

114 學年度 第 2 學期 軟體工程 課程大綱

<p>課程中文名稱 Title of Course in Chinese : 軟體工程</p> <p>課程英文名稱 Title of Course in English : Software Engineering</p> <p>應修系級 Major : 資訊管理研究所 1 , 財務金融英語碩士學位學程 2 , 智慧醫療管理英語碩士學位學程 1 , 智慧醫療管理英語碩士學位學程 2 , 英語授課商學碩士學分學程 , 電子商務碩士學分學程 , 城市治理英語碩士學位學程 1 , 城市治理英語碩士學位學程 2 ,</p> <p>授課教師 Instructor : 戴敏育</p> <p>選修類別 Required/Elective : 選</p> <p>全半學年 Whole or Half of the Academic Year : 半學年</p> <p>學 分 Credit(s) : 3 學分</p> <p>時 數 Hour(s) : 3 小時</p>
<p>教師網址 Instructor's Website : http://web.ntpu.edu.tw/~myday/</p>
<p>教師專長 Instructor's Specialty : 人工智慧 (Artificial Intelligence)、生成式 AI (Generative AI)、永續綠色金融科技 (ESG and Green Financial Technology)、大數據分析 (Big Data Analytics)、電子商務 (Electronic Commerce)</p>
<p>課綱附檔 Attachments :</p>
<p>先修科目 : 無</p>
<p>Prerequisites : None</p>
<p>教學目標 :</p> <ol style="list-style-type: none">1. 瞭解軟體工程基本概念、研究議題、與實務操作。2. 具備軟體工程實務操作能力。3. 進行軟體工程相關之資訊管理研究。
<p>Course Objectives :</p> <ol style="list-style-type: none">1. Understand the fundamental concepts and research issues of software engineering.2. Equip with Hands-on practices of software engineering.3. Conduct information systems research in the context of software engineering.
<p>本課程包含永續發展(SDGs)目標(→點此瞭解永續相關目標←) :</p> <p>SDG4 優質教育 (Quality Education)</p> <p>SDG8 尊嚴就業與經濟發展 (Decent Work and Economic Growth)</p>

SDG9 | 產業創新與基礎設施 (Industry, Innovation and Infrastructure)

SDG12 | 負責任的消費與生產 (Responsible Consumption and Production)

內容綱要：

This course introduces the fundamental concepts, research issues, and hands-on practices of software engineering. Topics include Introduction to Software Engineering, Software Products and Project Management: Software product management and prototyping with Generative AI, Agile Software Engineering: Agile methods, Scrum, and Extreme Programming, Features, Scenarios, and Stories, Software Architecture: Architectural design, System decomposition, and Distribution architecture, Cloud-Based Software: Virtualization and containers, Everything as a service, Software as a service, Cloud Computing and Cloud Software Architecture, Microservices Architecture, RESTful services, Service deployment, Security and Privacy, Reliable Programming, Testing: Functional testing, Test automation, Test-driven development, and Code reviews, DevOps and Code Management: Code management and DevOps automation, and Case Study on Software Engineering.

Course Outline：

[Software Engineering] This is an EMI Full English Course.

This course introduces the fundamental concepts, research issues, and hands-on practices of software engineering. Topics include Introduction to Software Engineering, Software Products and Project Management: Software product management and prototyping with Generative AI, Agile Software Engineering: Agile methods, Scrum, and Extreme Programming, Features, Scenarios, and Stories, Software Architecture: Architectural design, System decomposition, and Distribution architecture, Cloud-Based Software: Virtualization and containers, Everything as a service, Software as a service, Cloud Computing and Cloud Software Architecture, Microservices Architecture, RESTful services, Service deployment, Security and Privacy, Reliable Programming, Testing: Functional testing, Test automation, Test-driven development, and Code reviews, DevOps and Code Management: Code management and DevOps automation, and Case Study on Software Engineering.

學生核心能力關連(Student's Core Competence)：

(八大核心能力為百分比；合計 100%；Total 100%)

財務金融英語碩士學位學程 114 年 系核心能力：Communication: Each student will be able to demonstrate proficiency in oral and written communication. 10 %

Teamwork: Each student will demonstrate the ability to work well in teams. 10 %

Professionalism: Each student will have the ability to address and analyze business problems and provide suggestions to the related fields. 60 %

Business values: Each student will be aware of sustainable and ethical issues and their implications. 10 %

Global awareness: Each student will gain global awareness by participating in related

activities. 10 %

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資訊管理研究所 114 年 系核心能力：資訊科技新知探索與系統開發應用 90 %

網路行銷企劃能力 0 %

論文寫作與獨立研究能力新知 10 %

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智慧醫療管理英語碩士學位學程 114 年 系核心能力：透過跨領域的學習來培養學生創新思考並解決問題的素養 Students will be cultivated to think innovatively and build the competence of solving problems through cross-disciplinary learning. 10 %

訓練學生智慧醫療管理的專業素養 To train students the professional competence in smart healthcare management 60 %

來自不同文化的學生在學習及討論的過程中，了解彼此的差異、尋求共識，建立溝通協調的能力 To build up the abilities of students from various culture to understand the differences among each other, to seek the consensus and establish the ability for communication and coordination 5 %

藉由與不同國籍同學之間的合作培養團隊合作精神 To cultivate the spirit of team work through the cooperation among students of various nations 5 %

培養學生關注醫療、商業倫理素養 To cultivate the competence for focusing on healthcare and commercial ethics 5 %

培養學生關注人工智慧議題的專業倫理素養 To cultivate students' professional ethics in artificial intelligence issues 5 %

養成學生對於不同領域之議題之思辨力 To develop students' competence in critical thinking of various fields 5 %

培養跨領域專業人才以因應未來國際趨勢 To cultivate the professional talents of cross-disciplinary in response to the international trends in the future 5 %

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城市治理英語碩士學位學程 114 年 系核心能力：專業知識與跨域整合：培養學生掌握當代城市治理的專業知識，並進行跨域整合的能力 Professional Knowledge and Interdisciplinary Integration: Equip students with contemporary urban governance expertise and the ability to integrate knowledge across domains 70 %

國際多元與團隊合作：培養國際觀與多元尊重，並掌握全球情勢脈動，以進行團隊合作 International Diversity and Teamwork: Develop global perspectives and respect for diversity while understanding global trends to effectively collaborate in teams 10 %

智慧永續與創新思維：培養學生具備資料分析與了解智慧科技的能力，並應用創新思維於創意城市環境與地方創生的建構 Smart Sustainability and Innovative Thinking: Train students in data analysis and understanding of smart technology, applying innovative thinking to the construction of creative urban environments and local revitalization 10 %

政策制定與執行：培養同學思考公私部門永續發展議題，並以專業跨域整合思維，具備制定與執行政策的能力 Policy Formulation and Implementation: Foster the ability to consider sustainable development issues in the public and private sectors, and to formulate and implement

policies with professional interdisciplinary integration thinking 10 %
[-]

校四大基本素養

Four Fundamental Qualities

專業 Professionalism		人際 Interpersonal Relationship		倫理 Ethics		國際觀 International Vision	
創意思考 與問題解 決 (Creative thinking and Problem- solving) 30 %	綜合統整 (Comprehensi ve Integration) 30 %	溝通協調 (Communicati on and Coordination) 10 %	團隊合作 (Teamwor k) 10 %	誠信正直 (Honest y and Integrit y) 5 %	尊重自省 (Self- Esteem and Self- reflectio n) 5 %	多元關懷 (Caring for Diversit y) 5 %	跨界宏觀 (Interdisciplina ry Vision) 5 %

商學院院核心素養目標 (College Competency Goals) :

- Communication
- Fundamental Skill
- Teamwork
- Leadership
- Professionalism
- Research
- Business Ethics and Sustainability
- Global Awareness

教學進度(Teaching Contents) :

週別 (Weekly Schedule)	日期 (Date)	教學預定進度 (Tentative teaching schedule) (若有調整·依教師實際授課為準;Adjustments are made according to instructor's actual teaching schedule)	教學方法與教學 活動 (Teaching methods and activities)
Week 1	20260225	Introduction to Software Engineering	講授 Lecture 討論

			Discussion 實習 Practicum
Week 2	20260304	Software Products and Project Management: Software product management and prototyping with Generative AI and Agentic AI	講授 Lecture 討論 Discussion 實習 Practicum
Week 3	20260311	Agile Software Engineering: Agile methods, Scrum, and Extreme Programming	講授 Lecture 討論 Discussion 實習 Practicum
Week 4	20260318	Case Study on Software Engineering I	討論 Discussion
Week 5	20260325	Features, Scenarios, and Stories	講授 Lecture 討論 Discussion 實習 Practicum
Week 6	20260401	Software Architecture: Architectural design, System decomposition, and Distribution architecture	講授 Lecture 討論 Discussion 實習 Practicum
Week 7	20260408	Cloud-Based Software: Virtualization and containers, Everything as a service, Software as a service	
Week 8	20260415	Midterm Project Report	討論 Discussion
Week 9	20260422	Cloud Computing and Cloud Software Architecture	講授 Lecture 討論 Discussion

			實習 Practicum
Week 10	20260429	Microservices Architecture, RESTful services, Service deployment	講授 Lecture 討論 Discussion 實習 Practicum
Week 11	20260506	Case Study on Software Engineering II	討論 Discussion
Week 12	20260513	Security and Privacy; Reliable Programming; Testing: Functional testing, Test automation, Test-driven development, and Code reviews	講授 Lecture 討論 Discussion 實習 Practicum
Week 13	20260520	Industry Practices of Software Engineering	講授 Lecture 討論 Discussion
Week 14	20260527	DevOps and Code Management: Code management and DevOps automation	講授 Lecture 討論 Discussion 實習 Practicum
Week 15	20260603	Final Project Report I	討論 Discussion
Week 16	20260610	Final Project Report II	討論 Discussion
彈性補充教學		課程於 16 週內上完。彈性補充教學規劃如下： 問題討論 翻轉教學 展演實作 校外參訪 校內外各類演講/講座 線上作業 數位自學 課業輔導 遠距教學(同步) 遠距教學(非同步) 學生自主學習 其他	

評量方式(Evaluation Methods)：

課堂之前測(Pre-test) 0 %

課堂之隨堂測驗(Quiz) 0 %

期中考-筆試(Mid-Term Exam) 0 %
個案分析報告(Case Report) 10 %
個人報告(Individual Presentation) 60 %
作業(Assignment) 10 %
其他評量方式(Other Evaluation Methods)

期末考-筆試(Final Exam) 0 %
課堂參與(Class Participation) 10 %
團體報告(Group Presentation) 10 %

指定用書(Required Texts) :

Ian Sommerville (2019), *Engineering Software Products: An Introduction to Modern Software Engineering*, Pearson.

參考書目(Reference Books) :

Ian Sommerville (2015), *Software Engineering*, 10th Edition, Pearson.
Titus Winters, Tom Manshreck, and Hyrum Wright (2020), *Software Engineering at Google: Lessons Learned from Programming Over Time*, O'Reilly Media.
Sergio Pereira (2025), *Generative AI for Software Development*, O'Reilly Media.
Jim Arlow and Ila Neustadt (2024), *Generative Analysis: The Power of Generative AI for Object-Oriented Software Engineering with UML*, Addison-Wesley Professional.
Mark Winteringham (2024), *Software Testing with Generative AI*, Manning.
Thomas R. Caldwell (2025), *The Agentic AI Bible: The Complete and Up-to-Date Guide to Design, Build, and Scale Goal-Driven, LLM-Powered Agents that Think, Execute and Evolve*, Independently published

其他參考資料(Other References) :

『請遵守智慧財產權』及『不得非法複製及影印』

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