國立清華大學課程大綱

科號 **Course Number**		**學分** **Credit**		**人數限制** **Class Size**	
中文名稱 **Course Title**	教育與心智科學專論				
英文名稱 **Course English Title**	Advanced topics in Education and Mind Sciences				
任課教師 **Instructor**	莊鈞翔				
上課時間 **Time**		**上課教室** **Room**			

課程簡述(必填) (最多 500 個中文字) 本欄位資料會上傳教育部課程網

Brief Course Description (required)(50-200 words if possible, up to 1000 letters

Advanced Topics in Education and Mind Sciences is an interdisciplinary course that explores cutting-edge research and innovative practices at the intersection of education, cognitive science, and neuroscience. Through a series of lectures, discussions, and hands-on activities, students will delve into the latest theories and findings from psychology, neuroscience, and educational research, and examine their implications for teaching, learning, and educational policy. Throughout the course, students will be challenged to evaluate research studies critically, apply theories to real-world educational contexts, and engage in collaborative projects that explore new frontiers in education and mind sciences. By the end of the course, students will have gained a deeper understanding of the complex interplay between the mind and education, and be equipped with the knowledge and skills for their research careers.

教育與心智科學專論是一門跨學科課程，我們將探索教育、認知科學與神經科學的跨學科課程，期望透過一系列的講座、書報討論和實驗活動，深入研究其最新理論和發現，挖掘對教學、學習和教育政策的可能影響。並且藉由審慎地評述最新研究，探尋將理論應用於現實世界教育環境的可能，期盼課程結束時，學生具備其知識和技能奠定在教育與心智科學的研究基礎。

請輸入課程內容「中文暨英文關鍵字」至少 5 個, 每個關鍵字至多 20 個中文,

以半形逗點分隔 (必填)

Please fill in at least 5 course keywords (up to 40 letters for each keyword) and use commas to separate them.(required)

Education, Mind Sciences, Neuroscience, Brain-Computer Interaction, Hyperscanning

教育、心智科學、神經科學、腦機互動、超掃描

課程大綱 Detailed Course Syllabus

- **課程說明(Course Description)**

This plan allows students to develop their critical thinking and research skills while exploring cutting-edge topics in education, cognitive science, and neuroscience. The midterm and final reports and literature reviews give students an opportunity to delve deeper into a topic of their choice and demonstrate their knowledge and analytical skills.

- **指定用書(Text Books)**

- **參考書籍(References)**

BATTRO, A. M., FISCHER, K. W. & LENA, P. J. 2008. The Educated Brain: Essays in Neuroeducation, Cambridge, Cambridge University Press.
TOKUHAMA-ESPINOSA, T. 2010. Mind, Brain, and Education Science: A Comprehensive Guide to the New Brain-based Teaching, W. W. Norton.

- **教學方式(Teaching Method)**

- **教學進度(Syllabus)**

Week 1: Introduction to Education and Cognitive Science/Brain Anatomy and Function
Week 2: Cognitive Development and Learning
Week 3: Attention and Memory
Week 4: Neurobiology of numeracy and mathematical cognition
Week 5: Neurobiology of Language and Reading
Week 6: Experimental Designs
Week 7: Research Methods in Education and Cognitive Science
Week 8: Midterm Reports/Exam
Week 9: Electroencephalographic Data Collection
Week 10: Physiological Modalities
Week 11: Collaborative Problem-Solving and Hyperscanning
Week 12: Self-paced Brain-Computer Interfaces

Week 13: Stimulus-based Brain-Computer Interfaces
Week 14: Mobile Brain and Body Imaging Technology
Week 15: Learning Disabilities and Developmental Disorder
Week 16: Final Reports

● 成績考核(Evaluation)

Class Activity (30%)
Midterm Report/Exam (40%)
Final Report Presentation (40%)

● 可連結之網頁位址 相關網頁(Personal Website)

● 生成式人工智慧倫理聲明

基於透明與負責任的原則，本課程鼓勵學生利用 AI 進行協作或互學，以提升本門課產出品質。根據本校公布之「大學教育場域 AI 協作、共學與素養培養指引」，本門課程採取有條件開放，說明如下

學生可於課堂作業或報告中的「標題頁註腳」或「引用文獻後」簡要說明如何使用生成式 AI 進行議題發想、文句潤飾或結構參考等使用方式。然而，在本課程的「個人反思報告」、「小組採訪作業」中，學生不得使用生成式 AI 工具撰寫作業。若經查核使用卻無在作業或報告中標明，教師、學校或相關單位有權重新針對作業或報告重新評分或不予計分。
本門課授課教材或學習資料若有引用自生成式 AI，教師也將在投影片或口頭標注。
修讀本課程之學生於選課時視為同意以上倫理聲明。

Ethics Statement on Generative Artificial Intelligence

Grounded in the principles of transparency and responsibility, this course encourages students to leverage AI for collaboration and mutual learning to enhance the quality of course outputs. In accordance with the published Guidelines for Collaboration, Co-learning, and Cultivation of Artificial Intelligence Competencies in University Education, this course adopts the following policy：Conditionally open

Students may briefly explain how generative AI was used for topic ideation, sentence refinement, or structural reference in the footnotes of the title page or after the bibliography in their assignments or reports. However, in the "personal reflection report" and "group interview assignment" of this course, students are not allowed to use generative AI tools for writing assignments. If usage is discovered without proper disclosure, instructors, the institution, or relevant units have the right to reevaluate the

assignment or report or withhold scores. If the course materials or learning resources have been derived from generative AI, the instructor will also indicate this in the slides or orally. Students enrolled in this course agree to the above ethics statement if registering for the class.