國立東華大學

教學計劃表　Syllabus

課程名稱(中文) Course Name in Chinese	高等科學教育特論			學年/學期 Academic Year/Semester	115/1
課程名稱(英文) Course Name in English	Advanced Issues in Science Education				
科目代碼 Course Code	SCE_70500	系級 Department & Year	博士	開課單位 Course-Offering Department	教育與潛能開發學系
修別 Type	必修 Required	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/陳世文				
先修課程 Prerequisite					

課程描述　Course Description

本課程為一門進階科學教育課程，旨在引導學生深入研讀重要學術文獻，內容涵蓋科學學習、科學教學、科學課程與評量、AI導向之科學評量設計，以及科學師資培育等主題，以增進學生對當代科學教育發展趨勢與關鍵研究議題之理解。本課程亦致力於培養學生在科學教育領域中的批判思考與反思能力，作為未來高階科學教育專業人才培育之重要基礎。

This course is an advanced science education course that guides students through the content of significant academic literature, including science learning, science teaching, science curriculum and assessment, AI-based science evaluation design, and science teacher education, which aiming to enhance their understanding of contemporary scientific educational trends and key research issues. It seeks to develop students' critical thinking and reflective abilities in science education, serving as an essential foundation for the cultivation of future high-level science education professionals.

課程目標　Course Objectives

以當前國際研究重要文獻為基礎，認識科學教育的過去、現況與未來之發展，以奠定科學教育研究之基礎

	系專業能力 Basic Learning Outcomes	課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.'s Education Objectives
A	具備科學教育專業理論發展與實踐之素養。To possess the capacity to develop and practice theories in science education.	●
B	具備科學教育獨立研究素養。To possess the ability of independent study focusing on science education.	
C	具備科學教育的創新與問題解決素養。To possess creativity in science education and the ability of problem solving.	○
D	具備國際學術交流之素養。To possess the ability of international academic exchanges.	●

圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated

授 課 進 度 表 Teaching Schedule & Content

週次Week	內容 Subject/Topics	備註Remarks
1	9／11：課程介紹（Course Introduction）	

2	9／18：科學學習：學習理論（Science Learning: Theories of Learning）	Presentation and discussion. Chapter 4 of the textbook
3	9／25：中秋節（放假1日）Mid-Autumn Festival Holiday	
4	10／2：科學學習：學生概念、概念改變與學習 Science Learning: Student Conceptions, Conceptual Change, and Learning	Presentation and discussion. Chapter 5 of the textbook
5	10／9：國慶日（補假1日）National Day Observed Holiday	
6	10／16：科學學習：學生對科學之態度、認同與志向 Science Learning: Student Attitudes, Identity, and Aspirations Toward Science	Presentation and discussion. Chapter 6 of the textbook
7	10／23：科學教學：幼兒科學教育之研究主題與未來方向 Science Teaching: Science Education During the Early Childhood Years—Research Themes and Future Directions	Presentation and discussion. Chapter 16 of the textbook
8	10／30：科學教學：國中小科學教學與科學素養目標 Science Teaching: Elementary and Middle Science Teaching Toward the Goal of Scientific Literacy	Presentation and discussion. Chapter 17 of the textbook
9	11／6：期中考試週 （Midterm Exam）	Curriculum issues review and reflection by an essay
10	11／13：科學教學：跨領域取向與整合式STEM科學教學 Science Teaching: Interdisciplinary Approaches and Integrated STEM in Science Teaching	Presentation and discussion. Chapter 18 of the textbook
11	11／20：科學師資培育：科學教師專業發展方案研究 Science Teacher Education: Research on Teacher Professional Development Programs in Science	Presentation and discussion. Chapter 37 of the textbook
12	11／27：科學課程：課程標準、課程改革與科學素養 Science Curriculum: Content Standards, Curriculum Reform, and Scientific Literacy	Presentation and discussion. Chapters 26 and 25 of the textbook
13	12／4：參加第42屆科學教育國際學術研討會（Participation in the 42nd International Conference on Science Education）	Attend to the conference in NTNU
14	12／11：科學評量：科學本質評量、大規模評量與AI導向科學評量設計 Science Assessment: Nature of Science Assessment, Large-Scale Assessment, and AI-Based Science Evaluation Design	Presentation and discussion. Chapters 27 and 33 of the textbook
15	12／18：課程綜合檢討	
16	12／25：行憲紀念日（放假1日）Constitution Day Holiday	
17	12／25：元旦（放假1日）New Year’s Day	

彈性教學規劃 Flexible Teaching Plan	請勾選(至少需勾選1 個項目)： Please tick the box(es). (At least one item is required.): ☐ 問題討論 Problem-based Discussion ☐ 翻轉教學 Flipped Classroom ☐ 展演實作 Performance / Practical Presentation ☐ 校外參訪Off-campus Visit ☐ 講座活動 Lecture / Seminar ☐ 線上作業 Online Assignments ☐ 自主學習 Self-directed Learning ☐ 課業輔導Academic Support ☐ 實驗操作 Experiment Operation ☐ 遠距教學(同步) Distance Learning (Synchronous) ☐ 遠距教學(非同步) Distance Learning (Asynchronous) ☐ 其他(請填寫) Others (Please specify.): 備註: 本校學期週數自115 學年度起調整為17 週，為符合1學分18 小時之原則，請教師規劃安排彈性教學。 Note: From the 115th academic year, the semester will be 17 weeks. Please include flexible teaching activities to meet the required 18 hours per credit.

教 學 策 略 Teaching Strategies

☑ 課堂講授 Lecture ☑ 分組討論Group Discussion ☐ 參觀實習 Field Trip

☐ 其他Miscellaneous:

教 學 創 新 自 評 Teaching Self-Evaluation

創新教學(Innovative Teaching)

☑ 問題導向學習(PBL) ☐ 團體合作學習(TBL) ☐ 解決導向學習(SBL)

☐ 翻轉教室 Flipped Classroom ☐ 磨課師 Moocs

社會責任(Social Responsibility)

☑ 在地實踐Community Practice ☐ 產學合作 Industy-Academia Cooperation

跨域合作(Transdisciplinary Projects)

☐ 跨界教學Transdisciplinary Teaching ☐ 跨院系教學Inter-collegiate Teaching

☐ 業師合授 Courses Co-taught with Industry Practitioners

其它 other: _____

學期成績計算及多元評量方式 Grading & Assessments									
配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績(含出缺席) General Performance (Attendance Record)	20%			✓		✓			
期中考成績 Midterm Exam	30%	✓							
期末考成績 Final Exam	30%	✓							
作業成績 Homework and/or Assignments	20%			✓					
其他 Miscellaneous (_____)									

評量方式補充說明
Grading & Assessments Supplemental instructions

教科書與參考書目（書名、作者、書局、代理商、說明）
Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

Lederman, N. G., Zeidler, D. L., & Lederman, J. S. (2023). Handbook of Research on Science Education. Volume III. New York, NY: Routledge.

課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)
Teaching Aids & Teacher's Website(Including online teaching information. Personal website can be listed here.)

其他補充說明 (Supplemental instructions)