

## Course Description

### MEDD8894 Design Thinking and Education

Course description			
<p>Designing has been practiced for ages in the world: pencil and paper, engines and headphones, metro systems and urban planning, artwork and social media, everyday things, and many other solution-centric end-products. Design is a humane way of engineering that approach fundamental issues by using transdisciplinary methodologies to understand and serve human, social, and environmental needs. Learning by design is a pedagogical approach that empowers students to bring their disciplinary knowledge, scientific methods, pro-social values, and creativity together in authentic and lifelong STEM Education. To make learning by design possible, a teacher needs to experience, embody, apply, and teach design thinking that promises 6 interconnected phases: emphasizing, defining, ideating, prototyping, testing, and implementation. This course adopts the train-the-trainer model that 1) places learners (inservice and future educators) in different design experiences and challenges to practice different skill sets, 2) supervises learners to synthesize and apply these skill sets in a real-life project, and 3) fosters learners to reflect and develop on their personal pedagogies.</p>			
<p><b>Coursework / Examination ratio:</b> <u>100</u> % Coursework, <u>0</u> % Examination</p>			
Course objectives			
<p>This course is to equip STEM Education students with a disposition to apply design thinking and develop transdisciplinary methodologies underpinned by their disciplinary knowledge and creativity in developing learning by designing education opportunities and resources. The course will lead students to engage with concepts from Science, Mathematics, Engineering, Technology, Arts and other disciplines and combine methodologies shaping these disciplinary practices in crating educational innovations. In addition, the students will explore opportunities of the contemporary STEM technologies to systematically apply design thinking in turning their ideations into prototypes and final innovative creations for education and beyond.</p>			
Course learning outcomes		Aligned programme learning outcomes (PLOs)	
1. Discuss design thinking theory and methodology for a hands-on, learning by design approach to problem solving in STEM Education		PLOs 1, 2, 4	
2. Implement design thinking methodology to develop a STEM Education resources		PLOs 2, 3, 5	
3. Apply design thinking in learning designs and innovative approaches in STEM Education		PLOs 3, 4, 5	
Course assessment methods			
Assessment method	Type of assessment (e.g. description of assignment)	Weighting (%)	Aligned course learning outcome(s)
Reflective journal	Individual	10	CLOs 1, 2
Mini tasks	Individual	30	CLOs 1, 2
Maker project	Individual	20	CLOs 1, 3
Group project	Group	30	CLOs 1, 2, 3
Participation	Individual	10	CLOs 1, 2, 3
Course content and topics			
<ul style="list-style-type: none"> <li>• Introduction to Design Thinking Roadmap with Examples</li> <li>• The Pain</li> <li>• TBD (Case study most likely)</li> <li>• Patent</li> <li>• 3D Printing for prototyping</li> <li>• User-experience for feedback</li> <li>• Business realisation of innovative ideas and design products</li> </ul>			

- Individual Showcase
- Group Showcase

**Required / recommended readings and online materials**

- Blikstein, P. (2013). Digital Fabrication and 'Making' in Education: The Democratization of Invention. In J. Walter-Herrmann & C. Büching (Eds.), *FabLabs: Of Machines, Makers and Inventors*. Bielefeld: Transcript Publishers. Available at <https://tltlab.org/wp-content/uploads/2019/02/2013.Book-B.Digital.pdf>
- Goldman, S., & Zieleszinski, M.B. (2022). *Design thinking for every classroom: a practical guide for educators*. (2<sup>nd</sup> ed). Routledge.
- Ideo, (2021). *Design Thinking for Educators Toolkit*. available at <https://page.ideo.com/design-thinking-edu-toolkit>
- Norman, D. (2013). *The Design of Everyday Things: Revised and Expanded Edition*. N.Y.: Basic Books.

More references can be found there: [https://libguides.lib.hku.hk/sb.php?subject\\_id=138734](https://libguides.lib.hku.hk/sb.php?subject_id=138734)

**Other additional course information**

Nil