

**2+i Industry-Academia Collaboration Program of Civil Engineering,**

**Minghsin University of Science and Technology**

明新科技大學「印尼二技(2+i)產學合作國際專班」土木工程專班

Department 開課單位：Department of Civil Engineering and Environmental Informatics

土木工程與環境資源管理系

**General Education Courses 通識必修**

Course Title 科目名稱		Chinese 華語文教學	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標：</b> 1.The language focuses on the practical, authentic, and functional aspects so students can use what they’ve learned in everyday life. 2.Comprehensive language ability is the focus, with balanced development of the four basic language techniques: listening, speaking, reading, and writing. 3.The dialogues, sentences, Chinese characters, grammatical structures and their quantity and order, are based on the students’ proficiency level. 4.The vocabulary and grammar progress by spiral upward from low to high level and are very common and usable. 5.Interactive in-class games and task-based activities are used so the language learning will be natural. 6.The workbook uses a constructive design and advances by steps to consolidate what’s been learned in an easy way.</p> <p>1. 語言著重生活化，具真實性及功能性，學習後能應用於日常生活。                  2. 注重語言整體使用能力，聽、說、讀、寫四種語言技能平衡發展。                  3. 課文對話、詞彙、漢字、語法句型等都依學習者的認知能力，定量並排序。                  4. 詞彙及語法由淺入深，螺旋上升，具高度常用性。                  5. 以互動式的課堂遊戲及任務活動帶動語言學習，達到自然而然的學習目標。                  6. 作業本採建構式設計，循序漸進，以輕鬆方式鞏固所學。</p>			
Week 1 第 1 週	Hello, how are you? 你好嗎？	Week 10 第 10 週	1 Say “Milk, bread, fruit, juice” and other names of food and drinks 。 2 Use “What do we have?” in a question 。 來吃早餐
Week 2 第 2 週	Introduce oneself by using “My name is _____.” 自我介紹	Week 11 第 11 週	1 Use “and also” to express personal needs 。 2 Use “there is...and also...” to express two of the kinds of things

			above。 來吃早餐
Week 3 第 3 週	1 Name the members of a family。 2 Say the numbers one to five。 介紹家人	Week 12 第 12 週	1 Use “very”, “a little” and “too...(completed action marker)” to express different degrees。 2 Say the seasons, “summer” and “winter”。 我喜歡夏天
Week 4 第 4 週	1 Understand when asked how many people there are in his/her family。 2 Use question words and quantifiers. 介紹家人	Week 13 第 13 週	1 Use “but” to express different opinions。 2 Use “like” and “dislike” to express good and bad。 我喜歡夏天
Week 5 第 5 週	1 Ask others and talk about the number of students in the class。 2 Use “two” before a quantified noun。 你們班有幾個同學？	Week 14 第 14 週	1 Use “almost here” to indicate the approach of time。 2 Use “all right?” in a question when asking for others’ opinions。 我的生日
Week 6 第 6 週	1 Use the conjunction “and also”。 2 Say the numbers six to ten。 你們班有幾個同學？	Week 15 第 15 週	1 Utilize and express numbers up to 30。 2 Ask and talk about things they like。 我的生日
Week 7 第 7 週	Overview-1 複習-1	Week 16 第 16 週	Overview-2 複習-2
Week 8 第 8 週	Quiz 小考	Week 17 第 17 週	Quiz 小考
Week 9 第 9 週	Midterm 期中考	Week 18 第 18 週	Final examination 期末考

**General Education Courses 通識必修**

Course Title 科目名稱		Professional Chinese 專業華語	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> Take the student as the center, And the daily life of practical spoken language based on Chinese language teaching, and has the basic grammar introduction and the hearing training, achieved listens to, to say, to read, writes the teaching curriculum which four Skills simultaneously develop, establishes the primary Chinese study skill.            以學生為中心，並以日常生活實用口語為基礎的華語教學，並有基本語法介紹及聽力訓練，達到聽、說、讀、寫四種技能同時發展的教學課程，奠定初級華語學習技能。</p>			
Week 1 第 1 週	Outline 、Contents & approaches 課程簡介	Week 10 第 10 週	Shall we meet this evening? 我們今天晚上見面好嗎？
Week 2 第 2 週	Number 數字、日期	Week 11 第 11 週	line--making phone calls and appointments line--打電話
Week 3 第 3 週	Appointents 約時間	Week 12 第 12 週	Where is that place? 那個地方在哪裡？
Week 4 第 4 週	measure 量詞	Week 13 第 13 週	make friends 交朋友
Week 5 第 5 週	Direction and Position 方位詞	Week 14 第 14 週	What shall we eat 吃什麼好
Week 6 第 6 週	Shooping 買東西	Week 15 第 15 週	Dining at a restaurant 在餐廳吃飯
Week 7 第 7 週	my family 我的家人	Week 16 第 16 週	Can I use a credit card? 可不可以刷卡？
Week 8 第 8 週	What Are You Doing Over the Weekend 週末做什麼	Week 17 第 17 週	Review 總複習
Week 9 第 9 週	Middle-term Exam 期中考	Week 18 第 18 週	Final-term Exam 期末考

**General Education Courses 通識必修**

Course Title 科目名稱		Physical Education 體育	
Credit/學分數	1	Hour/時數	1
<p><b>Course Objective 教學目標:</b> To let students know the manner of bowling, how to play bowling, understand the basic actions of bowling.                      1.認識保齡球活動 2.了解保齡球禮儀 3.了解保齡球基礎動作 4.達到運動效果</p>			
Week 1 第 1 週	Choice course and the history of bowling 選課及保齡球歷史	Week 10 第 10 週	Practice of send bowling ball 送球練習
Week 2 第 2 週	Manners of bowling 保齡球禮儀	Week 11 第 11 週	Theorem of straight ball 直球原理
Week 3 第 3 週	Selecting your equipment 裝備選擇	Week 12 第 12 週	Straight ball 直球練習
Week 4 第 4 週	Pendulum swing 鐘擺練習	Week 13 第 13 週	Rules of bowling 保齡球規則
Week 5 第 5 週	Footwork 步法練習	Week 14 第 14 週	Straight ball and individual guidance 直球練習與個別指導
Week 6 第 6 週	Pendulum swing / Footwork 鐘擺及步法練習	Week 15 第 15 週	Straight ball and individual guidance 直球練習與個別指導
Week 7 第 7 週	Spring holidays 綜合複習	Week 16 第 16 週	Straight ball and individual guidance 直球練習與個別指導
Week 8 第 8 週	Midterm 期中考	Week 17 第 17 週	Final examination 期末考
Week 9 第 9 週	Practice of set free bowling ball 放球練習	Week 18 第 18 週	Final examination 期末考

**General Education Courses 通識必修**

Course Title 科目名稱		Technology English 科技英文	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> 1. Be able to understand and use a wide range of technical vocabulary 2. Have improved understanding and use of technical English in variety of practical purposes 3. Have gained the confidence to discuss and present technical issues . 1. 可以了解技術詞彙 2. 在沒目標可以專業使用科技英文 3. 獲得了討論和提出技術問題的信心.</p>			
Week 1 第 1 週	Introduction of the course and Benefits	Week 10 第 10 週	How to write the literature review and methodology of a research paper
Week 2 第 2 週	How to write Method Statement for a work	Week 11 第 11 週	How to write the experimental results and discussion of a research paper
Week 3 第 3 週	How to write Job Safety Analysis for a work	Week 12 第 12 週	How to write the Conclusion and references a research paper
Week 4 第 4 週	Practice of Writing MST and JSA	Week 13 第 13 週	Common writing errors and corrections
Week 5 第 5 週	How to read and understand content of a research paper	Week 14 第 14 週	Letter of Submission / Presentation of a research paper
Week 6 第 6 週	Structure of a research paper and the importance of each sections	Week 15 第 15 週	Practice of presentation: Group 1 & 2
Week 7 第 7 週	How to write the abstract of a research paper	Week 16 第 16 週	Practice of presentation: Group 3 & 4
Week 8 第 8 週	How to write the introduction of a research paper	Week 17 第 17 週	Practice of presentation: Group 5 & 6
Week 9 第 9 週	Midterm 期中考	Week 18 第 18 週	Final examination 期末考

**Required Professional Courses 專業必修**

Course Title 科目名稱		Civil Materials 土木材料	
Credit/學分數	3	Hour/時數	3
<b>Course Objective 教學目標:</b> To excute the test of civil engineering materials. 認識土木工程材料基本試驗。			
Week 1 第 1 週	Concept 總論	Week 10 第 10 週	Wood 木材
Week 2 第 2 週	Metal materials 金屬材料	Week 11 第 11 週	Stone 石材 2
Week 3 第 3 週	Reinforce materials 鋼筋材料	Week 12 第 12 週	Brick 磚 1
Week 4 第 4 週	Steel materials 鋼骨材料	Week 13 第 13 週	Tiles 瓦 2
Week 5 第 5 週	Ductile materials 延性材料	Week 14 第 14 週	Soil 土壤
Week 6 第 6 週	Cement materials 水泥材料	Week 15 第 15 週	Clay 黏土
Week 7 第 7 週	Aggregate materials 骨材材料	Week 16 第 16 週	Other waste materials 廢棄物材料
Week 8 第 8 週	Concrete materials 混凝土材料	Week 17 第 17 週	Other materials 其他材料
Week 9 第 9 週	Mid test 期中考	Week 18 第 18 週	Final test 期末考

### Required Professional Courses 專業必修

Course Title 科目名稱		Mechanics of Materials 材料力學	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> This course covers the knowledge of basic mechanics of materials which focus on the relationship between the force and displacement. In addition, the three major topics, member forces, stiffness and stability, are included and detailed covered in this topic.</p> <p>強調學生了解可變形體的力(包括力 扭矩 彎矩)與變形的關係，及學習材料力學涵蓋的三大主軸，即桿件的強度，勁度與穩定。</p>			
Week 1 第 1 週	Introduction 材料力學概述	Week 10 第 10 週	Shear force and bending moment (A) 剪力與彎矩(一)
Week 2 第 2 週	Stress and Strain 應力與應變	Week 11 第 11 週	Shear force and bending moment (B) 剪力與彎矩(二)
Week 3 第 3 週	Mechanical Properties 材料機械性質	Week 12 第 12 週	Shear force and bending moment (C) 剪力與彎矩(三)
Week 4 第 4 週	Shear stress and Shear strain 剪應力與剪應變	Week 13 第 13 週	Beam's bending stresses (A) 梁的應力(一)
Week 5 第 5 週	Axially loaded member (A) 軸向桿件分析(一)	Week 14 第 14 週	Beam's bending stresses (B) 梁的應力(二)
Week 6 第 6 週	Axially loaded member (B) 軸向桿件分析(二)	Week 15 第 15 週	Beam's bending stresses (C) 梁的應力(三)
Week 7 第 7 週	Torsion (A) 扭轉(一)	Week 16 第 16 週	Plane stress and strain (A) 應力與應變分析(一)
Week 8 第 8 週	Torsion (B) 扭轉(二)	Week 17 第 17 週	Plane stress and strain (B) 應力與應變分析(二)
Week 9 第 9 週	Mid-term Exam 期中考	Week 18 第 18 週	Final exam 期末考

### Required Professional Courses 專業必修

Course Title 科目名稱		Surveying Practice 測量實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> The purpose of this course yield students to understand basic Surveying principles and data processing method. To establish students' foundation for the Surveying through cases discussion and practice etc.</p> <p>本課程的目的在於讓學生了解基本測量方法與儀器之原理、程序、精度與資料處理方法等課題。透過測量實習、案例之探討，奠定學生對測量基本理論有深厚基礎。</p>			
Week 1 第 1 週	Introduction of Surveying 測量概論	Week 10 第 10 週	Angle measurement methods 角度測量
Week 2 第 2 週	Distance measurement methods 距離測量方法	Week 11 第 11 週	Radiation method 輻射法(光線法)
Week 3 第 3 週	Distance measurement methods 距離測量方法	Week 12 第 12 週	Radiation method 輻射法(光線法)
Week 4 第 4 週	Elevation Surveying methods 高程測量方法	Week 13 第 13 週	Intersection method 前方交會法
Week 5 第 5 週	Elevation Surveying methods 高程測量方法	Week 14 第 14 週	Intersection method 前方交會法
Week 6 第 6 週	Elevation Surveying methods 高程測量方法	Week 15 第 15 週	New surveying techniques I 測量新科技 I
Week 7 第 7 週	Angle measurement methods 角度測量	Week 16 第 16 週	New surveying techniques II 測量新科技 II
Week 8 第 8 週	Angle measurement methods 角度測量	Week 17 第 17 週	New surveying techniques III 測量新科技 III
Week 9 第 9 週	Middle exam 期中考	Week 18 第 18 週	Final exam 期末考



**Required Professional Courses 專業必修**

Course Title 科目名稱		Concrete mixture proportion and practice 混凝土配比與實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> Introduce the test of cement concrete and materials test. And with the Ministry of Labor's concrete technicians license exam to cultivate students' workplace competitiveness. 認識水泥混凝土材料理論與實務試驗, 並配合勞動部混凝土技術士證照考試加以培育學生職場競爭力。</p>			
Week 1 第 1 週	Concept 總論	Week 10 第 10 週	Concrete make sample practice 混凝土拌試體製作實作
Week 2 第 2 週	Portland cement material concept 波特蘭水泥起源與品質	Week 11 第 11 週	Introduce the admixture material 摻合料介紹
Week 3 第 3 週	Portland cement classification and component 波特蘭水泥種類與成份鑑定	Week 12 第 12 週	Fresh concrete quality and curing 新拌混凝土品質與養護
Week 4 第 4 週	Portland cement practice and quick connector practice 水泥實作與演練接泵送管接管	Week 13 第 13 週	Harden concrete quality and compression condition prepare 硬固混凝土品質與抗壓前準備
Week 5 第 5 週	Fineness grain classification and component quality 細粒料種類與品質鑑定	Week 14 第 14 週	Harden concrete compression test and analyze 硬固混凝土品質與抗壓測試與數據分析
Week 6 第 6 週	Coarse grain classification and component quality 粗粒料種類與品質鑑定	Week 15 第 15 週	High performance concrete quality technical 高性能混凝土品質技術
Week 7 第 7 週	Concrete mixing practice 混凝土拌合實作	Week 16 第 16 週	High performance concrete quality and monitor procedure 高性能混凝土品質技術檢定程序
Week 8 第 8 週	Concrete slump practice 混凝土坍度實作	Week 17 第 17 週	High performance concrete practice 高性能混凝土實作
Week 9 第 9 週	Mid-test 期中考	Week 18 第 18 週	Final test 期末測驗

**Required Professional Courses 專業必修**

Course Title 科目名稱		Practice of Reinforced Concrete 鋼筋混凝土實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b></p> <p>1. Understand the material properties of reinforced concrete. 瞭解鋼筋混凝土材料特性及其強度</p> <p>2. Apply basic theory of material strength to derive the structural behavior of reinforced concrete. 應用基本材料力學演導鋼筋混凝土之結構行為</p> <p>3. Reinforced concrete beam flexural and shear analysis and design. 鋼筋混凝土梁撓曲及剪力分析設計</p>			
Week 1 第 1 週	Introduction 鋼筋混凝土材料介紹	Week 10 第 10 週	Analysis and design of T-shaped beams T-型梁之分析及設計
Week 2 第 2 週	Basic design concept 鋼筋混凝土設計概論	Week 11 第 11 週	Deflection control 撓度控制
Week 3 第 3 週	Ultimate strength design method 強度設計法之基本假設	Week 12 第 12 週	Shear resistance on concrete beam without shear reinforcing 無腹筋梁之抗剪機制
Week 4 第 4 週	Failure mode of R.C. flexural member 鋼筋混凝土梁之破壞型式	Week 13 第 13 週	Shear resistance on concrete beam with shear reinforcing 具腹筋鋼筋混凝土梁之剪力強度
Week 5 第 5 週	Analysis and design for single layer reinforced steel bar 單筋梁之分析及設計	Week 14 第 14 週	Shear analysis and design 剪力分析及設計
Week 6 第 6 週	Design details 設計細節	Week 15 第 15 週	Shear analysis and design 剪力分析及設計
Week 7 第 7 週	Analysis and design for double layer reinforced steel bars 雙筋梁之分析及設計	Week 16 第 16 週	Column analysis and design 中短柱之分析設計
Week 8 第 8 週	Analysis and design for double layer reinforced steel bars 雙筋梁之分析及設計	Week 17 第 17 週	Column analysis and design 中短柱之分析設計

Week 9 第 9 週	Mid-term Exam 期中考	Week 18 第 18 週	Final exam 期末考
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### Required Professional Courses 專業必修

Course Title 科目名稱		Structure Analysis 結構學	
Credit/學分數	3	Hour/時數	3

#### Course Objective 教學目標:

Analysis Statically determinate or un-determinate Structure support reaction forces and structural member shear and moment diagram or displacement.

計算靜定或靜不定結構物受外力後之支撐反力與桿端之剪力圖與彎矩圖繪製或受到外力的結構位移。

Week 1 第 1 週	Concept 概論	Week 10 第 10 週	Unit loading method to calculate of displacement 單位虛荷重法計算變位
Week 2 第 2 週	Analyze of the stability degree of the structure 結構物之穩定性分析	Week 11 第 11 週	Volume integral to calculate of displacement of beam and rigid frame structure 體積積分法計算變形位
Week 3 第 3 週	Analyze the reaction of structure 靜定結構之反力分析計算	Week 12 第 12 週	No side sway statically in determine frame 無側移之超靜定結構
Week 4 第 4 週	Analyze the shear and moment diagram of beam structure 靜定梁之剪力圖與彎矩圖計算	Week 13 第 13 週	Superposition method 相合變行法計算
Week 5 第 5 週	Analyze shear and moment diagram of rigid frame structure 靜定剛架剪力圖與彎矩圖計算	Week 14 第 14 週	Slope and deflection method 1 傾角變位法解超靜定結構 1
Week 6 第 6 週	Analyze shear and moment diagram of rigid truss structure 靜定桁架結構之分析計算	Week 15 第 15 週	Moment distribution method 1 彎矩分配法解超靜定結構 1
Week 7 第 7 週	Analyze shear and moment diagram of rigid composite	Week 16 第 16 週	With side sway statically in-determine frame

	structure 靜定靜定組合結構之分析計算		具側移之超靜定結構
Week 8 第 8 週	Conjugate beam method to calculate the displacement of statically determined beam structure 共軛樑法計算靜定樑變位	Week 17 第 17 週	The inflection line of structure 結構感應線
Week 9 第 9 週	Mid-test 期中測驗	Week 18 第 18 週	Final test 期末考

### Elective Professional Courses 專業選修

Course Title 科目名稱		Engineering Geology 工程地質	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b></p> <p>Engineering geology studies may be performed during the planning, environmental impact analysis, civil or structural engineering design, value engineering and construction phases of public and private works projects, and during post-construction and forensic phases of projects. Works completed by engineering geologists include; geological hazard assessments, geotechnical, material properties, landslide and slope stability, erosion, flooding, dewatering, and seismic investigations, etc. Engineering geology studies are performed by a geologist or engineering geologist that is educated, trained and has obtained experience related to the recognition and interpretation of natural processes, the understanding of how these processes impact human made structures (and vice versa), and knowledge of methods by which to mitigate against hazards resulting from adverse natural or human made conditions. The principal objective of the engineering geologist is the protection of life and property against damage caused by various geological conditions. 工程地質學廣泛應用於工程規劃，勘察，設計，施工與維護等各個階段。本課程期望藉由課堂與現勘，使學生習得工程地質對於土木工程之重要性。</p>			
Week 1 第 1 週	Introduction 緒論	Week 10 第 10 週	Rock 岩石與岩體工程地質性質
Week 2 第 2 週	Mineral 礦物與工程	Week 11 第 11 週	Geology maps 地質圖分析
Week 3	Igneous rock	Week 12	Groundwater

第 3 週	火成岩與工程	第 12 週	地下水與工程、地質災害
Week 4 第 4 週	Sedimentary rock 沉積岩與工程	Week 13 第 13 週	Site Investigation 工址調查
Week 5 第 5 週	Metamorphic rock 變質岩與工程	Week 14 第 14 週	Macro geology engineering 宏觀地質與工程
Week 6 第 6 週	Loose deposit 鬆散堆積物與工程	Week 15 第 15 週	Geological problem 建築基地的主要工程地質課題
Week 7 第 7 週	Fold and Fault 褶皺與工程、斷層與工程	Week 16 第 16 週	Civil Engineering 道路及橋樑的主要工程地質課題、隧道的主要工程地質課題、大壩及水庫的主要工程地質課題
Week 8 第 8 週	Joints 節理及其他不連續面工程	Week 17 第 17 週	Case study 案例探討
Week 9 第 9 週	Mid-test 期中測驗	Week 18 第 18 週	Final test 期末考

### Elective Professional Courses 專業選修

<b>Course Title 科目名稱</b>		<b>Water and Soil Conservation Engineering 水土保持工程</b>	
<b>Credit/學分數</b>	<b>3</b>	<b>Hour/時數</b>	<b>3</b>
<b>Course Objective 教學目標:</b> Analysis Statically determinate or un-determinate Structure support reaction forces and structural member shear and moment diagram or displacement. 計算靜定或靜不定結構物受外力後之支撐反力與桿端之剪力圖與彎矩圖繪製或受到外力的結構位移。			
Week 1 第 1 週	Introduction I 簡介一	Week 10 第 10 週	Rainfall and Drainage System Analysis I 逕流量分析及排水計畫一

Week 2 第 2 週	Introduction II 簡介二	Week 11 第 11 週	Rainfall and Drainage System Analysis II 逕流量分析及排水計畫二
Week 3 第 3 週	Preparation Plan Prior for Development of the land I 開發前準備工作一	Week 12 第 12 週	Slope Stability Analysis I 邊坡穩定一
Week 4 第 4 週	Preparation Plan Prior for Development of the land II 開發前準備工作二	Week 13 第 13 週	Slope Stability Analysis II 邊坡穩定二
Week 5 第 5 週	Basic Work Preparation I 開發前之基本工作一	Week 14 第 14 週	Disaster Protection Plan I 施工時防災計畫一
Week 6 第 6 週	Basic Work Preparation II 開發前之基本工作二	Week 15 第 15 週	Disaster Protection Plan II 施工時防災計畫二
Week 7 第 7 週	Site Condition Arrangement I 整地工程一	Week 16 第 16 週	Construction Management 施工管理一
Week 8 第 8 週	Site Condition Arrangement II 整地工程二	Week 17 第 17 週	Construction Management II 施工管理二
Week 9 第 9 週	Mid-test 期中測驗	Week 18 第 18 週	Final test 期末考

### Elective Professional Courses 專業選修

Course Title 科目名稱		Construction Management 營建管理	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> The course will provide students solid knowledge of construction management, including academic and real application in terms of cost, schedule, time, risk management. 該課程將為學生提供紮實的施工管理知識，包括成本，進度，時間，風險管理方面的學術和實際應用。</p>			
Week 1	Introduce the class and its application in construction	Week 10	Progress Management (2)

第 1 週	industry 介紹課程和重要性，應用	第 10 週	進度管理 (2)
Week 2 第 2 週	Construction Planning (1) 工程規劃 (1)	Week 11 第 11 週	Cost Control (1) 成本控制 (1)
Week 3 第 3 週	Construction Planning (2) 工程規劃 (2)	Week 12 第 12 週	Cost Control (2) 成本控制 (2)
Week 4 第 4 週	Engineering Management (1) 工程管理 (1)	Week 13 第 13 週	Quality Management 品質管制
Week 5 第 5 週	Engineering Management (2) 工程管理 (2)	Week 14 第 14 週	Construction management software: Naviswork 營建管理之軟體：Naviswork
Week 6 第 6 週	Progress Diagram 進度圖表	Week 15 第 15 週	Construction management software Primavera P6 營建管理之軟體：Primavera P6
Week 7 第 7 週	Progress Management (1) 進度管理 (1)	Week 16 第 16 週	Construction management software Primavera P6 營建管理之軟體：Primavera P6
Week 8 第 8 週	Review and Q/A for mid-exam 中期考試的複習和 Q/A	Week 17 第 17 週	Review and Q/A for final exam 期末考試的複習和 Q/A
Week 9 第 9 週	Mid exam 期中考	Week 18 第 18 週	Final exam 期末考

## Elective Professional Courses 專業選修

Course Title 科目名稱		Engineering Sketching 工程試圖	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> This course introduces students to the visual language of drawing through observation a realistic image. In addition to traditional drawing techniques, this course will cover figure drawing. The course develops insights in the mechanisms of visual perception, how the individual components of the drawing relate to the whole and compositional organization. Each student develops observational skills rooted in traditional drawing media while striving to develop critical thinking and research skills.</p> <p>熟習土木及建築工程所使用的圖說，使能畢業後迅速使用。</p>			
Week 1 第 1 週	Course Introduction 課程介紹，施工圖說	Week 10 第 10 週	Drawing of Temporary work 假設工程
Week 2 第 2 週	Drawing of Plan 平面圖	Week 11 第 11 週	Drawing of Structural plan 結構平面圖
Week 3 第 3 週	Drawing of Elevation 立面圖	Week 12 第 12 週	Drawing of Rebar 配筋圖
Week 4 第 4 週	Drawing of Section 剖面圖	Week 13 第 13 週	Drawing of Steel Structure 鋼構圖
Week 5 第 5 週	Drawing of Window and Door 門窗圖	Week 14 第 14 週	M&E Drawing part 1: Air-con 空調施工圖
Week 6 第 6 週	Detail Drawing 詳圖	Week 15 第 15 週	M&E Drawing part 2: Plumbing and Electricity 水電圖
Week 7 第 7 週	Shop Drawing 製造圖	Week 16 第 16 週	Drawing of Retaining wall, Ditch and Road 雜項工程圖一：擋土 牆，水溝，道路
Week 8 第 8 週	Detailed Construction Drawing 施工大樣圖	Week 17 第 17 週	Drawing of Bridge and Tunnel 雜項工程圖二：橋梁，隧道
Week 9 第 9 週	Mid-term exam 期中考	Week 18 第 18 週	Final exam 期末考



## Elective Professional Courses 專業選修

Course Title 科目名稱		BIM Lab 建築資訊模型實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> The course will provide students solid knowledge of BIM, including academic and real application.            該課程將為學生提供紮實的 BIM 知識，包括學術和實際應用。</p>			
Week 1 第 1 週	Introduce the Class and Application in Construction Industry State Requirement for student 介紹課程，重要性和應用 * 提供課程之要求	Week 10 第 10 週	Export Drawings + Load / Create Drawing Templates 出圖紙+下載 / 新建圖紙样板
Week 2 第 2 週	Set up a new project and get familiar with Revit interface 設置一個新專案+熟悉 Revit 界面	Week 11 第 11 週	Create Family: Door, Window 創建原件：門，窗戶
Week 3 第 3 週	Basic Commands and working with CAD 基本指令和使用 CAD	Week 12 第 12 週	Create Family: Stair Railing, Annotate 創建原件：樓梯欄杆，註釋
Week 4 第 4 週	Column, Beam, Wall, Slab, Stair, roof, ramp 柱，梁，牆，平板，樓梯，屋頂，坡道	Week 13 第 13 週	Practice and Q/A 實踐和問答
Week 5 第 5 週	Column, Beam, Wall, Slab, Stair, roof, ramp 柱，梁，牆，平板，樓梯，屋頂，坡道	Week 14 第 14 週	Naviswork Management: Function and Interface Naviswork Management : 功能和界面
Week 6 第 6 週	Set up Visual Graphical + Tag Element 設置 Visual Graphical + 註解	Week 15 第 15 週	Naviswork: Construction Sequence + Clash Detection Naviswork : 施工順序+衝突檢測

Week 7 第 7 週	Schedule and Details 明細表和詳細信息	Week 16 第 16 週	On-class Exercise 課堂練習
Week 8 第 8 週	Practice and Q/A for Mid-Exam 中考的練習和問答	Week 17 第 17 週	Practice and Q/A 實踐和問答
Week 9 第 9 週	Mid-term exam 期中考	Week 18 第 18 週	Final exam 期末考

### Required Professional Courses 專業必修

Course Title 科目名稱		Construction Engineering 土木施工學	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> To introduce kinds of civil engineering construction method, hopping help student to realize civil engineering adn will involve it. 簡介土木工程各種施工方法，使學生瞭解土木工程施工實務，引發其學習興趣。</p>			
Week 1 第 1 週	一、Introduction 1-1、Construction plane 一、土木概論與計畫 1-1、施工計畫	Week 10 第 10 週	四、Concrete construction 4-1、Concrete material and its property 四、Concrete construction 4-1、material property 四、混凝土工程 4-1、混凝土的材料及性質
Week 2 第 2 週	1-2、Construction Method 1-3、Material 1-2、施工方法 1-3、施工材料	Week 11 第 11 週	4-2、The mixing and pouring of contrecte 4-2、混凝土的拌和及澆置
Week 3 第 3 週	二、Temporary construction 2-1、Safety fance 二、假設工程 2-1、安全圍籬	Week 12 第 12 週	4-2、The mixing and pouring of concrete 4-2 混凝土的拌和及澆置
Week 4 第 4 週	2-2、Scaffold construction 2-2、施工架	Week 13 第 13 週	4-3、The concrete curing

			4-3、混凝土的養護
Week 5 第 5 週	2-3、The Formwork 三、鋼筋工程 2-3、模板工程	Week 14 第 14 週	4-4、The maintenance of reinforce concrete 4-4、鋼筋混凝土工程維護
Week 6 第 6 週	三、The Reinforced engineering 3-1、Type of Reinforce bar and examination 3-2、Construction of reinforce 三、鋼筋工程 3-1、鋼筋種類、檢驗 3-2、鋼筋加工、續接	Week 15 第 15 週	五、基礎工程 5-1、地基調查 五、Foundation eigneering 5-1、Site investigation
Week 7 第 7 週	3-3、Field construction 3-4、reinforce spacing 3-3、現場施工 3-4、鋼筋間距	Week 16 第 16 週	5-2、Retaining wall construction 5-2、擋土工程
Week 8 第 8 週	3-5、The management of reinforce construction 3-5、鋼筋工程的管理	Week 17 第 17 週	5-3、Deep excavation 5-3、水平支撐工法
Week 9 第 9 週	Mid Test 期中考	Week 18 第 18 週	Final test 期末考

### Required Professional Courses 專業必修

Course Title 科目名稱		Practice of Foundation Engineering 基礎工程與實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> To understand the foundation engineer; to understand the foundation design procedure; to understand the foundation using. 旨在使學生了解基礎工程設計分析的重要性，基礎之種類，設計之理論與程序，進一步與產業界配合，學以致用。</p>			
Week 1	Concept	Week 10	The theory of earth pressure

第 1 週	概論	第 10 週	側向土壓力種類
Week 2 第 2 週	Analysis the string foundation 條型基礎設計	Week 11 第 11 週	Rankine's earth pressure theory 蘭金氏土壓理論
Week 3 第 3 週	Analysis the square foundation 方型基礎設計	Week 12 第 12 週	Coulomb's earth pressure theory 庫倫氏土壓理論
Week 4 第 4 週	Analysis the circle foundation 圓型基礎設計	Week 13 第 13 週	Analysis of piles foundations 深基礎分析
Week 5 第 5 週	Terzaghi's bearing capacity theory 德在基承載理論	Week 14 第 14 週	Analysis of group piles 群樁分析
Week 6 第 6 週	Analysis of eccentric load on shallow foundation 淺基礎偏心荷重分析	Week 15 第 15 週	Theory of slope stability analysis 邊坡穩定分析理論
Week 7 第 7 週	The theory of raft foundation 筏式基礎理論	Week 16 第 16 週	Slope stability analysis 1 邊坡穩定分析 一
Week 8 第 8 週	Analysis the raft foundation 筏式基礎分析	Week 17 第 17 週	Slope stability analysis 2 邊坡穩定分析 二
Week 9 第 9 週	Mid Test 期中考	Week 18 第 18 週	Final test 期末考

### Elective Professional Courses 專業選修

Course Title 科目名稱		Steel Structure Construction 鋼結構施工	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> This course covers the knowledge of current steel structural building practices. In addition, the systems design method is introduced, Traditional steel construction building procedure is also reviewed.</p> <p>建築工程中鋼結構工程已是普遍使用在建築工程, 本課程提供全方位的介紹這些鋼結構建築專業領域及系統方法, 讓學生在未來就業的工作中能得以熟悉及應用。</p>			
Week 1	Steel structural Building Construction	Week 10	Steel Structural Construction Field Trip

第 1 週	Introduction 鋼結構工程概述	第 10 週	工地實務參訪
Week 2 第 2 週	Basic Steel Structural building elements 基本鋼結構建築元件	Week 11 第 11 週	steel structural Installation 工地安裝
Week 3 第 3 週	Structural Steel, Connections, Painting 鋼結構材料	Week 12 第 12 週	steel structural Installation 工地安裝
Week 4 第 4 週	steel structural elements manufacture 鋼結構工程製造	Week 13 第 13 週	steel Structural Installation 工地安裝
Week 5 第 5 週	steel structural elements manufacture 鋼結構工程製造	Week 14 第 14 週	Quality Control and inspection 鋼結構工程品質及檢驗
Week 6 第 6 週	steel structure welding 鋼結構銲接	Week 15 第 15 週	Quality Control and inspection 鋼結構工程品質及檢驗
Week 7 第 7 週	Steel structure welding 鋼結構銲接	Week 16 第 16 週	Case-Study and Discussion 鋼結構建築工程案例研究及討論
Week 8 第 8 週	Steel structure Bolted Connection 鋼結構螺栓接合	Week 17 第 17 週	Case-Study and Discussion (Continued) 鋼結構建築工程案例研究及討論 (Continued)
Week 9 第 9 週	Mid-term Exam. 期中考	Week 18 第 18 週	Final exam 期末考

### Required Professional Courses 專業必修

<b>Course Title 科目名稱</b>		<b>Practice of Engineering Planning and Management 工程規劃與管理實務</b>	
<b>Credit/學分數</b>	<b>3</b>	<b>Hour/時數</b>	<b>3</b>
<b>Course Objective 教學目標:</b> The course will provide students solid knowledge of planning and construction management, including academic and real application in terms of schedule,			

planning and plan management

該課程將為學生提供紮實的施工管理知識，案例建立計畫，進度，時間管理方面的學術和實際應用。

Week 1 第 1 週	Introduce the class and its application in construction industry 介紹課程和重要性，應用	Week 10 第 10 週	Project Monitoring and Control 專案監督和控制
Week 2 第 2 週	Develop a network model 建立網絡模型	Week 11 第 11 週	Computer Scheduling 電腦排程
Week 3 第 3 週	Precedence Diagrams 優先圖	Week 12 第 12 週	Earned value: a means for integrating cost and schedule 掙值：整合成本和進度的一種方法
Week 4 第 4 週	Determining Activity Durations 預計作業工期	Week 13 第 13 週	The impact of scheduling decision on productivity 計劃決策對生產力的影響
Week 5 第 5 週	Time in contract provisions 合同規定的時間	Week 14 第 14 週	CPM in Dispute resolution and litigation CPM 對糾紛解決和訴訟
Week 6 第 6 週	Resource allocation and resource leveling 資源分配和資源均衡	Week 15 第 15 週	Short-interval schedules 短間隔時間表
Week 7 第 7 週	Money and Network Schedules 資金和網絡時間表	Week 16 第 16 週	Linear Scheduling 線性調度
Week 8 第 8 週	Review and Q/A for mid-exam 中期考試的複習和 Q/A	Week 17 第 17 週	Review and Q/A for final exam 期末考試的複習和 Q/A
Week 9 第 9 週	Mid-exam 期中考	Week 18 第 18 週	Final exam 期末考

## Elective Professional Courses 專業選修

Course Title 科目名稱		Practice of Non-destructive Testing 非破壞性檢測實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> The quality of structure is required to be exterminated no matter just constructed or already used. However, that cannot be made damage. Visual inspection and non-destructive testing method therefore are introduced in this course.            結構物無論在新建完成或使用時日後，都會有材料品質是否符合功能的問題。通常這些檢驗方是不能採取破壞的手段，以免讓結構物更快喪失功能。因此本課程將介紹目視、非破壞檢測等方式，讓結構物功能的檢測與評估更為快速與完善。</p>			
Week 1 第 1 週	Introduction 地球物理方法概論	Week 10 第 10 週	Retaining structure quality inspection 擋土結構物檢測
Week 2 第 2 週	RC quality inspection 混凝土品質檢測	Week 11 第 11 週	Retaining structure quality inspection 擋土結構物檢測
Week 3 第 3 週	RC quality inspection 混凝土品質檢測	Week 12 第 12 週	Underground structure quality inspection 地中結構物檢測
Week 4 第 4 週	RC quality inspection 混凝土品質檢測	Week 13 第 13 週	Underground structure quality inspection 地中結構物檢測
Week 5 第 5 週	Ground investigating 地層調查	Week 14 第 14 週	Underground structure quality inspection 地中結構物檢測
Week 6 第 6 週	Ground investigating 地層調查	Week 15 第 15 週	Underground structure quality inspection 地中結構物檢測
Week 7 第 7 週	Ground investigating 地層調查	Week 16 第 16 週	Bridge structure quality inspection 橋梁結構目視檢測
Week 8 第 8 週	Ground investigating 地層調查	Week 17 第 17 週	Tunnel structure quality inspection 隧道檢測
Week 9 第 9 週	Mid-term exam 期中考	Week 18 第 18 週	Final-term exam 期末考

## Elective Professional Courses 專業選修

Course Title 科目名稱		GIS Lab GIS 實務	
Credit/學分數	3	Hour/時數	3
<p><b>Course Objective 教學目標:</b> GIS is a fast developing science and technology. Multiple spatial resources can be integrated into a geographic database. It makes users understand complicated natural and cultural environment, and help decision-maker to draw up the best spatial policy. This is a basic course to provide students principles, techniques and its applications for GIS.</p> <p>GIS 是項快速發展科技，能夠整合各種不同來源的空間資料成為地理資料庫，以幫助吾人掌握複雜的自然與人文環境，並協助決策者擬訂最佳的空間決策。本課程為培育 GIS 專門人才的入門課程。提供學生學習 GIS 相關的學理、技術及其應用。</p>			
Week 1 第 1 週	Introduction for GIS 地理資訊系統發展概況	Week 10 第 10 週	Web Map Service 網路地圖服務
Week 2 第 2 週	QGIS Installation and Interface Introduction QGIS 軟體安裝與介面簡介	Week 11 第 11 週	Story map planning 故事地圖規劃
Week 3 第 3 週	Data Models 認識各種空間資料	Week 12 第 12 週	Investigation in situ I 田野調查 I
Week 4 第 4 週	Data Input and Editing 空間資料輸入與編輯	Week 13 第 13 週	Investigation in situ II 田野調查 II
Week 5 第 5 週	Spatial Data Query 空間資料查詢	Week 14 第 14 週	Investigation in situ III 田野調查 III
Week 6 第 6 週	Spatial Analysis I 空間分析 I	Week 15 第 15 週	Story map making I 故事地圖製作 I
Week 7 第 7 週	Spatial Analysis II 空間分析 II	Week 16 第 16 週	Story map making II 故事地圖製作 II
Week 8 第 8 週	Open Data Searching 開放資料搜尋	Week 17 第 17 週	Story map making III 故事地圖製作 III
Week 9 第 9 週	Operation test 期中上機考	Week 18 第 18 週	Presentation for story map 故事地圖成果報告



**Required Internship Courses 校外實習必修**

Course Title 科目名稱		Internship Practical Training (I)(III)(V) 產業實務實習(一)(三)(五)	
Credit/學分數	10	Hour/時數	10
<p><b>Course Objective 教學目標:</b> 1. To help students build up their ability of learning by doing. 2. To help students receive real world experience and develop their skills. 3. To meet the needs of insustry. 1. 培養學生做中學之能力 2. 讓學生獲取實務經驗並發展專長 3. 使人才培育更能符合產業界需求。</p>			
Week 1 第 1 週	Objective of internship training program 實習動機與目的	Week 10 第 10 週	Execution 職場業務執行
Week 2 第 2 週	Ethics and work attitude 職場倫理與工作態度培養	Week 11 第 11 週	Execution 職場業務執行
Week 3 第 3 週	Work plan 實習計畫書撰寫	Week 12 第 12 週	Execution 職場業務執行
Week 4 第 4 週	Data collection and collation 實習資料收集與整理	Week 13 第 13 週	Problem soving 解決問題能力
Week 5 第 5 週	Data collection and collation 實習資料收集與整理	Week 14 第 14 週	Problem soving 解決問題能力
Week 6 第 6 週	Data collection and collation 實習資料收集與整理	Week 15 第 15 週	Ability to work independly and in a team 獨立作業與協作
Week 7 第 7 週	Execution 職場業務執行	Week 16 第 16 週	Ability to work independly and in a team 獨立作業與協作
Week 8 第 8 週	Execution 職場業務執行	Week 17 第 17 週	Ability to work independly and in a team 獨立作業與協作
Week 9 第 9 週	Experience sharing seminar 簡報與分享	Week 18 第 18 週	Internship report 實習心得報告

## Elective Internship Courses 校外實習選修

Course Title 科目名稱		Internship Practical Training (II)(IV)(VI) 產業實務實習(二)(四)(六)	
Credit/學分數	10	Hour/時數	10
<p><b>Course Objective 教學目標:</b> 1. To help students build up their ability of learning by doing. 2. To help students receive real world experience and develop their skills. 3. To meet the needs of industry.</p> <p>1. 培養學生做中學之能力 2. 讓學生獲取實務經驗並發展專長 3. 使人才培育更能符合產業界需求。</p>			
Week 1 第 1 週	Objective of internship training program 實習動機與目的	Week 10 第 10 週	Execution 職場業務執行
Week 2 第 2 週	Ethics and work attitude 職場倫理與工作態度培養	Week 11 第 11 週	Execution 職場業務執行
Week 3 第 3 週	Work plan 實習計畫書撰寫	Week 12 第 12 週	Execution 職場業務執行
Week 4 第 4 週	Data collection and collation 實習資料收集與整理	Week 13 第 13 週	Problem solving 解決問題能力
Week 5 第 5 週	Data collection and collation 實習資料收集與整理	Week 14 第 14 週	Problem solving 解決問題能力
Week 6 第 6 週	Data collection and collation 實習資料收集與整理	Week 15 第 15 週	Ability to work independly and in a team 獨立作業與協作
Week 7 第 7 週	Execution 職場業務執行	Week 16 第 16 週	Ability to work independly and in a team 獨立作業與協作
Week 8 第 8 週	Execution 職場業務執行	Week 17 第 17 週	Ability to work independly and in a team 獨立作業與協作
Week 9 第 9 週	Experience sharing seminar 簡報與分享	Week 18 第 18 週	Internship report 實習心得報告

### Elective Internship Courses 校外實習選修

Course Title 科目名稱		Project Study I-II-III 實務專題(一、二、三)	
Credit/學分數	10	Hour/時數	10
<b>Course Objective 教學目標:</b> Train student to fitting the function that the profession need. 以工程實務作為訓練學生, 進入職場時可快速與現實狀況銜接, 為教學目標,			
Week 1 第 1 週	Topic selection 實務專題題目之選定	Week 10 第 10 週	Collection of data and discussion 資料蒐集與內容討論
Week 2 第 2 週	Topic content 專題題目與綱要內容之說明	Week 11 第 11 週	Collection of data and discussion 資料蒐集與內容討論
Week 3 第 3 週	Collection of data and discussion 資料蒐集與內容討論	Week 12 第 12 週	Collection of data and discussion 資料蒐集與內容討論
Week 4 第 4 週	Collection of data and discussion 資料蒐集與內容討論	Week 13 第 13 週	Collection of data and discussion 資料蒐集與內容討論
Week 5 第 5 週	Collection of data and discussion 資料蒐集與內容討論	Week 14 第 14 週	Group report and discussion 群體報告與檢討
Week 6 第 6 週	Collection of data and discussion 資料蒐集與內容討論	Week 15 第 15 週	Group report and discussion 文獻回顧
Week 7 第 7 週	Report & criticism 報告討論與檢討	Week 16 第 16 週	Group report and discussion 文獻回顧
Week 8 第 8 週	Revise the content and report 部分內容之修正與定稿	Week 17 第 17 週	Group report and discussion 文獻回顧
Week 9 第 9 週	Operation test 期中上機考	Week 18 第 18 週	Final report 完成報告