THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2021-22 Term Fall

b) Department Code[3]: MATH Subject Area[3]: *Mathematics* Course Number [4]: MATH 4343

Previous Course Code[5]: MATH 4821B

c) Full Title[6] *(max. 100 characters)*: Introduction to Graph Theory

d) Abbreviated Title[7] *(max. 30 characters)*: Intro to Graph Theory

e) Course Credits[8]: ☑ Fixed: 4 ○ Range: From _____ To _____

f) Catalog Description[9] *(word limit = 150)*:

This course is to equip students with basic knowledge of graph theory that will be needed in mathematics, computer science, and engineering (in particular network analysis).

Topics include but not restricted to: Euler tours and Chinese postman problem, Hamilton cycles and traveling salesman problem; minimum spanning trees and searching algorithms; block decomposition, ear decomposition, connectivity and edge connectivity; network flows, Ford-Fulkerson (Max-Flow Min-Cut) theorem, augmenting-path algorithm; planar graphs, Euler formula, duality, classification of Platonic solids, Kuratowski (planarity) theorem; maximum matchings and perfect matchings, matchings in bipartite graphs, matchings in general graphs, Tutte-Berge theorem, Petersen theorem; probabilistic method, page rank problem, random walks; cycle spaces and bond spaces, graph Laplace operator, matrix-tree theorem; Four-Color problem, colorings and flows, chromatic number and flow number, chromatic polynomials, flow polynomials, Tutte polynomials; matroids.

g) Grading Type[10]: ☑ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify):* _____

h) ☑ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
MATH 2343	Discrete Structure

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☐ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) ☐ Co-listing[14]: ☐ Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] ☑ No ○ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

☐ Others *(please specify):* _____

m) Medium of Instruction/Materials[16]: ☑ English ○ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ☑ No ○ Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

☑ Major

Program of Study	As		
BSc(MATH)	☐ Required Course	☑ Elective	☐ Prerequisite
BSc(MAEC)	☐ Required Course	☑ Elective	☐ Prerequisite

☑ Minor

Program of Study	As		
Minor in MATH	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

Graph is everywhere; network is the most popular example of graphs. With the development network analysis, neural networks, and graph learning, graph theory becomes more and more popular, useful and be needed for students of mathematics, computer science and engineering. Except its traditional applications to computer science and engineering, graph theory also becomes applicable to social sciences such as organization structure, social hierarchy, consistency choice, social networks, etc.

The course has been offered three times under the request of students. Syllabus and contents are relatively fixed. The instructor have had prepared almost all written notes. It's time to have the course regularly offered rather than a seminar course again and again.

The course is targeted to senior undergraduate students and first-year postgraduate students. Exceptional year-2 students need approval of the course instructor to take the course.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Formulate related problems in graph language and graph models.	A, B
2	Master standard useful matrix methods such as incidence matrix, Laplace matrix, matrix-tree formula, and graph Fourier transforms, etc.	A, B
3	Master basic concepts, ideas, techniques and core theorems of graph theory that may be applicable to network analysis and other practical problems.	A, B
4	Demonstrate abilities in applying algorithms, graph analytic skills, and theoretical thinking for software development.	A, B, C
5	Demonstrate ability in working with unsolved problems and explore new problems for future advanced studies.	A, B, C
6		
7		
8		

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: BSc(MATH) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Explain knowledge, principles and use of quantitative techniques in mathematical sciences at college level.	CILO-1, CILO-2, CILO-3, CIOL-4
2	Model real-world problems and information mathematically, and make independent judgment by applying structural and analytical approaches.	CILO-1, CILO-2, CILO-4
3	Apply logical, analytic, and highly numerate methods to execute tasks and solve real-world mathematical problems.	CILO-1, CILO-2, CILO-3, CIOL-4
4	Work independently and collaborate effectively in a team.	CILO-4, CILO-5
5	Show appreciation of mathematical sciences and its interface with human activities, and arouse audience's interest in the beauty, logic and precision of mathematical sciences.	CILO-1, CILO-2, CILO-3, CIOL-4, CILO-5
6		

	Program of study 2: _____ **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1		
2		
3		
4		
5		
6		

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

Teaching & Learning Arrangement		Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☑ Lecture*	3	CILO-1, CILO-2, CILO-3, CIOL-4	
	☑ Tutorial*	1	CILO-1, CILO-2, CILO-3, CIOL-4	
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
The total learning hours of the course# is equivalent to 120 **hours** [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*				

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☑ In-class test	0		
☑ Mid-term test	30	CILO-1, CILO-2, CILO-3, CIOL-4	
☑ Final exam	50	CILO-1, CILO-2, CILO-3, CIOL-4	
☑ Written assignment	10	CILO-1, CILO-2, CILO-3, CIOL-4	Homework assignment
☐ Project report			
☐ Presentation			
☐ Learning portfolio			
☑ Course participation	10		
☐ Peer evaluation			
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

(●) 1 term ( ) 2 terms ( ) Others, *pls specify:* _____

***2.6 Planned Frequency of Offerings** [Check all appropriate boxes]:*

- [ ] Every Fall
- [x] Every Spring
- [ ] No fixed pattern
- [x] Other *(pls specify):* Either every Fall or every Spring but not both, avoid the semester with MATH 3343
- [ ] Every Winter
- [ ] Every Summer

2.7 Course outline attached (●) No ( ) Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

NA

2.8 Resources

Request extra resources for teaching this course? (●) No ( ) Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	1-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	1-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Science	Associate Dean	Prof Pak Wo LEUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2021-22 Term Fall

b) Department Code[3]: MATH Subject Area[3]: *MATH* Course Number [4]: 4632

Previous Course Code[5]: MATH4824B (Alternate code: COMP 4901K)

c) Full Title[6] *(max. 100 characters)*: Machine Learning with Structured Data

d) Abbreviated Title[7] *(max. 30 characters)*: ML with Structured Data

e) Course Credits[8]: ☑ Fixed: 3 ○ Range: From ____ To ____

f) Catalog Description[9] *(word limit = 150)*:

This course provides an introduction to statistical machine learning algorithms for structured data such as text sequences, taxonomy trees, relational databases (such as knowledge bases), and graphs (including graph databases such as biomedical graphs and large heterogeneous information networks such as knowledge graphs), and using programming tools such as Python to implement them for real problems. It will use some of the following practical problems such as text and graph classification, statistical relational learning, information extraction, sequence modeling, graph modeling, protein 3D structure prediction, QA system, etc. as illustrations to demonstrate the power of the statistical learning algorithms.

g) Grading Type[10]: ☑ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify)*: ____

h) ☑ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
(COMP 2011 OR COMP 2012 OR COMP 2012H) AND	Programming with C++ OR Object-Oriented Programming and Data Structures OR Honors Object-Oriented Programming and Data Structures
(COMP 2711 OR COMP 2711H OR MATH 2343) AND	Discrete Mathematical Tools for Computer Science OR Honors Discrete Mathematical Tools for Computer Science OR Discrete Structures
(MATH 2111 OR MATH 2121 OR MATH 2131)	Matrix Algebra and Applications OR Linear Algebra OR Honors in Linear and Abstract Algebra I

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☑ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
COMP 4901K	Machine Learning for Natural Language Processing
MATH 4824B	Machine Learning for Natural Language Processing

k) ☐ Co-listing[14]: ☑ Multi-coding[14]:

Course Code	Course Title
COMP 4222	Machine Learning with Structured Data

l) Other Enrollment Restrictions[15] ◉ No ○ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

☐ Others *(please specify):* _____

m) Medium of Instruction/Materials[16]: ◉ English ○ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ◉ No ○ Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

☑ Major

Program of Study	As		
BEng(COMP) BSc(COSC) BSc(DSCT) BSc(MATH)	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Minor

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

The course is an interdisciplinary course which needs both computer science background and mathematics background. The algorithms introduced in this course will enrich both CSE and Math students' knowledge. The spectral graph theory is highly related to Math, which is the foundation of development of graph neural networks. Then the realization and implementation of machine learning algorithms of structured data is highly related to CSE techniques. The students are required to work in small groups for a number of homework assignments. During the course, there will be some projects requires students working as teams to work on some real world problems. It will encourage students from Math and CSE (especially DCST), CPEG, and other departments to register and to work together to bring different background knowledge working on interesting real problems. The students will be merged in one Canvas session so they can collaborate with each other to work on the assignments/projects. This will enable students to form multidisciplinary teams. The course especially fits the DCST program with complementary contents in additional to existing machine learning and optimization courses to deal with more complex data structures. The multi-coded courses will be identical to students enrolled in both course codes. The evaluation, examination, projects, assignments will be identical.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Explain the basic principles behind machine learning algorithms for structured data	A
2	Implement programs for structured prediction tasks	B
3	Formulate machine learning solutions to domain problems	B
4	Demonstrate the ability to understand of the complexity of real world problems	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: _BEng(COMP) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	PO1. An ability to apply knowledge of computing and mathematics appropriate to the discipline.	CLIO-1
2	PO2. An ability to apply knowledge of a computing specialisation, and domain knowledge appropriate for the computing specialisation to the abstraction and conceptualisation of computing models.	CLIO-2, CLIO-3
3	PO3. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	CLIO-2, CLIO-3
4	PO4. An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.	CLIO-2, CLIO-3, CLIO-4
5	PO5. An ability to function effectively in teams to accomplish a common goal.	CLIO-4
6	PO6. An understanding of professional, ethical, legal, security and social issues and responsibilities.	
7	PO7. An ability to communicate effectively with a range of audiences	CLOI-4
8	PO8. An ability to analyze the local and global impact of computing on individuals, organizations, and society.	
9	PO9. Recognition of the need for, and an ability to engage in, continuing professional development.	
10	PO10. An ability to use current techniques, skills, and tools necessary for computing practices.	CLOI-4

	Program of study 2: BSc(COSC) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Explain knowledge, principles and use of IT skills in mathematical and computer sciences at college level. (Knowledge)	CILO-1
2	Evaluate information critically, and make independent judgment by applying principles and methods in mathematical and computer sciences. (Judgment)	CILO-1,CILO-3
3	Apply quantitative, analytic methods and IT skills to execute tasks and solve problems in mathematical and computer sciences. (Execution)	CILO-2
4	Work independently and collaborate effectively in a team. (Interpersonal Skill and Leadership)	CILO-3,CILO-4
5	Communicate effectively, both in oral and written forms, about mathematical knowledge to audience. (Communication)	CILO-3,CILO-4
6	Self-evaluate their own learning progress, and develop motivation and skills for lifelong learning. (Self-reflection)	

7	Recognize the importance of complying with ethics of science and academic integrity. (Ethical Practice)	
8	Show appreciation of mathematical and computer sciences and its interface with human activities, and arouse audience's interest in the beauty, logic and precision of mathematical and computer sciences. (Appreciation)	CILO-1
9	View issues in mathematical sciences with reference to the practices of the international science community. (International Outlook)	

	Program of study 3: BSc(DSCT) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	The ability to understand data problems arising in the areas of commerce and industry etc.	CILO-3,CILO-4
2	The ability to model data problems using different mathematical tools.	CILO-1
3	The ability to design and implement efficient algorithms to solve different mathematical models for data problems.	CILO-2
4	The ability to interpret the results provided by different algorithms and apply them to the data problems to gain meaningful insights or offer predictions.	CILO-3,CILO-4

	Program of study 4: BSc(MATH-AM) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Explain knowledge, principles and use of quantitative techniques in mathematical sciences at college level. (Knowledge)	CILO-1
2	Model real-world problems and information mathematically, and make independent judgment by applying structural and analytical approaches. (Judgment)	CILO-1
3	Apply logical, analytic, and highly numerate methods to execute tasks and solve real-world mathematical problems. (Execution)	CILO-1
4	Work independently and collaborate effectively in a team. (Interpersonal Skill and Leadership)	CILO-2,CILO-3
5	Communicate effectively, both in oral and written forms, about mathematical knowledge to audience. (Communication)	CILO-4
6	Self-evaluate their own learning progress, and develop motivation and skills for lifelong learning. (Self-reflection)	CILO-4
7	Recognize the importance of complying with ethics of science and academic integrity. (Ethical Practice)	
8	Show appreciation of mathematical sciences and its interface with human activities, and arouse audience's interest in the beauty, logic and precision of mathematical sciences. (Appreciation)	CILO-1
9	View issues in mathematical sciences with reference to the practices of the international science community. (International Outlook)	

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

Teaching & Learning Arrangement		Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☑ Lecture*	3 hours	CILO-1, CILO-2, CILO-3, CILO-4	
	☑ Tutorial*	1-hour	CILO-1, CILO-2, CILO-3, CILO-4	
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
The total learning hours of the course# is equivalent to 120 **hours** [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*				

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☐ In-class test			
☐ Mid-term test			
☑ Final exam	40%	CILO-1, CILO-3	
☑ Assignments	30%	CILO-1, CILO-2, CILO-3	
☑ Final Project	20%	CILO-2, CILO-3, CILO-4	
☑ Presentation	10%	CILO-3, CILO-4	
☐ Learning portfolio			
☐ Course participation			
☐ Peer evaluation			
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

☑ 1 term ○ 2 terms ○ Others, *pls specify:* _____

***2.6 Planned Frequency of Offerings** [Check all appropriate boxes]:*

☐ Every Fall ☐ Every Winter

☐ Every Spring ☐ Every Summer

☐ No fixed pattern

☑ Other *(pls specify):* This course (COMP4222/MATH4632) will be taught every two years. The other PG co-listed course (COMP5222/MATH5471) will be taught with similar purpose.

2.7 Course outline attached ○ No ☑ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip

- Insertion of international theme as part of the course

- Integrating the course content with international material as examples or case studies

- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

2.8 Resources

Request extra resources for teaching this course? ○ No ☑ Yes

Textbook / Reference Books

- Jurafsky and Martin (2008), Speech and Language Processing, 2nd edition.
- Noah Smith (2011), Linguistic structure prediction, Online.
- Lise Getoor and Ben Taskar (2007). Introduction to Statistical Relational Learning. The MIT Press.
- Pedro Domingos and Daniel Lowd, Markov Logic: An Interface Layer for AI, Morgan & Claypool, 2008.

Course Outline of COMP4222 (multi-coding with MATH4632)

Week	Topics	Briefly outline what this topic will cover *(Include reading assignments if available)*	Indicate which course ILOs this topic is related to *(Write CILO-1, CILO-2, etc.)*
1	Introduction	Introduction to the course and context of the content.	CILO-1
2	Structured perceptron and its generalizations with global optimization methods	Introduction to structure prediction problems and the basic algorithms, Relational Markov networks and conditional random fields	CILO-1
3	Graph based semi-supervised learning	Spectral graph theory, graph Laplacian	CILO-1
4	Introduction to deep learning	Introduction basic deep learning concepts for structured data, e.g., CNN, RNN on node classification, link prediction over sequences, trees, and graphs	CILO-1
5	Network embedding	Deepwalk, node2vec, heterogeneous information network embeddings, etc.	CILO-1
6	Deep sets	Generalize deep learning algorithms to set data, Transformer Networks	CILO-1
7	Graph neural networks	General graph neural networks: Graph CNN, GraphSage, Message Passing Networks	CILO-1
8	Graph isomorphism and subgraph isomorphisms	Graph Isomorphism Networks and applications such as summary statistics, counting, other NP hard problems	CILO-1
9	Deep graph generation	Generative models for graphs	CILO-1
10	Application 1: Knowledge graph base QA System	QA system using existing knowledge graphs	CILO-3, CILO4
11	Application 2: Protein 3D structure prediction	AlphaFold and others in biomedical data	CILO-3, CILO4
12	Student project presentations	Knowledge sharing	CILO-2, CILO-3, CILO4
13	Student project presentations	Knowledge sharing	CILO-2, CILO-3, CILO4

Section 3: Learning Outcomes and Alignment *(for Common Core Course)*

3.1 Course Objectives: *Please outline what this course aims to achieve*

Alignment with Common Core program goals (Details here): Check the appropriate box(es) below to indicate which Common Core goal(s) this course aims to achieve, and explain briefly how this course would help to achieve the selected Common Core goal(s).

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Dept of Computer Science and Engineering	UG Coordinator	Dr Qiong LUO	14-Jan-21
Dept of Mathematics	Program Director	Prof Mo MU	18-Jan-21
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	19-Jan-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Dept of Computer Science and Engineering	UG Coordinator	Dr Qiong LUO	14-Jan-21
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	19-Jan-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Engineering	Associate Dean	Prof Philip MOK	19-Feb-21
School of Science	Associate Dean	Prof Pak Wo LEUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*
Interdisciplinary Programs Office	UG Coordinator	Prof Betty LIN	15-Jan-21

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2021-22 Term Fall

b) Department Code[3]: CSE Subject Area[3]: *COMP* Course Number [4]: 4222

Previous Course Code[5]: COMP 4901K (Alternate code: MATH4824B)

c) Full Title[6] *(max. 100 characters)*: Machine Learning with Structured Data

d) Abbreviated Title[7] *(max. 30 characters)*: ML with Structured Data

e) Course Credits[8]: ☑ Fixed: 3 ○ Range: From ____ To ____

f) Catalog Description[9] *(word limit = 150)*:

This course provides an introduction to statistical machine learning algorithms for structured data such as text sequences, taxonomy trees, relational databases (such as knowledge bases), and graphs (including graph databases such as biomedical graphs and large heterogeneous information networks such as knowledge graphs), and using programming tools such as Python to implement them for real problems. It will use some of the following practical problems such as text and graph classification, statistical relational learning, information extraction, sequence modeling, graph modeling, protein 3D structure prediction, QA system, etc. as illustrations to demonstrate the power of the statistical learning algorithms.

g) Grading Type[10]: ☑ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify)*: ____

h) ☑ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
(COMP 2011 OR COMP 2012 OR COMP 2012H) AND	Programming with C++ OR Object-Oriented Programming and Data Structures OR Honors Object-Oriented Programming and Data Structures
(COMP 2711 OR COMP 2711H OR MATH 2343) AND	Discrete Mathematical Tools for Computer Science OR Honors Discrete Mathematical Tools for Computer Science OR Discrete Structures
(MATH 2111 OR MATH 2121 OR MATH 2131)	Matrix Algebra and Applications OR Linear Algebra OR Honors in Linear and Abstract Algebra I

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☑ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
COMP 4901K	Machine Learning for Natural Language Processing
MATH 4824B	Machine Learning for Natural Language Processing

k) ☐ Co-listing[14]: ☑ Multi-coding[14]:

Course Code	Course Title
MATH 4632	Machine Learning with Structured Data

l) Other Enrollment Restrictions[15] ☑ No ◯ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

☐ Others *(please specify):* _____

m) Medium of Instruction/Materials[16]: ☑ English ◯ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ☑ No ◯ Yes

1.2 Contribution of course to Programs of Study [Check all appropriate boxes below]

☑ Major

Program of Study	As		
BEng(COMP) BSc(COSC) BSc(DSCT) BSc(MATH)	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Minor

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

The course is an interdisciplinary course which needs both computer science background and mathematics background. The algorithms introduced in this course will enrich both CSE and Math students' knowledge. The spectral graph theory is highly related to Math, which is the foundation of development of graph neural networks. Then the realization and implementation of machine learning algorithms of structured data is highly related to CSE techniques. The students are required to work in small groups for a number of homework assignments. During the course, there will be some projects requires students working as teams to work on some real world problems. It will encourage students from Math and CSE (especially DCST), CPEG, and other departments to register and to work together to bring different background knowledge working on interesting real problems. The students will be merged in one Canvas session so they can collaborate with each other to work on the assignments/projects. This will enable students to form multidisciplinary teams. The course especially fits the DCST program with complementary contents in additional to existing machine learning and optimization courses to deal with more complex data structures. The multi-coded courses will be identical to students enrolled in both course codes. The evaluation, examination, projects, assignments will be identical.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Explain the basic principles behind machine learning algorithms for structured data	A
2	Implement programs for structured prediction tasks	B
3	Formulate machine learning solutions to domain problems	B
4	Demonstrate the ability to understand of the complexity of real world problems	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: _BEng(COMP) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	PO1. An ability to apply knowledge of computing and mathematics appropriate to the discipline.	CLIO-1
2	PO2. An ability to apply knowledge of a computing specialisation, and domain knowledge appropriate for the computing specialisation to the abstraction and conceptualisation of computing models.	CLIO-2, CLIO-3
3	PO3. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	CLIO-2, CLIO-3
4	PO4. An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.	CLIO-2, CLIO-3, CLIO-4
5	PO5. An ability to function effectively in teams to accomplish a common goal.	CLIO-4
6	PO6. An understanding of professional, ethical, legal, security and social issues and responsibilities.	
7	PO7. An ability to communicate effectively with a range of audiences.	CLIO-4
8	PO8. An ability to analyze the local and global impact of computing on individuals, organizations, and society.	
9	PO9. Recognition of the need for, and an ability to engage in, continuing professional development.	
10	PO10. An ability to use current techniques, skills, and tools necessary for computing practices.	CLOI-4

	Program of study 2: BSc(COSC) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Explain knowledge, principles and use of IT skills in mathematical and computer sciences at college level. (Knowledge)	CILO-1
2	Evaluate information critically, and make independent judgment by applying principles and methods in mathematical and computer sciences. (Judgment)	CILO-1,CILO-3

3	Apply quantitative, analytic methods and IT skills to execute tasks and solve problems in mathematical and computer sciences. (Execution)	CILO-2
4	Work independently and collaborate effectively in a team. (Interpersonal Skill and Leadership)	CILO-3,CILO-4
5	Communicate effectively, both in oral and written forms, about mathematical knowledge to audience. (Communication)	CILO-3,CILO-4
6	Self-evaluate their own learning progress, and develop motivation and skills for lifelong learning. (Self-reflection)	
7	Recognize the importance of complying with ethics of science and academic integrity. (Ethical Practice)	
8	Show appreciation of mathematical and computer sciences and its interface with human activities, and arouse audience's interest in the beauty, logic and precision of mathematical and computer sciences. (Appreciation)	CILO-1
9	View issues in mathematical sciences with reference to the practices of the international science community. (International Outlook)	

	Program of study 3: BSc(DSCT) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	• The ability to understand data problems arising in the areas of commerce and industry etc.	CILO-3,CILO-4
2	• The ability to model data problems using different mathematical tools.	CILO-1
3	• The ability to design and implement efficient algorithms to solve different mathematical models for data problems.	CILO-2
4	• The ability to interpret the results provided by different algorithms and apply them to the data problems to gain meaningful insights or offer predictions.	CILO-3,CILO-4

	Program of study 4: BSc(MATH-AM) **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Explain knowledge, principles and use of quantitative techniques in mathematical sciences at college level. (Knowledge)	CILO-1
2	Model real-world problems and information mathematically, and make independent judgment by applying structural and analytical approaches. (Judgment)	CILO-1
3	Apply logical, analytic, and highly numerate methods to execute tasks and solve real-world mathematical problems. (Execution)	CILO-1
4	Work independently and collaborate effectively in a team. (Interpersonal Skill and Leadership)	CILO-2,CILO-3
5	Communicate effectively, both in oral and written forms, about mathematical knowledge to audience. (Communication)	CILO-4
6	Self-evaluate their own learning progress, and develop motivation and skills for lifelong learning. (Self-reflection)	CILO-4
7	Recognize the importance of complying with ethics of science and academic integrity. (Ethical Practice)	
8	Show appreciation of mathematical sciences and its interface with human activities, and arouse audience's interest in the beauty, logic and precision of mathematical sciences. (Appreciation)	CILO-1
9	View issues in mathematical sciences with reference to the practices of the international science community. (International Outlook)	

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☑ Lecture*	3 hours	**CILO-1, CILO-2, CILO-3, CILO-4**	
	☑ Tutorial*	1-hour	**CILO-1, CILO-2, CILO-3, CILO-4**	
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to ____120_____ hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☐ In-class test			
☐ Mid-term test			
☑ Final exam	40%	**CILO-1, CILO-3**	
☑ Assignments	30%	**CILO-1, CILO-2, CILO-3**	
☑ Final Project	20%	**CILO-2, CILO-3, CILO-4**	
☑ Presentation	10%	**CILO-3, CILO-4**	
☐ Learning portfolio			
☐ Course participation			
☐ Peer evaluation			
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 *Course Duration*

☑ 1 term ○ 2 terms ○ Others, *pls specify:* _____

2.6 *Planned Frequency of Offerings [Check all appropriate boxes]:*

☐ Every Fall ☐ Every Winter

☐ Every Spring ☐ Every Summer

☐ No fixed pattern

☑ Other *(pls specify):* This course (COMP4222/MATH4632) will be taught every two years. The other PG co-listed course (COMP5222/MATH5471) will be taught with similar purpose.

2.7 *Course outline attached* ○ No ☑ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip

- Insertion of international theme as part of the course

- Integrating the course content with international material as examples or case studies

- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

2.8 *Resources*

Request extra resources for teaching this course? ○ No ☑ Yes

Textbook / Reference Books

- Jurafsky and Martin (2008), Speech and Language Processing, 2nd edition.
- Noah Smith (2011), Linguistic structure prediction, Online.
- Lise Getoor and Ben Taskar (2007). Introduction to Statistical Relational Learning. The MIT Press.
- Pedro Domingos and Daniel Lowd, Markov Logic: An Interface Layer for AI, Morgan & Claypool, 2008.

Course Outline of COMP4222 (multi-coding with MATH4632)

Week	Topics	Briefly outline what this topic will cover *(Include reading assignments if available)*	Indicate which course ILOs this topic is related to *(Write CILO-1, CILO-2, etc.)*
1	**Introduction**	**Introduction to the course and context of the content.**	**CILO-1**
2	**Structured perceptron and its generalizations with global optimization methods**	**Introduction to structure prediction problems and the basic algorithms, Relational Markov networks and conditional random fields**	**CILO-1**
3	**Graph based semi-supervised learning**	**Spectral graph theory, graph Laplacian**	**CILO-1**
4	**Introduction to deep learning**	**Introduction basic deep learning concepts for structured data, e.g., CNN, RNN on node classification, link prediction over sequences, trees, and graphs**	**CILO-1**
5	**Network embedding**	**Deepwalk, node2vec, heterogeneous information network embeddings, etc.**	**CILO-1**
6	**Deep sets**	**Generalize deep learning algorithms to set data, Transformer Networks**	**CILO-1**
7	**Graph neural networks**	**General graph neural networks: Graph CNN, GraphSage, Message Passing Networks**	**CILO-1**
8	**Graph isomorphism and subgraph isomorphisms**	**Graph Isomorphism Networks and applications such as summary statistics, counting, other NP hard problems**	**CILO-1**
9	**Deep graph generation**	**Generative models for graphs**	**CILO-1**
10	**Application 1: Knowledge graph base QA System**	**QA system using existing knowledge graphs**	**CILO-3, CILO4**
11	**Application 2: Protein 3D structure prediction**	**AlphaFold and others in biomedical data**	**CILO-3, CILO4**
12	**Student project presentations**	**Knowledge sharing**	**CILO-2, CILO-3, CILO4**
13	**Student project presentations**	**Knowledge sharing**	**CILO-2, CILO-3, CILO4**

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Dept of Computer Science and Engineering	UG Coordinator	Dr Qiong LUO	14-Jan-21
Dept of Mathematics	Program Director	Prof Mo MU	18-Jan-21
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	19-Jan-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Dept of Computer Science and Engineering	UG Coordinator	Dr Qiong LUO	14-Jan-21
Dept of Mathematics	UG Coordinator	Dr Tsz Kin LAM	19-Jan-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Engineering	Associate Dean	Prof Philip K.T. MOK	18-Feb-21
School of Science	Associate Dean	Prof Pakwo LEUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*
Dual Degree Program in Technology and Management	UG Coordinator	Prof Betty LIN	15-Jan-21

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2021-22 Term Fall

b) Department Code[3]: FINA Subject Area[3]: FINA Course Number [4]: 4513

Previous Course Code[5]:

c) Full Title[6] *(max. 100 characters)*: Risk Management

d) Abbreviated Title[7] *(max. 30 characters)*:

e) Course Credits[8]: ☑ Fixed: 3 ○ Range: From To

f) Catalog Description[9] *(word limit = 150)*:

This course covers the role of risk management in supporting companies as they strive to balance the internal and external risk factors surrounding the operation of their business model against their various stakeholder obligations. Topics include a review of basic hedging strategies (knowledge of futures and options is pre-requisite), the theory and evidence on the value of corporate risk management, review of the major surveys of risk management practices, business-case studies highlighting advanced derivatives and risk-management strategies, an illustrative model of integrated enterprise risk-management (featuring Monte-Carlo simulation), and student-led risk-management audits.

g) Grading Type[10]: ☑ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify)*:

h) ☑ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
FINA 3103	Intermediate Investments
FINA 3203	Derivative Securities

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☐ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) ☐ Co-listing[14]: ☐ Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] ☑ No ○ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study):

☐ Others *(please specify)*:

m) Medium of Instruction/Materials[16]: ☑ English ○ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ☑ No ○ Yes

1.2 *Contribution of course to Programs of Study* [Check all appropriate boxes below]

☑ Major

Program of Study	As		
BBA in Finance	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Minor

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

☐ Common Core

☑ Others (pls specify):

Program of Study	As		
BSc in Sustainable and Green Finance	☑ Required Course	☐ Elective	☐ Prerequisite

1.3 *Rationale for Introducing this course and other relevant information* [18]

This course dovetails with proposed course FINA 4703 ESG Investing. Whereas ESG Investing mainly focuses on the security-investing (*aka* asset-pricing) side of things, educating students in their role of delegated portfolio managers, socially-responsible investors, and stewards of the funds under their charge, this course on risk management takes the standpoint of corporate managers, such the CEO, CFO, or CRO, who take the signals conveyed to them *via* these ESG-savvy capital markets as guideposts chanelling their quest for profit maximization, and who should optimally internalize the demands of an increasingly ESG-sensible stakeholder audience.

Newly-priced risk factors canvased in the ESG Investing course, such as climate risk, find their counterparts in this corporate risk-management course, where the resulting premia enter the cost of capital and advanced securities such as weather derivatives enter optimal hedging strategies. These contemporary risks gain prominence alongside traditional risk factors such as foreign exchange, interest rates (green-bond premia affecting credit spreads), and commodities (renewal and non-renewable). These new considerations and sophisticated finance tools need to be integrated into managerial thinking and the calculus of shareholder-value maximization. This course invites students to gain the insights and skills needed to do so.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes (Should not normally exceed six or eight outcomes)

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Situate risk-management in an organization's value-adding chain.	A
2	Compare and contrast traditional and contemporary price-risk factors.	A
3	Tailor advanced derivatives and hedging strategies to preserve and add value.	A, B
4	Model causes and effects of risk factors using enterprise risk-management.	B
5	Conduct a structured and principled corporate risk-management audit.	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: BBA in Finance **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Graduates will be critical and creative thinkers who make effective decisions supported by analytical and quantitative techniques	CILO-1, 2, 3, 4, 5
2	Graduates will be effective communicators in oral and written English for general business applications.	CILO-5
3	Graduates will have broad understanding of the core business functions and integrate these functions to solve business problems	CILO-1, 2, 3, 4, 5
4	Graduates will have in-depth grasp of their area of business concentration or major.	CILO-1, 2, 3
5	Graduates will be effective team members and leaders	CILO-5
6	Graduates will be effective in multi-cultural and international settings	
7	Graduates will be effective users of information technology and sources of information in business applications.	CILO-3, 4
8	Graduates will understand their professional and ethical responsibility.	CILO-1, 2, 4, 5

	Program of study 2: BSC in Sustainable and Green Finance **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	have a broad understanding of Sustainable and green business functions and integrate these functions to adopt an inter-disciplinary approach and formulate effective and innovative solutions to tackle complex real-world problems.	CILO-4, 5
2	have in-depth grasp of Sustainable and green finance knowledge and skills, and transfer acquired knowledge and skills to meet changes and challenges in different fields.	CILO-1, 2, 3, 4, 5
3	engage in activities that lead to impact of societal improvement	CILO-4, 5
4	make effective ESG finance decisions supported by analytical and quantitative techniques.	CILO-3, 4, 5
5	have the ability to create and innovate with divergent thinking.	CILO-3, 4
6	communicate effectively with people of different levels and work areas.	CILO-1, 2, 5
7	work independently, collaborate effectively in teams, and lead a team to success.	CILO-5
8	demonstrate a global outlook and function effectively in multi-cultural and international settings.	
9	effectively use information technology and sources of information in work applications.	CILO-3, 4
10	understand professional and ethical responsibility, and recognize the importance of a sustainable and green living society.	CILO-1, 2, 4, 5

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☑ Lecture*	**3**	CILO-1, 2, 3, 4, 5	
	☐ Tutorial*			
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to 120 hours [8] *# including both scheduled instructional hours and hours for self study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☑ In-class test	**10**	CILO-1, 2, 3, 4, 5	
☑ Mid-term test	**20**	CILO-1, 2, 3, 4, 5	
☑ Final exam	**30**	CILO-1, 2, 3, 4, 5	
☑ Written assignment	**15**	CILO-1, 2, 3, 4, 5	
☑ Project report	**10**	CILO-1, 2, 3, 4, 5	
☑ Presentation	**5**	CILO-1, 2, 3, 4, 5	
☐ Learning portfolio			
☑ Course participation	**5**	CILO-1, 2, 3, 4, 5	
☑ Peer evaluation	**5**	CILO-1, 2, 3, 4, 5	
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 *Course Duration*

☑ 1 term ○ 2 terms ○ Others, *pls specify:* _____

2.6 *Planned Frequency of Offerings [Check all appropriate boxes]:*

☐ Every Fall ☐ Every Winter

☐ Every Spring ☐ Every Summer

☑ No fixed pattern

☐ Other *(pls specify):* _____

2.7 *Course outline attached* ☑ No ○ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip

- Insertion of international theme as part of the course

- Integrating the course content with international material as examples or case studies

- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

2.8 *Resources*

Request extra resources for teaching this course? ○ No ☑ Yes

BBA FINA Program ILOs (22 June 2018)

(1) Goal: Graduates will be critical and creative thinkers who make effective decisions supported by appropriate analytical techniques.

Objectives: Graduates will:

- Analyze the core issues and weigh the significance of key assumptions used in business decision-making scenarios.
- Solve business problems using appropriate analytical techniques.

(2) Goal: Graduates will be effective communicators in oral and written English for general business applications.

Objectives: Graduates will:

- Produce professional quality business documents in English.
- Deliver professional quality presentations in English.

(3) Goal: Graduates will have broad understanding of the core business functions and integrate these functions to solve business problems.

Objectives: Graduates will:

- Identify the key functional areas that are involved in specific business problems and articulate contributions made by these functional areas to the overall well-being of an organization.
- Connect different functional areas to formulate integrated solutions.

(4) Goal: Graduates will have in-depth grasp of financial knowledge and applications.

Objectives: Graduates will:

- Demonstrate substantial knowledge in finance.
- Apply financial skills and techniques to solve financial problems.

(5) Goal: Graduates will be effective team leaders and members.

Objectives: Graduates will:

- Demonstrate an understanding of the various roles played within the team.
- Collaborate and lead positively by actively seeking and engaging in discussion of the views of others while showing sensitivity to opposing views.

(6) Goal: Graduates will be effective in multi-cultural and international settings.

Objectives: Graduates will:

- Demonstrate a global outlook and an understanding of cultural diversity.
- Apply business concepts and theories to make proper business decisions in international settings.

(7) **Goal:** Graduates will be effective users of information technology and sources of information in business applications.

Objectives: Graduates will:

- Demonstrate proficiency in using IT applications in business and management.
- Locate, gather, organize and evaluate information using appropriate information technology and systems**.**

(8) **Goal:** Graduates will understand their professional and ethical responsibility

Objectives: Graduates will:

- Demonstrate an understanding of the role played by managers in ensuring the integrity of the firm and maintaining appropriate levels of social responsibility.
- Identify the activities/issues in their chosen profession that may present ethical challenges, and articulate the consequences associated with unethical behavior.

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Dept of Finance	Head of Dept	Prof Chu ZHANG	23-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Dept of Finance	Head of Dept	Prof Chu ZHANG	23-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Business and Management	Associate Dean	Prof Allen HUANG	23-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2021-22 Term Fall

b) Department Code[3]: FINA Subject Area[3]: FINA Course Number [4]: 4703

Previous Course Code[5]:

c) Full Title[6] *(max. 100 characters)*: ESG Investing

d) Abbreviated Title[7] *(max. 30 characters)*:

e) Course Credits[8]: ☑ Fixed: 3 ○ Range: From To

f) Catalog Description[9] *(word limit = 150)*:

This course focuses on the relevance of sustainability factors on financial performance of firms and securities. Topics in this course include the market terminology, practices, usages and impact of environmental, social and governance (ESG) factors and climate risk. Students will learn to analyze complex financial problems, adapt investment strategies to meet business needs, propose solutions that maximize stakeholder value, and apply ESG related concepts to the process of investment management and valuation.

g) Grading Type[10]: ☑ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify)*:

h) ☑ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
FINA3103	Intermediate Investments

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☐ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) ☐ Co-listing[14]: ☐ Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] ☑ No ○ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study):

☐ Others *(please specify)*:

m) Medium of Instruction/Materials[16]: ☑ English ○ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ☑ No ○ Yes

1.2 *Contribution of course to Programs of Study [Check all appropriate boxes below]*

☑ Major

Program of Study	As		
BBA in Finance	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Minor

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 *Rationale for Introducing this course and other relevant information [18]*

Those market players who originally shinned away from ESG themes are now looking for integration of this ESG into their core strategies. ESG is now becoming part of their fiduciary duties. Green bonds are used as a way to express commitment to ESG approach and raise funding for climate-related projects.

Nonetheless, many still hesitate to consider ESG Investing approach and green finance under the banner of "greenwashing". There is still ample room to grow. Sustainable investing is only $32bn compare to $85tn. Despite the exponential growth, green bonds are less than 1% the bond market. So, what prevents institutions from embracing ESG and its instruments? The easy answer is the unconvincing empirical evidence that it creates value. The true answer is that the concept and application of ESG are not clear to them and many others. ESG applied in the vacuum leads to underperformance. In addressing the growing need for ESG investing knowledge, this course puts together a collection of industry articles, cases, projects and academic papers.

Bottom line is that it is an investment approach that integrates three additional factors - environment (E), social (S) and governance (G), into the security analysis and portfolio allocation. In doing so, it creates market opportunities, mitigates risks, it lowers financing costs while leading to innovation and better resource allocation.

Last but not least, unlike any other course, you will be the first ones to learn about climate risk and climate finance. Climate risk will be **the most important risk** to be pricing in in asset allocation and investment decision. So far the industry is desperately in need of knowledge and expertise on climate risk. This will give you a strong edge for job application and for your future career.

The course benefits are as follows:
- Learn the latest market practice and market trends on sustainability.
- Acquire cutting edge knowledge for an increasingly complex and demanding market.
- Boost your ability to make a more informed investment decision.
- Industry networking.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes (Should not normally exceed six or eight outcomes)

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Analyze and comment on complex real-world financial problems.	A,B
2	Adapt investment strategies to meet business needs.	A,B
3	Propose asset/risk-management solutions that maximize stakeholder value.	A,B
4	Apply the principles, skills, methods, techniques, and knowledge of modern finance to the process of investment management and securities valuation.	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: BBA in Finance **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Graduates will be critical and creative thinkers who make effective decisions supported by analytical and quantitative techniques	CILO-1
2	Graduates will be effective communicators in oral and written English for general business applications.	
3	Graduates will have broad understanding of the core business functions and integrate these functions to solve business problems	CILO-1, 2, 3, 4
4	Graduates will have in-depth grasp of their area of business concentration or major.	CILO-1, 2, 3, 4
5	Graduates will be effective team members and leaders	
6	Graduates will be effective in multi-cultural and international settings	
7	Graduates will be effective users of information technology and sources of information in business applications.	
8	Graduates will understand their professional and ethical responsibility.	

	Program of study 2: **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☑ Lecture*	3	CILO-1, 2, 3, 4	
	☐ Tutorial*			
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to 120 hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☐ In-class test			
☐ Mid-term test			
☑ Final exam	45	CILO-1, 2, 3, 4	
☐ Written assignment			
☑ Project report	40	CILO-1, 2, 3, 4	
☐ Presentation			
☐ Learning portfolio			
☑ Course participation	10	CILO-1, 2, 3, 4	
☑ Peer evaluation	5	CILO-1, 2, 3, 4	
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 *Course Duration*

◉ 1 term ○ 2 terms ○ Others, *pls specify:* _____

2.6 *Planned Frequency of Offerings [Check all appropriate boxes]:*

☐ Every Fall ☐ Every Winter

☐ Every Spring ☐ Every Summer

☑ No fixed pattern

☐ Other *(pls specify):* _____

2.7 *Course outline attached* ○ No ◉ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

2.8 *Resources*

Request extra resources for teaching this course? ○ No ◉ Yes

BBA FINA Program ILOs (22 June 2018)

(1) Goal: Graduates will be critical and creative thinkers who make effective decisions supported by appropriate analytical techniques.

Objectives: Graduates will:

- Analyze the core issues and weigh the significance of key assumptions used in business decision-making scenarios.
- Solve business problems using appropriate analytical techniques.

(2) Goal: Graduates will be effective communicators in oral and written English for general business applications.

Objectives: Graduates will:

- Produce professional quality business documents in English.
- Deliver professional quality presentations in English.

(3) Goal: Graduates will have broad understanding of the core business functions and integrate these functions to solve business problems.

Objectives: Graduates will:

- Identify the key functional areas that are involved in specific business problems and articulate contributions made by these functional areas to the overall well-being of an organization.
- Connect different functional areas to formulate integrated solutions.

(4) Goal: Graduates will have in-depth grasp of financial knowledge and applications.

Objectives: Graduates will:

- Demonstrate substantial knowledge in finance.
- Apply financial skills and techniques to solve financial problems.

(5) Goal: Graduates will be effective team leaders and members.

Objectives: Graduates will:

- Demonstrate an understanding of the various roles played within the team.
- Collaborate and lead positively by actively seeking and engaging in discussion of the views of others while showing sensitivity to opposing views.

(6) Goal: Graduates will be effective in multi-cultural and international settings.

Objectives: Graduates will:

- Demonstrate a global outlook and an understanding of cultural diversity.
- Apply business concepts and theories to make proper business decisions in international settings.

(7) **Goal:** Graduates will be effective users of information technology and sources of information in business applications.

Objectives: Graduates will:

- Demonstrate proficiency in using IT applications in business and management.
- Locate, gather, organize and evaluate information using appropriate information technology and systems**.**

(8) **Goal:** Graduates will understand their professional and ethical responsibility

Objectives: Graduates will:

- Demonstrate an understanding of the role played by managers in ensuring the integrity of the firm and maintaining appropriate levels of social responsibility.
- Identify the activities/issues in their chosen profession that may present ethical challenges, and articulate the consequences associated with unethical behavior.

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Dept of Finance	Head of Dept	Prof Chu ZHANG	23-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Dept of Finance	Head of Dept	Prof Chu ZHANG	23-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Business and Management	Associate Dean	Prof Allen HUANG	23-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year **2021–2022** Term **Fall**

b) Department Code[3]: **HUMA** Subject Area[3]: _____ Course Number [4]: **4620**

Previous Course Code[5]: _____

c) Full Title[6] *(max. 100 characters)*: **Geopolitics**

d) Abbreviated Title[7] *(max. 30 characters)*: **Geopolitics**

e) Course Credits[8]: ◉ Fixed: **3** ○ Range: From _____ To _____

f) Catalog Description[9] *(word limit = 150)*:

This course surveys the history of modern geopolitical thinking and its relation to world politics over the past two centuries. What is the relationship between state power and the mastery of geographic space? How does geography both constrain and facilitate the ambition of states? Is geography destiny? Students will read some of the classics of modern Western geopolitical thought, alongside critical commentary and historical contextualization, and consider their relevance for understanding contemporary global affairs.

g) Grading Type[10]: ◉ Letter Grades ○ Distinction/Credit/Pass/Fail ○ Pass/ Fail
○ Distinction/Pass/Fail ☐ Others *(please specify)*: _____

h) ☐ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☐ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) ☐ Co-listing[14]: ☐ Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] ○ No ◉ Yes

☐ Instructor's approval required

☐ Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

☒ Others *(please specify)*: **To facilitate seminar discussion, I wish to restrict the size of the class to max. 20 students.**

m) Medium of Instruction/Materials[16]: ■ English ○ Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: ■ No ○ Yes

1.2 *Contribution of course to Programs of Study [Check all appropriate boxes below]*

■ Major

Program of Study	As		
Global China Studies	☐ Required Course	■ Free Elective	☐ Prerequisite

■ Minor

Program of Study	As		
Humanities	☐ Required Course	■ Free Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 *Rationale for Introducing this course and other relevant information[18]*

My aim in introducing this course is to provide undergraduate students with an accessible, seminar-format course on modern intellectual history. To maximize the appeal of the course to the undergraduate population, I have chosen a theme that does not require any real prerequisite knowledge of modern history or philosophy, and whose texts are non-technical in nature. I propose to survey the history of modern Western geopolitical thought from the late nineteenth century up until the present. Geopolitics is the interdisciplinary field of knowledge that investigates the impact of geography—and space, more broadly—on the development and interaction of polities. Since the end of the nineteenth century, the literature associated with this field has inspired and engaged politicians, scholars, and analysts around the world. Developed in part as a response to growing international and imperial rivalries in an era of globalization, geopolitics has served as an alibi and ideology of imperialism, but also as a framework for critiquing imperialist policies. The classic works of geopolitics have the advantage of engaging and responding to one another, and addressing concrete events of world history, which make them suitable texts for class discussion and paper-writing. They also speak to students with interests in history, political science, geography, political and social thought, and economics, which enables a course like this to appeal to a fairly wide student population. Though most of the authors to be discussed in this course came from Europe and the United States, I intend to also emphasize the relevance and reception of these texts outside the West, i.e. in Japan and China.

The reading list may include such primary sources as:

- Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783* (1890)
- Halford J. Mackinder, *Democratic Ideals and Reality* (1919)
- Karl Haushofer, selections in translation
- Carl Schmitt, *Land and Sea* (1942)
- Nicholas Spykman, *America's Strategy in World Politics* (1942)
- George Kennan, "The Sources of Soviet Conduct" (1947)
- Samuel P. Huntington, *The Clash of Civilizations* (1996)
- John J. Mearsheimer, *The Tragedy of Great Power Politics* (2003)
- Barry Posen, "Command of the Commons" (2003)

And secondary sources such as:

- Jeremy Black, *Geopolitics and the Quest for Dominance* (2016)
- Christopher I. Beckwith, *Empires of the Silk Road* (2009)
- Peter C. Purdue, *China Marches West* (2005)
- Neil Smith, *American Empire* (2003)
- Geroid O'Tuathail, *The Geopolitics Reader* (2003)
- Robert Kaplan, *The Revenge of Geography* (2013)
- Zbigniew Brzezinski, *The Grand Chessboard* (1997)
- John Darwin, *After Tamerlane* (2008)
- Peter Paret, ed., *Makers of Modern Strategy* (1986)
- Bruno Macaes, *Belt and Road* (2020)
- Adam Tooze, *The Deluge* (2014)
- Charles S. Maier, *Once Within Borders* (2016)

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 *Key Course Intended Learning Outcomes (Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	Nature of the learning outcomes (*A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others*)
1	**Acquire familiarity with the central themes and arguments of modern geopolitical thought.**	**A**
2	**Develop familiarity with key geopolitical events and trends in the past two centuries.**	**A**
3	**Gain experience reading and discussing theoretical texts**	**B**
4	**Acquire proficiency in writing analytical essays**	**B**
5		
6		
7		
8		

2.2 *Contribution of Learning Outcomes to Programs of Study identified in Section 1.2*

(Please also complete Section 4.1)

	Program of study 1: GCS Program ILOs	To be achieved through these course ILOs *(Write CILO-1, CILO-2, etc.)*
1	**Applying knowledge in humanities / social science to study issues of social or cultural significance**	**CILO-1, 2**
2	**Applying knowledge in humanities / social science to study issues relating to China and the world**	**CILO-1, 2**
3	**Develop students' academic and self-learning skills**	**CILO-3, 4**
4	**Enhance students' academic writing competence**	**CILO-4**
5		
6		
7		
8		

	Program of study 2: HUMA Minor Program ILOs	To be achieved through these course ILOs *(Write CILO-1, CILO-2, etc.)*
1	**Students will gain exposure to the critical methodologies of the humanities**	**CILO-1, 2, 3, 4**
2	**Students will develop their skills as readers and writers**	**CILO-3, 4**
3		
4		
5		
6		
7		
8		

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 *Planned Teaching & Learning Arrangement*

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☐ Lecture*			
	☐ Tutorial*			
	■ Seminar/Small-class*	**2 x 1.5 hrs**	**CILO-1, 2, 3, 4**	**25% instructor presentation, 75% class discussion**
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◯ No ◉ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to __120_____ hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

◯ Blended learning [20] ◯ Pure online delivery [21]

◯ Experiential learning [22] ◯ Others, *pls specify:*_____

2.4 *Planned Assessment Weightings*

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
■ In-class test	**20%**	**CILO-2**	**Two quizzes**
☐ Mid-term test			
☐ Final exam			
■ Midterm paper	**25%**	**CILO-4**	
■ Final paper	**35%**	**CILO-4**	
☐ Project report			
☐ Presentation			
☐ Learning portfolio			
■ Course participation	**20%**	**CILO-1, 2, 3**	
Peer evaluation			

☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 *Course Duration*

◉ 1 term ○ 2 terms ○ Others, *pls specify:* _____

2.6 *Planned Frequency of Offerings* *[Check all appropriate boxes]:*

☐ Every Fall ☐ Every Winter

☐ Every Spring ☐ Every Summer

☒ No fixed pattern

☐ Other *(pls specify):* _____

2.7 *Course outline attached* No ◉ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

The course covers the recent history of globalization and its ramifcations for world politics, focusing on the United States, Europe, and East Asia.

2.8 *Resources*

Request extra resources for teaching this course? ◉ No ○ Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
School of Humanities & Social Science	Associate Dean	Prof Carine YIU	16-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Division of Humanities	Head of Division	Prof Christian A DANIELS	9-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Humanities & Social Science	Dean	Prof Kellee TSAI	16-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

Sample Course Outline

Week 1: Introduction

Week 2: Globalization and territoriality

- Paul Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Vintage, 1987), pp. 194–274.
- Sven Beckert, "American Danger: United States Empire, Eurafrica, and the Territorialization of Industrial Capitalism, 1870–1950," *American Historical Review* 122, no. 4 (2017): 1137–70.

Week 3: Sea Power

- Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783*, 5th ed. (Mineola: Dover, 1987 [1894]), selections.

Week 4: Land Power

- Christopher I. Beckwith, *Empires of the Silk Road: A History of Central Eurasia from the Bronze Age to the Present* (Princeton: Princeton University Press, 2009), pp. 183–262.
- H. J. Mackinder, "The Geographical Pivot of History" (1904), *Geographical Journal* 170, no. 4 (2004): 298–321.

Week 5: Empire without conquest

- Neil Smith, *American Empire: Roosevelt's Geographer and the Prelude to Globalization* (Berkeley: University of California Press, 2003), selections.
- Mark Mazower, *Governing the World: The History of an Idea* (New York: Penguin, 2012), chapter 5.

Week 6: Living Space

- Andreas Dorpalen, *The World of General Haushofer: Geopolitics in Action* (New York: Farrar & Rinehart, 1942), selections.
- Adolf Hitler, *Mein Kampf*, trans. Ralph Manheim (Boston: Mariner, 1999), pp. 131–44, 659–64.

Week 7: Dividing the World

- Mazower, *Governing the World*, chapter 6.
- Carl Schmitt, "The *Großraum* Order of International Law" (1939), in Carl Schmitt, *Writings on War*, ed. Timothy Nunan (Cambridge: Polity, 2011), pp. 75–124.
- Joshua Derman, "Prophet of a Partitioned World: Ferdinand Fried, 'Great Spaces,' and the Dialectics of Deglobalization, 1929–1950," *Modern Intellectual History*, forthcoming.

Week 8: Securing the American century

- Nicholas Spykman, *America's Strategy in World Politics* (New York: Harcourt, Brace & Co., 1942), selections.
- Stephen Wertheim, *Tomorrow, the World: The Birth of U.S. Global Supremacy* (Cambridge, MA: Harvard University Press, 2020), selections.

Week 9: The Cold War

- George F. Kennan, "The Sources of Soviet Conduct," *Foreign Affairs* (1947)
- John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy During the Cold War*, rev. ed. (Oxford: Oxford University Press, 2005), selections.
- John H. Herz, "Rise and Demise of the Territorial State," *World Politics* 9, no. 4 (1957): 473–93.

Week 10: Globalization and its discontents

- Barry R. Posen, "Command of the Commons: The Military Foundation of U.S. Hegemony," *International Security* 28, no. 1 (2003): 5–46.
- Samuel P. Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996), selections.

Week 11: Realism redux

- John J. Mearsheimer, *The Tragedy of Great Power Politics*, rev. ed. (New York: Norton, 2014), pp. 55–137.
- Zbiginew Brzezinski, *The Grand Chessboard: American Primacy and its Geostrategic Imperatives*, 2nd ed. (New York: Basic Books, 2016), selections.

Week 12: Redividing the world

- Marlène Laruelle, *Russian Eurasianism: An Ideology of Empire* (Baltimore: Johns Hopkins University Press, 2012), selections.
- Bruno Macaes, *Belt and Road: A Chinese World Order* (London: Hurst, 2018), selections.

Week 13: Perspectives

- Robert D. Kaplan, *The Revenge of Geography: What the Map Tells Us About Coming Conflicts and the Battle Against Fate* (New York: Random House, 2013), selections.
- Anne-Marie Slaughter, *The Chessboard and the Web: Strategies of Connection in a Networked World* (New Haven: Yale University Press, 2017), selections.

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2020/21 Term Summer

b) Department Code[3]: SHSS Subject Area[3]: *SHSS* Course Number [4]: SHSS 1050

Previous Course Code[5]:

c) Full Title[6] *(max. 100 characters)*: Humanities and Social Science Co-op Program

d) Abbreviated Title[7] *(max. 30 characters)*: SHSS Co-op

e) Course Credits[8]: ☑ Fixed: 3 ○ Range: From To

f) Catalog Description[9] *(word limit = 150)*:

This course aims to engage students in working as an intern at an internship partner workplace in order to gain work experience while being guided by an alumni mentor and/or the staff of the DAO and SHSS program office. Course assessments will be based on students' written reports and supervisors' evaluation. Credits will only be granted for working at an internship partner recognized by DAO and SHSS. Course enrollment excludes SHSS students in their final year. Instructor's approval is required for enrolling in the course. Graded P or F.

g) Grading Type[10]: ○ Letter Grades ○ Distinction/Credit/Pass/Fail ☑ Pass/ Fail ○ Distinction/Pass/Fail ☐ Others *(please specify)*:

h) ☐ Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

i) ☐ Corequisites[12]:

Course Code	Course Title

j) ☐ Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) ☐ Co-listing[14]: ☐ Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] ○ No ⊘ Yes

☑ Instructor's approval required

☑ Restricted to specified student group(s) *(please specify, e.g. year and program of study):* SHSS students in Year 2 and 3

☐ Others *(please specify):*

m) Medium of Instruction/Materials[16]: ○ English ⊘ Others, (Pls specify and provide a justification in Section 1.3): Cantonese, Mandarin, English or other languages that are deemed appropriate

n) Allow course repetition for credit[17]: ⊘ No ○ Yes

1.2 *Contribution of course to Programs of Study* *[Check all appropriate boxes below]*

☑ Major

Program of Study	As		
Global China Studies Quantitative Social Analysis	☐ Required Course	☑ Elective	☐ Prerequisite

☐ Minor

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

☐ Common Core

☐ Others (pls specify):

Program of Study	As		
	☐ Required Course	☐ Elective	☐ Prerequisite

1.3 *Rationale for Introducing this course and other relevant information*[18]

Rationale

Today, university students face unprecedented challenges due to rapidly changing social, technological and economic conditions. A Co-operative Education (Co-op) program aims to address these challenges by enabling students to apply knowledge learned in the classroom to the workplace, to develop their career goals, and to acquire practical, industry-specific skills that will help them to adjust easily to the workplace upon graduation.

Many alumni entrepreneurs and alumni in senior management are keen to recruit HKUST talents, providing fellow alumni with a training opportunity which enables them to transition smoothly to the marketplace. This program will tap into the alumni network to provide work experience as well as mentorship for students enrolled in this program.

Other Relevant Information

In the workplace, English, Cantonese, and/or other languages may be used in some situations. Language requirements will be made clear to students before they decide to enroll in the course.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 *Key Course Intended Learning Outcomes (Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Have developed practical, hands-on experience in an industry related to his/her studies and/or career interests;	B
2	Have improved his/her communication skills and techniques	B
3	Have applied what s/he had learnt to the workplace	A
4	Have built an evidence-based work portfolio.	B
5		
6		
7		
8		

2.2 *Contribution of Learning Outcomes to Programs of Study identified in Section 1.2*

(Please also complete Section 4.1)

	Program of study 1: _____Global China Studies_____ **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Applying knowledge in humanities / social science to study issues of social or cultural significance	CILO-3
2	Applying knowledge in humanities / social science to study issues relating to China and the world	CILO-3
3	Develop students' academic and self-learning skills	CILO-1, CILO-2, CILO-3
4	Enhance students' academic writing competence	CILO-2, CILO-4
5		
6		
7		
8		

	Program of study 2: _____Quantitative Social Analysis_____ **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Describe differences between the major social science disciplines, especially in reference to their dominant paradigms, topics and subjects of concern, and approaches to the use of quantitative methods.	CILO-1, CILO-3
2	Define a research question that involves the analysis of social data, situate it within the existing literature(s) of one or more of the major social science disciplines, and identify the quantitative methodologies most appropriate for addressing it.	CILO-1, CILO-3
3	Recognize and describe the special challenges to drawing conclusions from the analysis of social data posed by issues such as selection, endogeneity, and omitted variable bias.	CILO-1, CILO-3
4	Locate existing datasets that will help them answer their question, or if	CILO-1, CILO-3

	there are no relevant datasets, collect new data.	
5	Design analysis to minimize the risk that observed relationships are spurious or artefactual.	CILO-1, CILO-3
6	Manage complex datasets to prepare them for analysis by using scripting facilities or programming languages that are routinely included as part of statistical software packages such as STATA.	CILO-1, CILO-3
7	Carry out analysis using advanced methods.	CILO-1, CILO-3
8	Communicate results in writing and via presentations to lay audiences.	CILO-2, CILO-4

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 *Planned Teaching & Learning Arrangement*

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☐ Lecture*			
	☐ Tutorial*			
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◯ No ◯ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☑ Others (e.g. fieldtrip, visit, etc.), *pls specify:* *Work placement*	10	CILO-1 to CILO-4	
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to a minimum of 150 hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

◯ Blended learning [20] ◯ Pure online delivery [21]

◯ Experiential learning [22] ◯ Others, *pls specify:*_____

2.4 *Planned Assessment Weightings*

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☐ In-class test			
☐ Mid-term test			
☐ Final exam			
☐ Written assignment			
☐ Project report			
☐ Presentation			
☑ Learning portfolio	**90%**	**CILO-1 to CILO-4**	
☐ Course participation			
☐ Peer evaluation			
☑ Others (e.g. proctored online exam, etc.), *pls specify:* *_Supervisor's evaluation_____*	**10%**	**CILO-1**	

2.5 *Course Duration*

☑ 1 term ○ 2 terms ○ Others, *pls specify:* _____

2.6 *Planned Frequency of Offerings [Check all appropriate boxes]:*

☐ Every Fall
☐ Every Spring
☑ No fixed pattern
☐ Other *(pls specify):* _____
☐ Every Winter
☐ Every Summer

2.7 *Course outline attached*

☑ No ○ Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

2.8 *Resources*

Request extra resources for teaching this course? ☑ No ○ Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
School of Humanities & Social Science	Associate Dean	Prof Carine YIU	9-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Development & Alumni Office	Director	Miss Daisy CHAN	9-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
School of Humanities & Social Science	Dean	Prof Kellee TSAI	9-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2023-2024 Term Fall

b) Department Code[3]: IPO Subject Area[3]: ENVR Course Number [4]: 2080

Previous Course Code[5]: N/A

c) Full Title[6] *(max. 100 characters)*: Circular Economy and Life Cycle Assessment

d) Abbreviated Title[7] *(max. 30 characters)*: Circular Econ and LCA

e) Course Credits[8]: (X) Fixed: 3 ( ) Range: From ____ To ____

f) Catalog Description[9] *(word limit = 150)*:

This course identifies the purpose of green finance as a means to promote and enable sustainable and resource-conserving economic systems.

While viable benchmarks and concepts for sustainable development exist, economic decision-makers and financial institutions by and large still focus on economic profit, leaving environmental and societal sustainability outside of their cost-benefit assessments. In order to provide an alternative approach that guides financial investment towards green ventures, the course offers insights into sustainable development concepts and respective assessment mechanisms for sustainable corporate performance. These concepts and mechanisms are exemplified in the Circular Economy (CE) and Life Cycle Assessment (LCA), which constitute increasingly important elements in sustainable development.

By adopting a multidisciplinary perspective, the classes cover the fundamentals of sustainable concepts, benchmarks on how to measure sustainable performance in the economic domain (i.e., at the corporate-, meso- and system-level) and empirical cases on how green finance has and can make a difference to promote sustainable growth.

g) Grading Type[10]: (X) Letter Grades ( ) Distinction/Credit/Pass/Fail ( ) Pass/ Fail ( ) Distinction/Pass/Fail [ ] Others *(please specify):* ____

h) [X] Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
SUST1000	Introduction to Sustainability

i) [ ] Corequisites[12]:

Course Code	Course Title

j) [ ] Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) [ ] Co-listing[14]: [ ] Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] (x) No ( ) Yes

[ ] Instructor's approval required

[ ] Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

[ ] Others *(please specify):* _____

m) Medium of Instruction/Materials[16]: (x) English ( ) Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: (x) No ( ) Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

[x] Major

Program of Study	As		
BSc in Sustainable and Geeen Finance	[x] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Minor

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Common Core

[ ] Others (pls specify):

Program of Study	As		
Tbd.	[ ] Required Course	[ ] Elective	[ ] Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

In order to understand how financing can render systems located in the economy-environment-society nexus more green, it is important to analyse three core dimensions: (1) Which factors constitute current systems and how do they operate; (2) which are the benchmarks of sustainable systems and their operation; (3) at which instances can financial investments help to induce a shift from non-sustainable to sustainable development patterns. Given the paucity of sustainable operations in the economy, the novelty of the sustainability concept, and the urgency for a sustainable transformation due to anthropogenic forcing, this course intends to equip students with a basic understanding of current and desired mechanisms in this vast transformation.

By implication, the main idea is to first provide basic insights into the characteristics of the currently most prominent sustainability paradigm, the Circular Economy, and selected indicator benchmarks for guiding the decision-making process in green finance.

In the second instance, the course introduces the Life Cycle Assessment (LCA) tool to provide a holistic assessment of emerging technologies, new products, and engineering systems and helps to identify opportunities for improving product designs to conserve resources and reduce pollution. The integration of environmental LCA can provide a measure of scope 3 carbon emissions (carbon footprints) and other environmental impacts of investment portfolios. Social LCA complements environmental LCA by measuring the impacts on society, including the challenge of child labor and worker health. The life cycle cost (LCC) offers an insight into the financial cost for investing in sustainable projects from a cost-benefit perspective. The introduction of environmental, economic, and social LCA will help students equip themselves with the capacity to understand and quantify the "green" component of financial projects.

Based on this tool-set, students will be confronted with various cases, which have to be solved in groups. Essentially, the task lies in using financial means (public, corporate, societal) to render system operations, products, and corporate processes sustainable. By exposing students to such causal mechanisms, i.e., how financial inputs do or don't induce processes/ products/ operations to be sustainable, the course will train a specific mindset currently sought by financial regulators and institutions.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Understanding the idea of the CE, its role in the future, and the function of Green Finance to promote CE related business ventures	A, B
2	Master key benchmarks/ indicators for assessing corporate CE performance & thereupon decide over green finance investment strategies/ approaches	A,B
3	Understand the principles of environmental, social, and economic life cycle assessment	A
4	Interpret and explain the conclusion from the life cycle assessment	B
5	Apply the life cycle assessment framework and circular economy perspectives for supporting investment decisions	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: _____BSc in Sustainable and Green Finance_____ **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Have a broad understanding of sustainable and green business functions and integrate these functions to adopt an inter-disciplinary approach and formulate effective and innovative solutions to tackle complex real-world problems.	1, 5
2	Have an in-depth grasp of Sustainable and green finance knowledge and skills, and transfer acquired knowledge and skills to meet changes and challenges in different fields.	1-5
3	Engage in activities that lead to the impact of societal improvement	1
4	Make effective ESG finance decisions supported by analytical and quantitative techniques	2-5
5	Have the ability to create and innovate with divergent thinking	2,4,5
6	Communicate effectively with people of different levels and work areas.	5
7	Work independently, collaborate effectively in teams, and lead a team to success	4,5
8	Demonstrate a global outlook and function effectively in multi-cultural and international settings.	1
9	Effectively use information technology and sources of information in work applications	4,5
10	Understand professional and ethical responsibility, and recognize the importance of a sustainable and green living society	1-5

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☒ Lecture*	3	**CILO-1-5**	
	☐ Tutorial*			
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◯ No ◯ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to ____120_____ hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:

◯ Blended learning [20]
◯ Pure online delivery [21]
◯ Experiential learning [22]
◯ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	**Proportion of Final Grade** (%)	**Indicate which course ILOs this task is to assess** *(Write CILO-1, CILO-2, etc.)*	**Additional Information** *(optional)*
☐ In-class test			
☒ Mid-term test	**30**	**CILO-1 to CILO-3**	Assessment of students' understanding of the course basics via a written mid-term (standardized questions)
☐ Final exam			
☒ Written assignment	**15**	**CILO-1 to CILO-5**	Personal reflection paper; aims to discern students' incorporation of acquired knowledge into their professional life
☒ Project report	**40**	**CILO-1 to CILO-5**	Based on a given task assigned student groups have to produce a project report. Metrics centre on CILOs and individual innovativeness
☐ Presentation			
☐ Learning portfolio			
☒ Course participation	**10**	**n.a.**	Measurement: Presence in class and frequency of comments & questions made in class
☒ Peer evaluation	**5**	**n.a.**	Measurement: Participation and activity in groups for working on the project report
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

(x) 1 term ( ) 2 terms ( ) Others, *pls specify:* _____

2.6 Planned Frequency of Offerings [Check all appropriate boxes]:

[ ] Every Fall
[ ] Every Winter
[x] Every Spring
[ ] Every Summer
[ ] No fixed pattern
[ ] Other *(pls specify):* _____

2.7 Course outline attached

( ) No (x) Yes

Internationalization:

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

Given the various approaches towards green bonds, this course will use a set of case examples and best case practices from all over the world to expose students to the latest trends and approaches towards sustainability assessment and economic approaches.

2.8 Resources

Request extra resources for teaching this course? ( ) No (x) Yes

Section 3: Learning Outcomes and Alignment *(for Common Core Course)* NOT APPLICABLE

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
Interdisciplinary Programs Office	Chair of IUSC	Prof Jimmy FUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

Attachment 1: Course Outline

Week	Topics	Briefly outline what this topic will cover *(Include reading assignments if available)*
1	**Sustainable development and Green Finance**	**Concept, history, and principals**
2	**Circular Economy**	**Concept & history**
3	**The CE in practice**	**Applications at systemic, corporate & product levels**
4	**CE indicators and benchmarks**	
5	**Assessment tools for CE: Framework for LCA**	**Framework for environmental LCA**
6		**Social LCA**
7		**Life Cycle Costing**
8	**CE and LCA approaches for green finance and comparison / complementary tools**	
9		
10	**Synergies for CE& LCA & Sector-specific case examples**	**Construction, Energy & Transport, Agriculture etc.**
11		
12		
13	**Group Project Presentations**	

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2023-2024 Term Fall

b) Department Code[3]: IPO Subject Area[3]: ENVR Course Number [4]: 3005

Previous Course Code[5]:

c) Full Title[6] *(max. 100 characters)*: Environmental Sustainability: Risks and Challenges

d) Abbreviated Title[7] *(max. 30 characters)*: Environmental Sustainability

e) Course Credits[8]: (X) Fixed: 3 ( ) Range: From To

f) Catalog Description[9] *(word limit = 150)*:

Human development is fundamentally supported by natural resources. Environmental sustainability ensures the responsible consumption of these resources while maintaining their regenerations without sacrificing the needs of future generations. The course covers the general understanding of key factors contributing to the rates of non-renewable resource depletion, renewable resources recovery, and pollution generation. Emergent challenges to environmental sustainability include energy, food, land use, water resource, and novel chemicals. Risks associated with these challenges like climate change, water scarcity, and soil degradation, ecosystem health, and biodiversity loss will be assessed. These risks will become catastrophic if no proper action is taken in view of the current rate of human development. Hence, the course outlines the fundamental concepts and practices of managing environmental risks: prevention, preparedness, response, and recovery (PPRR). Fundamental risk analysis techniques will also be introduced to identify and quantify the environmental risks.

g) Grading Type[10]: (X) Letter Grades ( ) Distinction/Credit/Pass/Fail ( ) Pass/ Fail ( ) Distinction/Pass/Fail [ ] Others *(please specify):*

h) [x] Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
SUST1000	Introduction to Sustainability

i) [ ] Corequisites[12]:

Course Code	Course Title

j) [ ] Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) [ ] Co-listing[14]: [ ] Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] (X) No ( ) Yes

[ ] Instructor's approval required

[ ] Restricted to specified student group(s)
(please specify, e.g. year and program of study):

[ ] Others *(please specify):*

m) Medium of Instruction/Materials[16]: (x) English ( ) Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: (x) No ( ) Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

[x] Major

Program of Study	As		
BSc in Sustainable and Green Finance	[x] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Minor

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Common Core

[ ] Others (pls specify):

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

Human development deploys extensive environmental resources. For sustainable development that future generations will not be jeopardized to their needs, the resources deployment rate should not be greater than that of the natural regeneration capability; or else, depletion of the resources. Beyond the rate of resource depletion, anthropogenic development induces a severe impact on the land-use change for agriculture for food and shelter, fossil fuel mines for energy. Not only are natural habitats destroyed, leading to biodiversity loss, the balance between the carbon sink and source is also disrupted as a result of extensive deforestation and excessive GHG emission from fossil fuel consumption; and consequentially the climate change (warming, extreme weathers, loss of glaciers, flooding, etc.). These damages to the environment can be catastrophic and irreversible if no appropriate actions are taken. Can human development or even humankind be sustainable?

Environmental sustainability becomes a crucial topic at the present time, emphasizing preserving the capability of the environment to recover itself. The understanding of Environmental Sustainability is also vital for sustainable finance and/or investments. The course will walk students through the current scenarios of the major environmental challenges (energy, land-use change, biodiversity loss, and climate change), identify the potential risks associated with these challenges. Fundamental risk analytical techniques will help students quantify these risks for better management. The Prevention, Preparedness, Response, and Recovery (PPRR) will provide students fundamental environmental management skills in maintaining environmental sustainability in supporting human development and growth. These skills are also applicable in quantifying and assessing the risks of sustainable finance or investments.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Describe the challenges on environmental sustainability	A
2	Identify the potential environmental risks that threaten the sustainable development	A, B
3	Quantify the degree of environmental risks and assess the impacts on financial investment	A, B
4	Apply the Prevention, Preparedness, Response and Recovery (PPRR)	B
5	Develop a holistic analysis on challenges, risks, and solutions in the context of sustainable and green finance	B
6	Nurture stewardship in sustainable finance professionals/practitioners for environmental sustainability	C (attitude)
7		
8		

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: __ BSc in Sustainable and Green Finance_____ **Program ILOs:** Graduates from the program are expected to:	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	have a broad understanding of Sustainable and green business functions and integrate these functions to adopt an inter-disciplinary approach and formulate effective and innovative solutions to tackle complex real-world problems.	CILO1, CILO2, CILO3, CILO4
2	have an in-depth grasp of Sustainable and green finance knowledge and skills, and transfer acquired knowledge and skills to meet changes and challenges in different fields.	CILO3, CILO4, CILO5
3	engage in activities that lead to the impact of societal improvement.	CILO5, CILO6
4	make effective ESG finance decisions supported by analytical and quantitative techniques.	CILO3, CILO5
5	have the ability to create and innovate with divergent thinking.	CILO5
6	communicate effectively with people of different levels and work areas.	CILO5, CILO6
7	work independently, collaborate effectively in teams and lead a team to success.	CILO5
8	demonstrate a global outlook and function effectively in multi-cultural and international settings.	CILO5, CILO6
9	effectively use information technology and sources of information in work applications.	CILO4, CILO5
10	understand professional and ethical responsibility, and recognize the importance of a sustainable and green living society.	CILO6

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	[x] Lecture*	**3/5**	**CILO1, CILO2, CILO3, CILO4**	
	[ ] Tutorial*			
	[x] Seminar/Small-class*	**0/1**	**CILO5, CILO6**	**Project guidance/Case discussion**
	[ ] Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◯ No ◯ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	[x] Others (e.g. fieldtrip, visit, etc.), *pls specify:* *Hong Kong Observatory, Daya Bay Nuclear Plant etc* _____		**CILO 6**	**Will arrange as far as possible for student's better understanding on Climate Risk, Nuclear Risk, etc**
Online activities	[ ] Online lecture videos			
	[ ] Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to 120 **hours** [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

◯ Blended learning [20] ◯ Pure online delivery [21]

◯ Experiential learning [22] ◯ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
[ ] In-class test			
[ ] Mid-term test			
[x] Final exam	**50%**	**CILO1, CILO2, CILO3, CILO4, CILO5**	
[ ] Written assignment			
[x] Project report	**20%**	**CILO 1, CILO2, CILO3, CILO4, CILO5, CILO6**	**Group project on environmental risks and challenges**
[x] Presentation	**10%**	**CILO 1, CILO2, CILO3, CILO4, CILO5, CILO6**	**Project presentation**
[ ] Learning portfolio			
[x] Course participation	**10%** **10%**	**CILO5, CILO6**	**In-class and project discussion** **Visit Report and Reflection**
[ ] Peer evaluation			
[ ] Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

(X) 1 term ( ) 2 terms ( ) Others, *pls specify:* _____

2.6 Planned Frequency of Offerings [Check all appropriate boxes]:

[X] Every Fall
[ ] Every Winter
[ ] Every Spring
[ ] Every Summer
[ ] No fixed pattern
[ ] Other *(pls specify):* _____

2.7 Course outline attached

( ) No (X) Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

- Environmental and Climate challenges and risks are global in nature, cases and examples (shrinkage of polar ice extent, renewable energy, food, etc) are with highly international perspective.
- Project works facilitate students in transferring the knowledge and analytical skills from class to the studied countries not covered in the classes.

2.8 Resources

Request extra resources for teaching this course? (X) No ( ) Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
Interdisciplinary Programs Office	Chair of IUSC	Prof Jimmy FUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

Attachment 1: Course Outline

Week No	Topic
1	Introduction to Environmental Challenges and Risk: Impact on Finance Investment
2	Human Thriving and Planet Boundary
3	Environmental Sustainability Challenge: Energy
4	Environmental Sustainability Challenge: Agriculture and Land Use Change
5	Environmental Sustainability Challenge: Water
6	Environmental Risk: Climate and Extreme Weather
7	Environmental Risk: Biodiversity Loss and Ecosystem Health Degradation
8	Environmental Risk: Emerging Diseases and Human Health
9	Environmental Risk Management: Prevention, Preparedness, Response and Recovery (PPRR)
10	Environmental Risk Management: Prevention, Preparedness, Response and Recovery (PPRR)
11	Fundamental Risk Analysis Techniques
12	Fundamental Risk Analysis Techniques
13	Project Presentation

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
Approval of Undergraduate Course

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2023-2024 Term Fall

b) Department Code[3]: IPO Subject Area[3]: ENVR Course Number [4]: 4340

Previous Course Code[5]: N/A

c) Full Title[6] *(max. 100 characters)*: Social Sustainability: Risks and Challenges

d) Abbreviated Title[7] *(max. 30 characters)*: Social Sustainability

e) Course Credits[8]: (X) Fixed: 3 ( ) Range: From ____ To ____

f) Catalog Description[9] *(word limit = 150)*:

Social sustainability is the least defined and least understood of the different ways of approaching sustainability. Nevertheless, reflecting on countries or regions where internal conflicts are fierce, it is clear that environmental or economic sustainability would be difficult without social stability or sustainability. In this course, referencing the Sustainable Development Goals (SDG) championed by the United Nations, we shall examine the challenges regarding social sustainabilities. This course shall first provide a review of the SDGs, highlighting the SDGs related to social sustainability and using them to discuss how their progress is measured and improved in various counties. The course shall also discuss existing and emerging challenges to social sustainability and the risks and impacts when countries fail to improve upon these goals. Case studies and quantitative analyses will be used as much as possible.

g) Grading Type[10]: (X) Letter Grades ( ) Distinction/Credit/Pass/Fail ( ) Pass/ Fail ( ) Distinction/Pass/Fail [ ] Others *(please specify):* ____

h) [x] Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
SUST1000	Introduction to Sustainability

i) [ ] Corequisites[12]:

Course Code	Course Title

j) [ ] Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) [ ] Co-listing[14]: [ ] Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] (x) No ( ) Yes

[ ] Instructor's approval required

[ ] Restricted to specified student group(s)
(please specify, e.g. year and program of study): _____

[ ] Others *(please specify):* _____

m) Medium of Instruction/Materials[16]: (x) English ( ) Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: (x) No ( ) Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

[x] Major

Program of Study	As		
BSc in Sustainable and Green Finance	[x] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Minor

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Common Core

[ ] Others (pls specify):

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

Social sustainability is the least defined and least understood of the different ways of approaching sustainability. Nevertheless, reflecting on countries or regions where internal conflicts are fierce, it is clear that environmental or economic sustainability would be difficult without social stability or sustainability. In this course, referencing the Sustainable Development Goals (SDG) championed by the United Nations, we shall examine the challenges we have regarding social sustainabilities.

This course shall first provide a review of the framework of the SDGs, their background, the targets of each SDG, and the indicator system used to measure and encourage progress across countries at a very different stage of development. The course will then focus on the goals more related to social sustainability, including 1 (no poverty), 2 (zero hunger), 3 (good health and well-being), 4 (quality education), 5 (gender equality), 10 (reduced inequalities), 11 (sustainable cities and communities), 16 (peace, justice, and strong institutions), and goal 17 (partnerships) through case studies. Examples will also be used to illustrate how the indicator system assesses and monitor the progress of these SDGs in improving social sustainability in different countries according to their developmental status. The course shall also discuss existing and emerging challenges to social sustainability and the risks and impacts when nations fail to improve upon these goals. Case studies and quantitative analyses will be used as much as possible.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Describe the framework of the UN SDGs, their background, and the system for assessing their progress.	A
2	Review and comment on the latest development of the SDGs related to social sustainability (1,2,3,4,5,10,11,16 and 17) in key countries.	A, B
3	Deliberate the essential needs of social sustainability and associate the risks without social sustainability for a country's development.	A, B
4	Analyse how the interests of various stakeholders facilitate or hinder the attainment of these goals	B
5	Interpret case examples, understand how certain countries or regions managed to overcome difficulties, and make significant progress in recent years.	B
6	Critically evaluate the specific bottlenecks facing some countries or regions and make informed suggestions.	B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: __BSc in Sustainable and Green Finance_____ **Program ILOs:** Graduates from the program are expected to:	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	have a broad understanding of Sustainable and green business functions and integrate these functions to adopt an inter-disciplinary approach and formulate effective and innovative solutions to tackle complex real-world problems.	CILO1, CILO2, CILO3, CILO4
2	have an in-depth grasp of Sustainable and green finance knowledge and skills, and transfer acquired knowledge and skills to meet changes and challenges in different fields.	CILO3, CILO4, CILO5
3	engage in activities that lead to the impact of societal improvement.	CILO5, CILO6
4	make effective ESG finance decisions supported by analytical and quantitative techniques.	CILO3, CILO5
5	have the ability to create and innovate with divergent thinking.	CILO5
6	communicate effectively with people of different levels and work areas.	CILO5, CILO6
7	work independently, collaborate effectively in teams and lead a team to success.	CILO5
8	demonstrate a global outlook and function effectively in multi-cultural and international settings.	CILO5, CILO6
9	effectively use information technology and sources of information in work applications.	CILO4, CILO5
10	understand professional and ethical responsibility, and recognize the importance of a sustainable and green living society.	CILO6

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	[x] Lecture*	**3/5**	**CILO1, CILO2, CILO3, CILO4**	
	[ ] Tutorial*			
	[x] Seminar/Small-class*	**0/1**	**CILO5, CILO6**	**Project guidance/Case discussion**
	[ ] Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ( ) No (X) Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	[x] Others (e.g. fieldtrip, visit, etc.), *pls specify:* *Visiting social minority groups/communities in HK.*		**CILO 6**	**Will arrange as far as possible for student's better understanding of social inequity issues etc**
Online activities	[ ] Online lecture videos			
	[ ] Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to ___120_____ hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

( ) Blended learning [20] ( ) Pure online delivery [21]

( ) Experiential learning [22] ( ) Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
[ ] In-class test			
[ ] Mid-term test			
[x] Final exam	**50%**	**CILO1, CILO2, CILO3, CILO4, CILO5**	
[ ] Written assignment			
[x] Project report	**20%**	**CILO 1, CILO2, CILO3, CILO4, CILO5, CILO6**	**Group project work on social sustainability issues**
[x] Presentation	**10%**	**CILO 1, CILO2, CILO3, CILO4, CILO5, CILO6**	**Project presentation**
[ ] Learning portfolio			
[x] Course participation	**10% 10%**	**CILO5, CILO6**	**In-class and project discussion Visit Report and Reflection**
[ ] Peer evaluation			
[ ] Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

(X) 1 term ( ) 2 terms ( ) Others, *pls specify:* _____

2.6 Planned Frequency of Offerings [Check all appropriate boxes]:

[X] Every Fall
[ ] Every Spring
[ ] No fixed pattern
[ ] Other *(pls specify):* _____
[ ] Every Winter
[ ] Every Summer

2.7 Course outline attached

( ) No (X) Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

- Social sustainability is fundamentally social equity (gender, food, education, social mobility, etc.) agenda which is internationally relevant and applicable despite challenges and risks varies according to the developmental status of the country/region.
- Project works help students transfer the knowledge and analytical skills from class to the studied countries not covered in the classes.

2.8 Resources

Request extra resources for teaching this course? (X) No ( ) Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
Interdisciplinary Programs Office	Chair of IUSC	Prof Jimmy FUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

Attachment 1: Course Outline

Week No	Topic
1	Introduction to Social Sustainability, the United Nations 17 Sustainability Development Goals (SDGs)
2	Targets and indicator system in assessing and monitoring the progress of the SDGs
3	Perspective and Challenges on SDG1 – No Poverty
4	Perspective and Challenges on SDG2 – Zero Hunger
5	Perspective and Challenges on SDG3 – Good Health & Well-being
6	Perspective and Challenges on SDG4 – Quality Education
7	Perspective and Challenges on SDG5 – Gender Equity
8	Perspective and Challenges on SDG 10 – Reduced Inequality
9	Perspective and Challenges on SDG11 – Sustainable Cities & Communities
10	Perspective and Challenges on SDG 16 – Peace, Justice & Strong Institutions
11	Perspective and Challenges on SDG 17 - Partnerships
12	Risks and Impacts with Social Sustainabilities
13	Project Presentation

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
APPROVAL OF UNDERGRADUATE COURSE

Section 1: Academic Administration [1]

1.1 Catalog

a) Course to be effective from: Academic Year 2023-24 Term Spring

b) Department Code[3]: IPO Subject Area[3]: ENVR Course Number [4]: 4350

Previous Course Code[5]: N/A

c) Full Title[6] *(max. 100 characters)*: Governing Green Finance: National and International Perspectives and Approaches

d) Abbreviated Title[7] *(max. 30 characters)*: Governing Green Finance

e) Course Credits[8]: (X) Fixed: 3 ( ) Range: From ____ To ____

f) Catalog Description[9] *(word limit = 150)*:

This course covers the study of the instruments of green finance and the organizations and/or institutions that design, implement, and monitors them, in short, the actors of and the dynamics in the governance of green finance. The course offers students an opportunity to review, evaluate, assess, appraise, and critique the various approaches and perspectives around the instruments, institutions, and challenges of green finance, nationally, regionally, and internationally. The course uses examples from cities, national governments, countries/states, regional institutions, and the United Nations to illustrate the processes of governing green finance. Using an interdisciplinary lens, the course uses concepts from public administration, public policy, international relations, development studies, science and technology studies, and human geography to shed light and bring out a critical analysis of the multiple actors and institutions of green finance governance, and their interests. This interactive course heavily relies on the learners' active engagement in class activities through pair or small-group discussions, role plays, and debates.

g) Grading Type[10]: (X) Letter Grades ( ) Distinction/Credit/Pass/Fail ( ) Pass/ Fail ( ) Distinction/Pass/Fail [ ] Others *(please specify):* ____

h) [X] Prerequisites[11]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained
SUST1000	Introduction to Sustainability
ENVR3005	Environmental Sustainability: Risks and Challenges
ENVR4340	Social Sustainability: Risks and Challenges

i) [ ] Corequisites[12]:

Course Code	Course Title

j) [ ] Exclusions[13]:

Course Code / Public Exam	Course Title / Exam Subject and Level / Grade attained

k) [ ] Co-listing[14]: [ ] Multi-coding[14]:

Course Code	Course Title

l) Other Enrollment Restrictions[15] (X) No ( ) Yes

[ ] Instructor's approval required

[ ] Restricted to specified student group(s)
(please specify, e.g. year and program of study): ____

[ ] Others *(please specify):* ____

m) Medium of Instruction/Materials[16]: (X) English ( ) Others, (Pls specify and provide a justification in Section 1.3): _____

n) Allow course repetition for credit[17]: (X) No ( ) Yes

1.2 Contribution of course to Programs of Study *[Check all appropriate boxes below]*

[X] Major

Program of Study	As		
BSc in Sustainable and Green Finance	[X] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Minor

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

[ ] Common Core

[ ] Others (pls specify):

Program of Study	As		
	[ ] Required Course	[ ] Elective	[ ] Prerequisite

1.3 Rationale for Introducing this course and other relevant information [18]

Green finance does not exist in isolation; rather, it is evolving as a co-produced concept, meaning that the instruments and mechanisms of green finance are simultaneously developed, deployed, and monitored alongside its actors and institutions' dynamics and evolutions. Studying how green finance instruments interact with these societal actors, and vice versa, thus, is important. In these processes of ordering social systems, governance is manifest. Governance of green finance is undertaken by market forces, by governments, or by networks through norms, rules, power, laws, and systems of an organized society. In its simplest form, governance, thus, is about decision-making, authority, and accountability. This course underlines the study of governance as it relates to green finance, particularly its instruments and mechanisms, to bring about a critical understanding of how, where, and why they occur, are sustained, and have failed or succeeded. The course looks at the multilevel governance systems of green finance, meaning that it explores how green finance and its instruments are/were governed at the municipal/city, national/state, regional, and international scales. The course does this by summoning case studies and examples from across these scales, such as from national governments and agencies of the United Nations, to map these actors and their locations in what can be argued as a green finance system. The course is extensively hinged at the international normative directions set by the Paris Agreement to reduce further warming to +2 C, if not +1.5 C, by 2100, and the Agenda 2030 on Sustainable Development, as well as on emergent national pathways towards net zero economies, accelerated energy transitions, and the Green New Deal. The course, thus, is timely, given the rapidly evolving dynamics in this area – and for strengthening Hong Kong's position as a center of and for green finance, regionally and globally.

Section 2A: Learning Outcomes and Alignment *(for courses not proposed to be Common Core Courses)*

2.1 Key Course Intended Learning Outcomes *(Should not normally exceed six or eight outcomes)*

Upon completion of this course, students are expected to be able to do the following:

	Course ILOs	**Nature of the learning outcomes** *(A - Knowledge/Content Related; B - Academic Skills/Competencies; C - Others)*
1	Review, evaluate, assess, appraise, and critique the various instruments and institutions of Green Finance, nationally and internationally, their descriptions, case examples, successes, failures, and contestations	A, B
2	Review, evaluate, assess, appraise, and critique the various governance issues surrounding the various extant instruments and institutions of Green Finance for their benefits and tradeoffs from multiple perspectives, including social, economic, and political and in the context of the climate emergency	A, B
3	Communicate balanced, evidence-based, and critical views of the various issues related to the instruments and institutions of Green Finance, nationally and internationally	A, B
4	Review, evaluate, assess, appraise, and critique governance frameworks that can contribute to the expansion of Green Finance approaches that work/does not work nationally and internationally	A, B
5	Produce Green Finance governance strategies that take a considered view of the climate emergency and sustainable development	A, B

2.2 Contribution of Learning Outcomes to Programs of Study identified in Section 1.2

(Please also complete Section 4.1)

	Program of study 1: __BSc in Sustainable and Green Finance_____ **Program ILOs**	**To be achieved through these course ILOs** *(Write CILO-1, CILO-2, etc.)*
1	Adopt an inter-disciplinary approach to tackle complex real-world problems.	CILO-1-5
2	Communicate effectively with people of different levels and work areas.	CILO-3
3	Transfer acquired knowledge to meet changes and challenges in different fields.	CILO-5
4	Engage in activities that lead to the impact of social improvement.	CILO-1-5
5	Have the ability to create and innovate with divergent thinking.	CILO-1-5
6	Demonstrate proficiency in their knowledge of advanced environmental technologies, environmental management practices, and the interface between these technologies and society, business, and policy.	CILO-1-5
7	Formulate effective and innovative solutions to environmental problems by integrating and applying concepts from environmental technology, management, and sustainable development.	CILO-5
8	Understand professional responsibilities and ethical, environmental standards and how to exercise them in the roles of environmental leaders, policymakers, and technical managers.	CILO-1-5

Section 2B: Additional Information[2] *(for courses not proposed to be Common Core Courses)*

2.3 Planned Teaching & Learning Arrangement

	Teaching & Learning Arrangement	Weekly Scheduled Hours/ Estimated Weekly Learning Hours	Indicate which course ILOs this activity serves to achieve *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
Face-to face activities	☒ Lecture*	**3**	**CILO-1-5**	
	☐ Tutorial*			
	☐ Seminar/Small-class*			
	☐ Laboratory*			
	*Does the above scheduled component(s) involve structured active learning activities? [19] ◉ No ○ Yes *If yes, please specify for each scheduled component, the percentage and the type of active learning involved in the "Additional Information" column.*			
	☐ Others (e.g. fieldtrip, visit, etc.), *pls specify:* _____			
Online activities	☐ Online lecture videos			
	☐ Other online learning tasks, *pls specify:* _____			
	The total learning hours of the course# is equivalent to _120____ hours [8] *# including both scheduled instructional hours and hours for self-study activities & assessment*			

- *For course adopting a pedagogic approach other than lecture, tutorial and laboratory, please indicate the pedagogy used:*

○ Blended learning [20] ○ Pure online delivery [21]

○ Experiential learning [22] ○ Others, *pls specify:*_____

2.4 Planned Assessment Weightings

Assessment Task	Proportion of Final Grade (%)	Indicate which course ILOs this task is to assess *(Write CILO-1, CILO-2, etc.)*	Additional Information *(optional)*
☒ In-class test	24	CILO-1-5	Short quizzes from Weeks 2-13 to rapidly assess student learning
☒ Written assignment	40	CILO-1-5	A writing portfolio comprising a 2500-word critical paper, an infographic, and an op-ed on a topic on Green Finance governance to be negotiated with the instructor
☐ Project report			
☐ Presentation			
☐ Learning portfolio			
☒ Course participation	36	CILO-1-5	Class participation, all weeks
☐ Peer evaluation			
☐ Others (e.g. proctored online exam, etc.), *pls specify:* _____			

2.5 Course Duration

(X) 1 term ( ) 2 terms ( ) Others, *pls specify:* _____

2.6 Planned Frequency of Offerings [Check all appropriate boxes]:

- [ ] Every Fall
- [ ] Every Winter
- [x] Every Spring
- [ ] Every Summer
- [ ] No fixed pattern
- [ ] Other *(pls specify):* _____

2.7 Course outline attached

( ) No (X) Yes

- **Internationalization:**

Internationalization in a course refers to course content and/or pedagogic approaches which incorporate an intercultural and international perspective. Examples may include:

- Collaboration with overseas institutions to develop and adopt international course content, or to arrange international field trip
- Insertion of international theme as part of the course
- Integrating the course content with international material as examples or case studies
- Elements to provide global diversified perspectives and/or practices around the world

Please briefly list or summarize any component(s) in the course that contributes to internationalizing the curriculum:

The course contains national, regional, and international examples, practices, and case studies, including on the Belt and Road Initiative, the European Union Emissions Trading Scheme, The Green Climate Fund, and Multilateral Development Banks, among others, to illustrate and analyze the various instruments and institutions of green finance. Cross-national case studies and examples are embedded in the course materials, both in lectures and class activities.

2.8 Resources

Request extra resources for teaching this course? (X) No ( ) Yes

Section 4: Development, Concurrence and Approval

4.1 Contribution to the Program Learning Outcomes

The course is confirmed by the following Major/Minor program department(s)/unit(s) as indicated in Section 1.2 that it would contribute appropriately to overall program learning outcomes.

Department/Program unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

4.2 Approvals

Recommendation from offering department(s) and School(s)/IPO

Offering Department/Program Unit	*Position*	*Name*	*Date*
Division of Environment & Sustainability	Head of Division	Prof Alexis LAU	16-Feb-21

Recommending School/IPO	*Position*	*Name*	*Date*
Interdisciplinary Programs Office	Chair of IUSC	Prof Jimmy FUNG	19-Feb-21

Concurrence from other Schools or departments/units

School/Dept/Program Unit	*Position*	*Name*	*Date*

Attachment 1: Course Outline

Week	Topics
	Part A: Introduction
1	Financing a sustainable world; what is green finance governance; why governance matters
2	A new financial landscape: The climate emergency, net-zero economies, and energy transitions
	Part B: Governing the instruments of green finance
3	Guaranteed markets: The governance of price- and quota-based instruments
4	Public debt and equity from capital markets: The governance of green bonds
5	The governance of carbon taxation
6	Pricing carbon: The governance of carbon trading
7	Subsidies: The Case of Fossil Fuel Subsidies
	Part C: Green finance in the developing world
8	Greening development finance and aid
9	Green Finance in Multilateral Development Banks
10	Climate finance: From CDM to the Green Climate Fund
	Part C: Emergent green finance approaches
11	Islamic Green Finance, and Financing the Green New Deal
12	Greening the Belt and Road Initiative
13	**Part D: Conclusion**