

課程中文名稱 Title of Course in Chinese : **智慧金融量化分析**

課程英文名稱 Title of Course in English : **Artificial Intelligence in Finance and Quantitative Analysis**

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 , 智慧永續發展與管理跨領域英語學士微學程 ,**

授課教師 Instructor : **戴敏育**

選修類別 Required/Elective : **選**

全半學年 Whole or Half of the Academic Year : **半學年**

學 分 Credit(s) : **3 學分**

時 數 Hour(s) : **3 小時**

教師網址 Instructor's Website : <http://web.ntpu.edu.tw/~myday/>

教師專長 Instructor's Specialty : **電子商務 (Electronic Commerce), 金融科技 (Financial Technology), 人工智慧 (Artificial Intelligence), 大數據分析 (Big Data Analytics), 資料探勘與文字探勘 (Data Mining and Text Mining)**

課綱附檔 Attachments :

先修科目 : **None**

Prerequisites : **None**

教學目標 :

1. 瞭解智慧金融量化分析基本概念與研究議題。
2. 具備智慧金融量化分析實務操作能力。
3. 進行智慧金融量化分析相關之資訊管理研究。

Course Objectives :

1. Understand the fundamental concepts and research issues of Artificial Intelligence in Finance and Quantitative Analysis.
2. Equip with Hands-on practices of Artificial Intelligence in Finance and Quantitative Analysis.
3. Conduct information systems research in the context of Artificial Intelligence in Finance and Quantitative Analysis.

本課程包含永續發展(SDGs)目標(→[點此瞭解永續相關目標](#)←) :

SDG3 | 良好健康和福祉 (Good Health and Well-being)

SDG4 | 優質教育 (Quality Education)

SDG8 | 尊嚴就業與經濟發展 (Decent Work and Economic Growth)

內容綱要 :

[AI in Finance and Quantitative Analysis] This is an EMI Full English Course.

本課程介紹智慧金融量化分析基本概念、研究議題、與實務操作。課程內容包括智慧金融量化分析概論、AI 金融科技: 元宇宙、Web3、DeFi、NFT、生成式AI金融創新應用、投資心理學與行為財務學、財務金融事件研究法、財務金融理論、數據驅動財務金融、金融計量經濟學、人工智慧優先金融、財務金融深度學習、財務金融強化學習、演算法交易、風險管理、交易機器人與基於事件的回測、與智慧金融量化分析分析個案研究。

Course Outline :

[AI in Finance and Quantitative Analysis] This is an EMI Full English Course.

This course introduces the fundamental concepts, research issues, and hands-on practices of AI in Finance and Quantitative Analysis. Topics include Introduction to Artificial Intelligence in Finance and Quantitative Analysis, AI in FinTech: Metaverse, Web3, DeFi, NFT, Generative AI for Financial Innovation Applications, Investing Psychology and Behavioral Finance, Event Studies in Finance, Finance Theory, Data-Driven Finance, Financial Econometrics, AI-First Finance, Deep Learning in Finance, Reinforcement Learning in Finance, Algorithmic Trading, Risk Management, Trading Bot and Event-Based Backtesting, and Case Study on AI in Finance and Quantitative Analysis.

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 113年 系核心能力 :

Communication: Each student will be able to demonstrate proficiency in oral and written communication. 5 %

Teamwork: Each student will demonstrate the ability to work well in teams. 5 %

Professionalism: Each student will have the ability to address and analyze business problems and provide suggestions to the related fields. 80 %

Business values: Each student will be aware of sustainable and ethical issues and their implications. 5 %

Global awareness: Each student will gain global awareness by participating in related activities. 5 %

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資訊管理研究所 113年 系核心能力 :

資訊科技新知探索與系統開發應用 80 %

網路行銷企劃能力 10 %

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 113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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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) 40 %	綜合統整 (Comprehensive Integration) 30 %	溝通協調 (Communication and Coordination) 5 %	團隊合作 (Teamwork) 5 %	誠信正直 (Honesty and Integrity) 5 %	尊重自省 (Self- Esteem and Self- reflection) 5 %	多元關懷 (Caring for Diversity) 5 %	跨界宏觀 (Interdisciplinary Vision) 5 %

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

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	20250218	Introduction to Artificial Intelligence in Finance and Quantitative Analysis	講授Lecture 討論Discussion
Week 2	20250225	AI in FinTech: Metaverse, Web3, DeFi, NFT, Generative AI for Financial Innovation Applications	講授Lecture 討論Discussion

			實習Practicum
Week 3	20250304	Investing Psychology and Behavioral Finance	講授Lecture 討論Discussion 實習Practicum
Week 4	20250311	Event Studies in Finance	講授Lecture 討論Discussion 實習Practicum
Week 5	20250318	Case Study on AI in Finance and Quantitative Analysis I	討論Discussion
Week 6	20250325	Finance Theory and Data-Driven Finance	講授Lecture 討論Discussion 實習Practicum
Week 7	20250401	Self-Study	其他Others
Week 8	20250408	Midterm Project Report	討論Discussion
Week 9	20250415	Financial Econometrics	講授Lecture 討論Discussion 實習Practicum
Week 10	20250422	AI-First Finance	講授Lecture 討論Discussion 實習Practicum
Week 11	20250429	Industry Practices of AI in Finance and Quantitative Analysis	講授Lecture 討論Discussion 實習Practicum
Week 12	20250506	Case Study on AI in Finance and Quantitative Analysis II	討論Discussion
Week 13	20250513	Deep Learning in Finance; Reinforcement Learning in Finance; Generative AI in Finance	講授Lecture 討論Discussion 實習Practicum
Week 14	20250520	Algorithmic Trading; Risk Management; Trading Bot and Event-Based Backtesting	講授Lecture 討論Discussion 實習Practicum
Week 15	20250527	Final Project Report I	討論Discussion
Week 16	20250603	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： <input type="checkbox"/> 問題討論 <input type="checkbox"/> 翻轉教學 <input type="checkbox"/> 展演實作 <input type="checkbox"/> 校外參訪 <input type="checkbox"/> 校內外各類演講/講座 <input type="checkbox"/> 線上作業 <input type="checkbox"/> 數位自學 <input type="checkbox"/> 課業輔導 <input type="checkbox"/> 遠距教學(同步) <input type="checkbox"/> 遠距教學(非同步) <input checked="" type="checkbox"/> 學生自主學習 <input checked="" type="checkbox"/> 其他 Self-Study	

評量方式(Evaluation Methods)：

課堂之前測(Pre-test) 0 %

期中考-筆試(Mid-Term Exam) 0 %

個案分析報告(Case Report) 20 %

個人報告(Individual Presentation) 30 %

作業(Assignment) 10 %

其他評量方式(Other Evaluation Methods)

課堂之隨堂測驗(Quiz) 0 %

期末考-筆試(Final Exam) 0 %

課堂參與(Class Participation) 10 %

團體報告(Group Presentation) 30 %

指定用書(Required Texts)：

Yves Hilpisch (2020), *Artificial Intelligence in Finance: A Python-Based Guide*, O'Reilly Media.

參考書目(Reference Books)：

Stefan Jansen (2020), *Machine Learning for Algorithmic Trading: Predictive models to extract signals from market and alternative data for systematic trading strategies with Python*, 2nd Edition, Packt Publishing.

Aurélien Géron (2022), *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*:

Concepts, Tools, and Techniques to Build Intelligent Systems, 3rd Edition, O'Reilly Media.
Hariom Tatsat, Sahil Puri, Brad Lookabaugh (2020), Machine Learning and Data Science Blueprints for Finance: From Building Trading Strategies to Robo-Advisors Using Python, O'Reilly Media
Chris Kelliher (2022), Quantitative Finance With Python: A Practical Guide to Investment Management, Trading, and Financial Engineering, Chapman and Hall/CRC.
Simon Thompson (2023), Green and Sustainable Finance: Principles and Practice in Banking, Investment and Insurance, 2nd Edition, Kogan Page.
Cino Robin Castelli, Cyril Shmatov (2022), Quantitative Methods for ESG Finance, Wiley
Abdullah Karasan (2021), Machine Learning for Financial Risk Management with Python: Algorithms for Modeling Risk, O'Reilly Media.
Yves Hilpisch (2018), Python for Finance: Mastering Data-Driven Finance, 2nd Edition, O'Reilly Media.
Denis Rothman (2024), Transformers for Natural Language Processing and Computer Vision - Third Edition: Explore Generative AI and Large Language Models with Hugging Face, ChatGPT, GPT-4V, and DALL-E 3, 3rd ed. Edition, Packt Publishing

其他參考資料(Other References) :

Paolo Sironi (2016), FinTech Innovation: From Robo-Advisors to Goal Based Investing and Gamification, Wiley.
Yves Hilpisch (2020), Financial Theory with Python: A Gentle Introduction, O'Reilly Media.
Yves Hilpisch (2020), Python for Algorithmic Trading: From Idea to Cloud Deployment, O'Reilly Media.
Yuxing Yan (2017), Python for Finance: Apply powerful finance models and quantitative analysis with Python, Second Edition, Packt Publishing.

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