

The Hong Kong University of Science and Technology
UG Course Syllabus

Practicum in STEAM Education

UTOP3201

3 Credits

Name: Marshal LIU

Paul LAVIGNE

Ian CHONG

Grace FUNG

Email: keysliu@ust.hk

egpaul@ust.hk

egian@ust.hk

eggrace@ust.hk

Office Hours: By email appointments

Course Description

This course is designed to provide undergraduate students with real-life teaching experience that develops skills useful to the community learning environment. Through pre-teaching training, consultation sessions, reflection sessions, and a mini teaching conference, students will acquire important knowledge and practice core competencies essential for teaching. Students are expected to formulate, design, and evaluate lesson plans from their own knowledge and experience, and conduct teaching sessions as the instructor. Students will learn to identify and address educational issues by adopting appropriate strategies to arouse learners' interest in a wide range of STEAM topics. Additionally, students will learn to reflect on and make reasoned analysis on their teaching. Upon completion of this course, students will have the skills and confidence to design and deliver STEAM courses and workshops, using innovative pedagogy and state-of-the-art teaching and assessment tools, for primary and secondary school students and even junior university students.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

ILO No.	Description
1	Explain the subject knowledge accurately and effectively to learners
2	Design, implement and evaluate appropriate learning, teaching and assessment strategies to cater for the learners' individual learning differences
3	Identify and address educational issues by adopting appropriate strategies to engage learners effectively
4	Reflect on and make reasoned analysis on one's teaching

Assessments

Assessment Task	Contribution to Overall Course Grade (%)	Due Date
Class Performance & Sharing	15%	Week 1 to 13
Teaching Materials Preparation (group)	10%	Week 7 & 10
Evaluation of Teaching Experiences (TE1/2) - TE1: Internal Teaching for a 30-min class session - TE2: External Teaching for an 80 to 110-min class session for the HKUST students	25%	Week 7-8 & Week 12-13
Participation & Presentation in Mini-Conference	15%	Week 13
Learning Portfolio	35%	Week 13

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Class Performance & Sharing	ILO1	The class participation assesses students' ability to articulate core concepts logically and explain subject knowledge accurately and effectively to their peers during interactive sharing sessions (ILO 1).
Teaching Materials Preparation (group)	ILO2	The preparation documentation assesses students' ability to co-create differentiated lesson packages, scaffolded activities, and tailored resources that effectively address the unique learning needs and varied starting points of their target audience (ILO 2).
Evaluation of Teaching Experiences (TE1/2)	ILO1, ILO2, ILO3	The delivery of classes assesses students' ability to explain subject knowledge both concisely and in-depth across varied teaching formats (ILO1), design and adjust instructional strategies to cater to diverse learner needs (ILO2), and manage real-time classroom dynamics to resolve educational issues and drive active engagement (ILO3). This is to collectively validate the pedagogical competency.
Participation & Presentation in Mini-Conference	ILO1, ILO2, ILO3	The participation & poster presentation assess students' ability to deliver clear, professional explanations of subject knowledge to external guests and parties (ILO1), employ interactive presentation and engagement strategies that accommodate diverse audience backgrounds (ILO2), and address spontaneous questions or educational issues raised by internal and external stakeholders to maintain active, real-time dialogue (ILO3).
Learning portfolio	ILO1, ILO2, ILO4	The task of the learning and teaching portfolio assesses students' ability to formulate clear, structured instructional content within an individual lesson plan (ILO1), design adaptive teaching resources that accommodate diverse classroom requirements in their documented practice (ILO2), and perform a deep, reasoned analysis of their overall classroom experiences to systematically improve their future teaching delivery (ILO4).

Final Grade Descriptors

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Grading Rubrics

Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.

Rubric for Rehearsal and Actual Teaching (graded individually)

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Lesson Organization	The lesson is well- organized, clear, and appropriate for the students' level. It includes clear objectives, activities, and assessments	The lesson is mostly well-organized and appropriate for the students' level. It includes clear objectives, activities, and assessments, but may have some minor issues with organization or clarity.	The lesson is somewhat organized and appropriate for the students' level, but may have some significant issues with organization or clarity.	The lesson is poorly organized and inappropriate for the students' level. It lacks clear objectives, activities, and assessments.
Instructional Delivery	The student teacher uses a variety of instructional strategies and active learning techniques to engage students.	The student teacher uses a variety of instructional strategies and active learning techniques, but may lack some enthusiasm or energy.	The student teacher lacks variety in instructional strategies or active learning techniques.	The student teacher lacks variety in instructional strategies or techniques.
Enthusiasm & Articulation	The student teacher delivers the lesson with enthusiasm, clarity, and engagement throughout the lesson. They establish clear expectations and routines, and handle disruptions or issues effectively.	The student teacher delivers the lesson with clarity and engagement most of the time. They establish clear expectations and routines, but may have some issues with handling disruptions or issues.	The student teacher delivers the lesson with some clarity and engagement. They may have issues with establishing clear expectations and routines, and struggle to handle disruptions or issues.	The student teacher delivers the lesson with little clarity or engagement. They lack clear expectations and routines, and struggle to handle disruptions or issues.
Feedback	The student teacher provides clear and constructive feedback to students on their performance.	The student teacher provides mostly clear and constructive feedback to students on their performance.	The student teacher provides limited or unclear feedback to students on their performance.	The student teacher provides little or no feedback to students on their performance.

Rubric for Poster Presentation

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Content (40%)	The content is easily understood without further explanation and is understandable by an educated non-expert. The content effectively illustrates the group's teaching experience, with a unique approach to the topic incorporated.	The content could be understood with some explanation by an educated non-expert. The content illustrates the group's teaching experience, with a typical approach to the topic incorporated.	The content could be difficult for an educated non-expert with some explanation. The content partially illustrates the group's teaching experience, with a basic approach to the topic incorporated.	The content could be challenging for an educated non-expert, even with an explanation. The content vaguely illustrates the group's teaching experience.
Poster Design (20%)	The visual appeal is outstanding with excellent use of color and font. The graphics are engaging and the design supports content without overwhelming it.	The visual appeal is effective with adequate use of color and font. The graphics enhance the text.	The visual appeal is adequate. The color and font are inconsistent. There is excessive text and few supporting graphics.	The appearance lacks professionalism. The color and font detract from understanding. Graphics are missing or do not enhance the text.
Organization (20%)	The poster is well-organized, and orderly. Information is presented in a logical flow with a strong central theme of the topic.	The poster is mostly well-organized and appropriate. But it may have some minor issues with organization or clarity.	The poster is somewhat organized and appropriate. But it may have some significant issues with organization or clarity.	The poster is poorly organized and inappropriate.
Presentation Communication and Effectiveness (20%)	The presenter greatly increases the audience's understanding and knowledge of the topic. The presenter has a distinct point of view and conveys it well. The narration and/or answering of questions is engaging, thorough, and adds greatly to the presentation.	The presenter increases the audience's understanding and knowledge of the topic. The presenter has a clear point of view and does an adequate job conveying it. The narration and/or answering of questions is adequate and adds to the presentation.	The presenter slightly increases the audience's understanding and knowledge of some points. The presenter's points may be clear but lack development or support. The narration and/or answering of questions is somewhat lacking.	The presenter fails to increase audience understanding and knowledge of the topic. The presenter fails to effectively convince the audience. The narration and/or answering of questions is lacking.

Rubric for Learning Portfolio (Individual Lesson Plan, Documentation of Teaching Practice, Reflection).

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Individual Lesson Plan & Organization (30%)	Well-organized, target-appropriate plan with a crystal-clear personal role, aligned objectives, activities, and assessments.	Mostly well-organized with clear role and objectives; minor alignment or clarity issues.	Somewhat organized; personal role lacks clarity; objectives and activities are loosely aligned.	Poorly organized; personal role is unclear or missing; lacks clear objectives and planning.
Self-Observation & Feedback Integration (20%)	Detailed self-observation; expertly synthesizes participant feedback and deep insights from the peer workshops.	Clear self-observation; considers participant feedback and insights from peer workshops well.	Superficial recounting of class; limited analysis of feedback or peer workshops.	Minimal/no self-observation; ignores feedback and peer workshop insights.
Reflection on Teaching Growth (30%)	Deeply analyzes growth between 1st and 2nd teaching practice; articulates clear transformation and actionable future goals.	Carefully considers progress between practices; identifies new understandings and clear lessons for future teaching.	Describes practices with little evaluation of growth; superficial insight into future improvement.	Superficial/automatic responses; no evidence of growth between practices or future goals.
Connection to Pedagogical Concepts (10%)	Superior connection between experiences, feedback, and academic concepts; effectively applies theory to reconstruct practice.	Clear, deliberate connections between teaching experiences and educational concepts/theories.	Basic connections between experience and course content but remains abstract or superficial.	No connections drawn between workshop experiences and academic concepts or literature.
Formatting & Presentation (10%)	Well-structured and professional; fits 600–1200 words; clear writing with flawless articulation.	Clear structure; within or close to 600–1200 words; minor errors that do not affect readability.	Disjointed structure or flow; noticeably outside word limit; occasional distracting errors.	Unstructured and hard to follow; significantly outside word limit; major language errors.

Course AI Policy

The use of Generative AI is permitted with proper acknowledgement. It is used only to assist students with brainstorming, drafting, and writing their papers and proposals.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include comments on strengths and areas for improvement. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Recommended Texts and Materials

Ambrose, S. A., Lovett, M., Bridges, M. W., DiPietro, M., Norman, M. K., & Mayer, R. E. (2010). *How learning works: Seven research-based principles for smart teaching*. Jossey-Bass.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Course Schedule

Week	Month	Mon		Fri	
1	Sept			4	UTOP Introduction
2		7	Sharing	11	Sharing
3		14	Hands-on experience at USEL	18	Students' Prior Knowledge (Marshal)
4		21	Students' Prior Knowledge (Marshal)	25	2-minute TE
5		28	2-minute TE		
5	Oct			2	AI Empowerment (Ian)
6		5	Learning Theories & Classroom Choices (Grace)	9	Connecting with Students (Grace)
7		12	Lesson Plan / Prep TE1	16	TE1
8		19	The day following the Chung Yeung Festival	23	TE1
9		26	Learning Practice & Feedback (Paul)	30	Student Motivation (Paul)
10	Nov	2	Prep TE2	6	Prep TE2
11		9	Student Mastery (Ian)	13	AI Empowerment Education (Ian)
12		16	TE2	20	TE2
13		23	TE2	27	Reflection / Preparation for the Mini-Conference
		30	Poster Mini Conference		