two-phase Flow<br>3-0-3            |                                      |                               |
| 引擎設計<br>Internal Combustion Engine Design<br>3-0-3                                                           | 計算流體力學<br>Introduction To Computational Fluid Dynamic<br>3-0-3           |                                      |                               |
| 高等流體力學<br>Advanced Fluid Dynamics<br>3-0-3                                                                   | 火災動力學<br>Fire Dynamics<br>3-0-3                                          |                                      |                               |
| 微奈米尺度熱流之基礎與工程<br>應用<br>Fundamentals of Micro/Nano Thermal<br>Fluids and Its Engineering Application<br>3-0-3 | 流場量測與分析<br>Measurement in Fluid Mechanics<br>3-0-3                       |                                      |                               |
|                                                                                                              | 高等熱力學<br>Advanced Thermodynamics<br>3-0-3                                |                                      |                               |
|                                                                                                              | 氣動力學<br>Gas Dynamics<br>3-0-3                                            |                                      |                               |
|                                                                                                              | 輻射熱傳學<br>3-0-3                                                           |                                      |                               |
|                                                                                                              | 氣渦輪引擎與工業應用<br>Gas turbine and Applications on Industry<br>3-0-3          |                                      |                               |
|                                                                                                              | 微流體系統設計與製造<br>Design and Fabrication of Microfluidics<br>System<br>3-0-3 |                                      |                               |
|                                                                                                              | 數值分析及其應用<br>Numerical Analysis and Application<br>3-0-3                  |                                      |                               |
|                                                                                                              | 高等熱傳學<br>Advanced Heat Transfer<br>3-0-3                                 |                                      |                               |
| <b>選修課程(至少應修 18 學分)</b>                                                                                      |                                                                          |                                      |                               |
| 合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)                                                                     |                                                                          |                                      |                               |
| 備註：本流程圖適用本所「產業實務組」之博生。                                                                                       |                                                                          |                                      |                               |

# 國立雲林科技大學113學年度工程科技研究所博士班 選修 課程流程圖

## The curriculum flow diagrams of elective course

### 產業實務組化學工程與材料工程領域 選修課流圖

112.11.07 第1次所課程委員會議通過

### Chemical and Materials Engineering in Industry Practice Program

(講授時數-實習時數-學分數)  
(Lecture hours - Laboratory hours - Credit)

| 第一學年(博一) 1 <sup>st</sup> session                                            |                                                                                     | 第二學年(博二) 2 <sup>nd</sup> session                                |                                            |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------|
| 第一學期 1 <sup>st</sup> semester                                               | 第二學期 2 <sup>nd</sup> semester                                                       | 第一學期 1 <sup>st</sup> semester                                   | 第二學期 2 <sup>nd</sup> semester              |
| 高等輸送現象<br>Advanced Transport Phenomena<br>3-0-3                             | 高等化工動力學<br>Advanced Chemical Engineering Kinetics<br>3-0-3                          | 智慧財產權與工程倫理<br>Intellectual Property Engineering Ethics<br>2-0-2 | 高分子黏彈學<br>Polymer Viscoelasticity<br>3-0-3 |
| 高等化工熱力學<br>Advanced Thermodynamics of Chemical Engineering<br>3-0-3         | 專業寫作與表達<br>3-0-3                                                                    | 橡膠材料特論<br>Special Topics of Elastomeric Materials<br>3-0-3      |                                            |
| 有機合成專論<br>Special Topics on Organic Synthesis<br>3-0-3                      | 電極材料特論<br>Electrode Evaluation for the chemical Process Industry<br>3-0-3           | 聚合反應工程<br>Polymerization Reaction Engineering<br>3-0-3          |                                            |
| 高等高分子物理<br>Advanced Polymer Physics<br>3-0-3                                | 界面化學特論<br>Special Topics of Interfacial Chemistry<br>3-0-3                          | 化學感測器特論<br>Special Topics on chemical sensors<br>3-0-3          |                                            |
| 無機材料特論<br>Special Topics on Inorganic Materials<br>3-0-3                    | 高等高分子化學<br>Advanced Polymer Chemistry<br>3-0-3                                      | 微電子製程與構裝<br>Microelectronics Processing and Packaging<br>3-0-3  |                                            |
| 電化學特論<br>Advanced electrochemistry<br>3-0-3                                 | 功能性高分子特論<br>Advanced Functional Polymers<br>3-0-3                                   | 製程危害性評估<br>Polymer Characterization<br>3-0-3                    |                                            |
| 綠色化學特論<br>Special topics on Green Chemistry<br>3-0-3                        | 奈米材料化學<br>Nanostructured Materials Chemistry<br>3-0-3                               | 不均相觸媒<br>Heterogeneous Catalysis<br>3-0-3                       |                                            |
| 危害物跨介質傳輸<br>Multimedia Transport of Hazardous Waste<br>3-0-3                | 材料結構學<br>Material Structure<br>3-0-3                                                | 非線性程序控制<br>3-0-3                                                |                                            |
| 腐蝕防制工程<br>Anticorrosion Engineering<br>3-0-3                                | 複合材料特論<br>Special Topics on Composite Materials<br>3-0-3                            | 流體化工程<br>3-0-3                                                  |                                            |
| 清淨技術特論<br>Special Topics on Cleaning Technology<br>3-0-3                    | 高分子分析技術<br>Methods of Polymer Characterizations<br>3-0-3                            | 生化分離程序<br>Biochemical Separation Processes<br>3-0-3             |                                            |
| 吸附分離特論<br>Special Topics of Adsorptive Separations<br>3-0-3                 | 材料化學分析技術<br>Analytical techniques for Materials Chemistry<br>3-0-3                  |                                                                 |                                            |
| 生化工程特論<br>Special Topics on Biochemical Engineering<br>3-0-3                | 碳材料特論<br>Special Topics on Carbonaceous Materials<br>3-0-3                          |                                                                 |                                            |
| 生物化學特論<br>Special Topics in Biochemistry<br>3-0-3                           | 人工智慧在化工上的應用<br>Artificial Intelligent Applications on Chemical Engineering<br>3-0-3 |                                                                 |                                            |
| 基因重組技術<br>3-0-3                                                             | 耐燃防爆材料<br>Anti-fire and Anti-explosion Material<br>3-0-3                            |                                                                 |                                            |
| 微奈米流體晶片的應用<br>Micro-/Nano-fluidics for Lab-on-a-Chips Applications<br>3-0-3 | 化工製程安全設計特論<br>3-0-3                                                                 |                                                                 |                                            |
| 生醫材料特論<br>Specific Topic for Biomedical Materials<br>3-0-3                  | 質傳特論<br>Mass Transfer<br>3-0-3                                                      |                                                                 |                                            |
|                                                                             | 應用實驗設計<br>Applied Experimental Design and Analysis<br>3-0-3                         |                                                                 |                                            |
|                                                                             | 高等數值分析<br>Advanced Numerical Analysis<br>3-0-3                                      |                                                                 |                                            |
|                                                                             | 高等程序控制<br>Advanced Process Control<br>3-0-3                                         |                                                                 |                                            |
|                                                                             | 食品化學特論<br>3-0-3                                                                     |                                                                 |                                            |
|                                                                             | 發酵技術<br>3-0-3                                                                       |                                                                 |                                            |
|                                                                             | 生化反應工程<br>3-0-3                                                                     |                                                                 |                                            |
|                                                                             | 酵素工程學<br>3-0-3                                                                      |                                                                 |                                            |
|                                                                             | 藥物控制釋放特論<br>A lecture Control release and delivery drug<br>3-0-3                    |                                                                 |                                            |
|                                                                             | 生醫工程特論<br>Advanced biomedical engineering<br>3-0-3                                  |                                                                 |                                            |

選修課程(至少應修 18 學分)

合計：最低畢業總學分數為 28 學分(含博士論文 6 學分及專題研討 4 學分)

備註：本流程圖適用本所「產業實務組」之博士生。