Course Description

MEDD8895 STEM across the Curriculum and the Society

Course description
Cross-disciplinary integration is a central concept to STEM education. This course is aimed at looking at various models and approaches (e.g. discipline-focused, interdisciplinary, transdisciplinary, STEAM, STREAM) for developing integrated STEM curricula, among and beyond STEM-related disciplines (e.g. arts, languages, and humanities etc) to strengthen the coherence and collaboration among teachers of different disciplines. Critical reviews of the various integrated STEM curricula in Hong Kong and abroad are included to facilitate students to appreciate the good practices, realize the challenges involved, and examine outcomes when learning in these ways. Students have opportunities to design and develop integrated STEM curricula for the learning and teaching contexts they are familiar with. Besides discussing STEM across the curriculum, the role of STEM education in modern society is also discussed to facilitate students to understand its implications for society. **Coursework / Examination ratio: 100 % Coursework, 0 % Examination**

Course objectives
• Be able to adopt appropriate theories, models and approaches for planning, organizing and evaluating STEM education-related practices to strengthen the coherence and collaboration among teachers of different disciplines; and • Appreciate the other developments and enhancements of STEM education, such as STEAM and STREAM with the incorporation of multiple elements. • Develop a series of class activities or curricula that integrate STEM concepts and skillsets with real-life themes and topics, and clearly document the curriculum design so that they can be reproduced by other teachers.

Course learning outcomes	**Aligned programme learning outcomes (PLOs)**
1. Understand the importance and role of STEM education in the contemporary world	PLOs 1, 2, 3, 4
2. Discuss practices and policies of STEM education in different countries including Hong Kong	PLOs 1, 2, 3, 4
3. Apply theories, models and learning approaches in planning, organizing and evaluating STEM Education	PLOs 1, 2, 3
4. Discuss international trends, theories and issues relating to STEM, STEAM (Science, Technology, Engineering, Arts and Mathematics) and STREAM (Science, Technology, Reading/Writing, Engineering, and Mathematics) education	PLOs 1, 2, 3

Course assessment methods

Assessment method	**Type of assessment (e.g. description of assignment)**	**Weighting (%)**	**Aligned course learning outcome(s)**
Problem sets	Individual	50	CLOs 1, 2, 3
Presentation	Individual	10	CLOs 1, 3, 4
Final Portfolio	Individual	20	CLOs 1, 2, 3, 4
Class Participation	Group	20	CLOs 1, 2, 3, 4

Course content and topics
Introduction to STEM integration STEM + Nature of Science (NOS) STEM + Algorithms to Live By Everything Everywhere All at Once: STEM + Geometry Everything I Learn I learned in Kindergarten: STEM, Storytelling, and Art STEM in the Movies

STEM in the Arcade
STEM in the News Co-design with Experts

Required / recommended readings and online materials

• *Dikilitas, K. (Ed.) (2016). *Innovative professional development methods and strategies for STEM education*. Hershey PA : Information Science Reference.
• *Duschl, R. A. & Bismack, A. S. (Eds.) (2016). *Reconceptualizing STEM education: The central role of practices*. New York, NY : Routledge.
• Honey, M., Pearson, G., & Schweingruber, H. (Eds.). (2014). *STEM integration in K-12 education: Status, prospects, and an agenda for research*. Washington, D.C.: National Academies Press. Retrieved September 4, 2020, from http://stemoregon.org/wpcontent/uploads/2014/04/STEM-Integration-in-K12-Education-Book-Ginger-recommendation-from-OACTE.pdf (Can be downloaded online)
• *Johnson, C. C., Peters-Burton E.E. & Moore, T. J. (Eds.) (2016). *STEM road map : A framework for integrated STEM education*. New York : Routledge.

* eBooks in HKU Library

More references can be found there: https://libguides.lib.hku.hk/sb.php?subject_id=138734

Other additional course information

Nil