Course Outline Template

Introduction

The course outline template is provided as a checklist and form for teachers to use in preparing course catalog for inputting to the Chinese University Student Information System (CUSIS) for undergraduate and/or postgraduate courses and for preparing course outline for students. It gives a 'road map' or rationale to students about the purpose and structure of the course, and it explains to them how their learning performance in the course will be assessed and graded. It is important that course catalog and outline are consistent with the University's teaching and learning policy. The 15 sections in a course outline are described below. Sections 1–10 are required in course catalog for course approval; these sections will be stored in CUSIS. Information in sections 11–15 should be provided each time a course is offered. Please feel free to adapt this current template format, especially sections 11–15, to suit the needs of your course(s).

1. Course code
2. English title
3. Chinese title
4. Course description
5. Learning outcomes
6. Course syllabus
7. Course components (Teaching modes (Learning activities)
8. Assessment type
9. Required and recommended readings
10. Feedback for evaluation
11. Course schedule
12. Contact details for teacher(s) or teaching assistant (TA)(s)
13. Details of course website
14. Academic honesty and plagiarism
15. Use of Generative AI tools

1–3. Course code, English title and Chinese title

Key points: This is a straightforward section. Provide the basic information about the course code and name of your course at the beginning of the course outline.

Course Code: **CSCI2100B** **Title in** **English: Data** **Structures** **Title in** **Chinese:数据** **结构**

4. Course description

Key points: Explain concisely in your statement(s) what the course is about and how the overall course will support student learning in the discipline(s) of the programme. The purpose of a course description is to provide a holistic view of your course with coherent information for your students. It is useful to give details of the background of the subject: the prior knowledge the students should have, the overall aims of the course, and/or how the course relates to the other courses in the programme.

Course description: The concept of abstract data types and the advantages of data abstraction are introduced. This course emphasizes the following topics: data structures, abstract data types, recursive algorithms, algorithm analysis, sorting and searching, and problem-solving strategies.

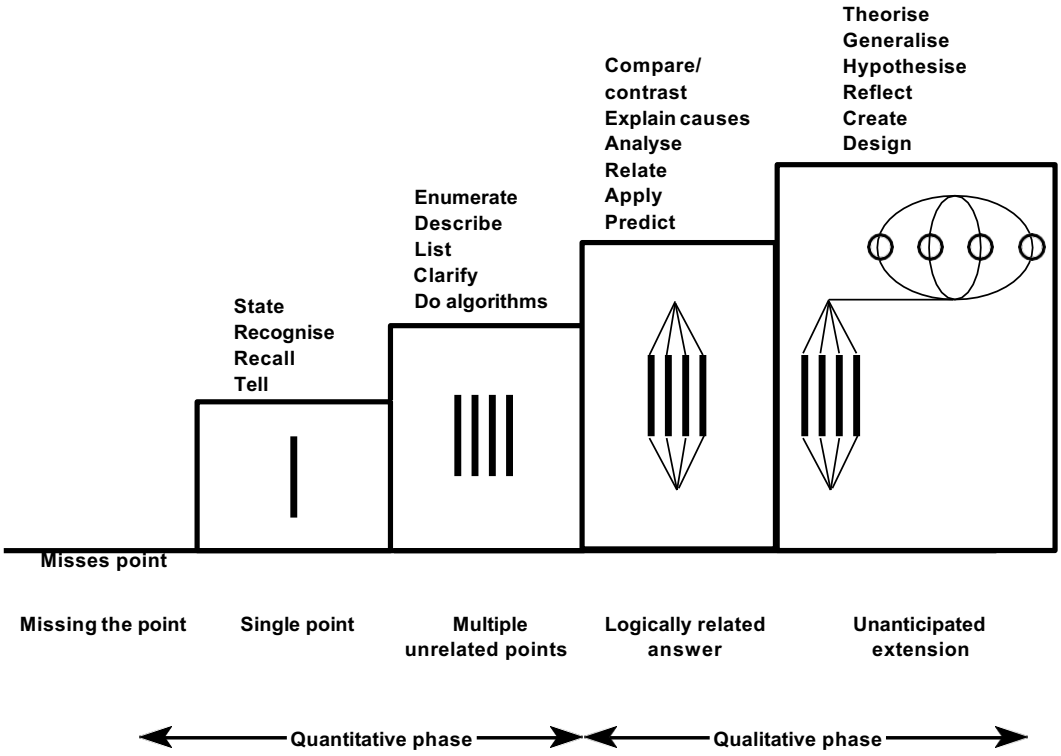
5. Learning outcomes

Although the term 'learning outcome' is often used interchangeably with terms such as 'learning objectives', 'educational objectives', and 'instructional objectives', there are some differences that are worth mentioning. Learning outcomes are student-oriented, referring specifically to what students are expected to achieve or learn at the end of the course.

Objectives are usually used to describe course design in terms of what teachers want to teach or how they view the course as contributing to the content areas covered by the entire programme. Teachers are encouraged to go over these learning outcomes with students in the first session of the course to manage their expectation of what they are going to learn in the course.

Key point: State clearly **what** you expect/ intend students to achieve. This is usually more helpful than stating what the teacher is planning to teach. Teachers can indicate different levels of students' expected learning outcomes. The model below may be helpful in distinguishing basic and higher-order desired learning outcomes (after Biggs, 2003).

Biggs, J. B. (2003). *Teaching for quality learning at university* (2nd ed.). Buckingham: Society for Research into Higher Education & Open University Press.



Learning outcomes: Upon completing the Data Structures class, students are expected to have a comprehensive understanding of the fundamental concepts of data structures including arrays, linked lists, stacks, queues, trees, and graphs. They will be able to analyze the efficiency of these structures in terms of time and space complexities and implement them effectively in a programming language. The course is designed to enhance the students' ability to develop algorithms using appropriate data structures for solving complex computational problems. he course not only aims to provide a solid theoretical foundation but also focuses on the practical aspects of data structures, preparing students for advanced study and professional work in computer science and related fields.

6. Course syllabus

Key point: Highlight the fundamental concepts involved in each topic in order to help students better understand what is and what is not covered in the course.

Topic	Contents/ fundamental concepts

Algorithm Analysis	This crucial section of the course delves into the methodology for evaluating the performance of algorithms. Students will learn about the Big O notation, which is the standard metric for classifying algorithms based on their time and space complexity.
Arrays, Stacks, Queues, and Lists	This comprehensive section covers the core concepts and operations of linear data structures, namely arrays, stacks, queues, and lists, providing a fundamental understanding of how they organize and manage data linearly.
Trees	This topic delves into hierarchical data structures, with a focus on binary trees, binary search trees, AVL trees, and B-trees. Students learn about node structure, tree traversal methods (preorder, inorder, postorder), and the application of trees in organizing hierarchical data, searching, and sorting.
Hash Function and Hash Tables	This section introduces hash tables as an efficient data structure for data retrieval. The course covers the key concepts of hashing, hash functions, and collision resolution techniques such as chaining and open addressing.
Sorting	Sorting is explored as a fundamental algorithmic concept in computer science. The course covers a range of sorting algorithms including bubble sort, selection sort, insertion sort, merge sort, quicksort, and heap sort. Students will learn about the theory behind these algorithms, their time and space complexities, and their practical applications.
Graphs	The course introduces graphs as collections of nodes and edges, covering both directed and undirected graphs. Fundamental concepts like adjacency matrices, adjacency lists, graph traversal algorithms (like DFS and BFS), and shortest path algorithms (like Dijkstra's and Bellman-Ford) are covered.

7. Course components (Teaching modes and Learning activities)

Indicate the components of the course, including the teaching mode(s), teaching activities and percentage of time for each component / learning activity. Teaching modes may vary from onsite face-to-face, online synchronous, online asynchronous, mixed, blended to hybrid. Details of each mode are attached in Appendix 1. Examples of teaching activities include lecture, interactive tutorial, laboratory, lecture recordings, online exercises, field studies/field trips, etc.

Key point： Consideration should be taken into regarding "classroom contact hours" and "self-study hours" at course level. According to the University's Policy on External Referencing to Hong Kong Qualifications Framework approved by the Senate, the ratio between contact hours and self-study hours is one classroom contact hour to 2 to 2.75 self-study hours. A 3-unit course would normally entail a total of around 39 hours of classroom contact hours and some 78 to 107 self-study hours, plus two to three hours of assessment, i.e. a student's total learning hours for a 3-unit course should be 117 to 146.

Teaching Modes and Learning Activities	
On-site face-to-face **(please specify if it is hybrid, i.e. some students will attend the activities elsewhere)**	**Percentage of time**
Lectures (hybrid no)	20
Interactive tutorial (hybrid no)	10
Online asynchronous	
Assigned reading	30
Homework exercises	30
Programming assignments	10

8. Assessment type, percentage and rubrics

Key point: If we consider assessment to be part of the learning activities in the course, then it is clear that assessment must be matched to the desired learning outcomes. You need to consider what and how the assessment task(s) are able to help students achieve the desired learning outcomes. As far as possible, it is desirable to include assessment rubrics for the assessment tasks so that students are clear about the criteria of assessment and the performance standard for each grade.

Assessment type	**Percentage**
Written Homework	30
Programming Assignments	14
Quizzes	6
Midterm Exam	20
Final Exam	30

9. Required and recommended readings

Key points*:* A well-structured set of learning resources should be provided to students. These are usually in the form of reading lists and references. They may also include sets of links to online resources and eBooks. It is often helpful to separate these resources into ones which are central to the content and desired learning outcomes of the course (required readings), and those which are related to extensions of areas of the course (recommended readings). One needs to be realistic about the amount of reading material students are likely to delve into. Overly long reading lists can be counter- productive and discourage students.

Required readings:
A collection of reading will be posted and assigned to students.

Recommended readings:
Introduction to Algorithms, MIT press, by Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein.

10. Feedback for evaluation

Key point: There are many forms of evaluation that you can use to generate feedback from students such as questionnaires, and qualitative feedback from students through focus-group meetings or email exchanges. Teachers may encourage students to make use of the Early Feedback Collection System to share their feedback on individual classes in the middle of the semester. Planning to have a variety of evaluation strategies is more likely to ensure that valid, rich, and diagnostic information is received.

Feedback for evaluation:
Students are encouraged to contact the instructor for any feedback.

11. Course schedule

Key point: A matrix is suggested as a good way to represent a course schedule including class, date, topic and requirements so that students can prepare their own learning before classes. It is useful to highlight important dates for students, including holidays, dates when assessments are due and/or dates of tests and examinations.

Class/ week	Date	Topic
Week 1-2	Jan 8-21	Course overview and introduction. Mathematic review. Algorithm analysis

Week 3	Jan 22-28	Lists, stacks and queues
Week 4-5	Jan 29-Feb 11	Tree data structures and algorithms
Week 6	Feb 12-18	Lunar new year
Week 7	Feb 19-25	Priority queues
Week 8	Feb 26- March 3	Sorting Algorithm

Week 9	March 4-10	Reading week
Week 10	March 11-17	Sorting algorithm cont.
Week 11	March 18-24	Hash function and tables
Week 12-14	March 25 - Apr 14 (No class on April 1st: Easter Monday)	Graphs and algorithms
Week 15	March 15-21	Course summary and final exam review

12. Contact details for teacher(s) or TA(s)
Key point: Help students to easily locate your contact information. The information allows students to arrange for any consultation after classes or receive support in terms of learning and teaching from teachers, tutors and/or teaching

assistants. It is better to put both the teachers' and TAs' contact details such as name, office location, phone number and email address.

Professor/Lecturer/Instructor:	
Name:	Keren Zhu
Office Location:	SHB 128
Telephone:	53880377
Email:	kerenzhu@cuhk.edu.hk
Teaching Venue:	SHB 128
Website:	krz.engineer
Other information:	

Teaching Assistant/Tutor:	
Name:	Liang XIAO
Office Location:	SHB 913
Telephone:	67491557
Email:	lxiao6623@gmail.com
Teaching Venue:	SHB 913
Other information:	Office hour: Wed 9:00-11:00AM
Teaching Assistant/Tutor:	
Name:	Bin XIA
Office Location:	SHB904
Telephone:	54637529
Email:	zibinxia@gmail.com
Teaching Venue:	SHB904
Other information:	Office hour: Th 4:00-5:00PM

13. Details of course website

Key point: Information concerning the accessibility of the course website (if it exists). This might be an open website or the Blackboard platform hosted by the University. Teachers should also demonstrate the site in class to familiarise students with the key functionalities.

Course website: https://www.cse.cuhk.edu.hk/~kerenzhu/csci2001b/
The course materials will be posted on the website, including the lecture slides, homework set, assigned reading, etc.
Blackboard: blackboard.cuhk.edu.hk
The homework and programming assignment can be submitted via the Blackboard system.

14. Academic honesty and plagiarism

Key point: Relevant information can be found via: http://www.cuhk.edu.hk/policy/academichonesty/. A course outline may also include subject-specific requirements on plagiarism. A statement to be included in a course outline can be constructed from the following paragraphs, depending on the nature of the assessment tasks.

In view of the potential challenges to upholding academic honesty in the development of generative AI tools, teachers are encouraged to remind students about academic honesty and plagiarism issues when adopting AI tools in their academic work.

Academic honesty and plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/.

With each assignment, students will be required to submit a signed declaration that they are aware of these policies, regulations, guidelines and procedures.

- In the case of group projects, all members of the group should be asked to sign the declaration, each of whom is responsible and liable to disciplinary actions, irrespective of whether he/she has signed the declaration and whether he/she has contributed, directly or indirectly, to the problematic contents.
- For assignments in the form of a computer-generated document that is principally text-based and submitted via VeriGuide, the statement, in the form of a receipt, will be issued by the system upon students' uploading of the soft copy of the assignment.
- Students are fully aware that their work may be investigated by AI content detection software to determine originality.
- Students are fully aware of the AI approach(es) adopted in the course. In the case where some AI tools are allowed, students have made proper acknowledgment and citations as suggested by the course teacher.

Assignments without a properly signed declaration will not be graded by teachers.

Only the final version of the assignment should be submitted via VeriGuide.

The submission of a piece of work, or a part of a piece of work, for more than one purpose (e.g. to satisfy the requirements in two different courses) without declaration to this effect shall be regarded as having committed undeclared multiple submissions. It is common and acceptable to reuse a turn of phrase or a sentence or two from one's own work; but wholesale reuse is problematic. In any case, agreement from the course teacher(s) concerned should be obtained prior to the submission of the piece of work.

The copyright of the teaching materials, including lecture notes, assignments and examination questions, etc., produced by staff members/ teachers of The Chinese University of Hong Kong (CUHK) belongs to CUHK. Students may download the teaching materials produced by the staff members/ teachers from the Learning Management Systems, e.g. Blackboard, adopted by CUHK for their own educational use, but shall not distribute/ share/ copy the materials to a third-party without seeking prior permission from the staff members/ teachers concerned.

15. Use of Generative Artificial Intelligence (AI) Tools in Teaching, Learning and Assessment

Generative Artificial Intelligence (AI) tools have their pros and cons in teaching, learning and assessment. Teachers and students are encouraged to explore and take advantage of the benefits of adopting appropriate AI tools to enhance teaching and learning.

Four approaches regarding the use of AI tools have been identified depending on the learning outcomes, pedagogical design and assessment scheme of different courses. According to the University's Guidelines on the Use of Artificial Intelligence (AI) Tools in Teaching, Learning and Assessment, teachers are expected to include a section in their course outlines on the AI approaches that are adopted in the courses concerned. Examples of information for each of the four AI use approaches to be included in the course outline are attached in **Appendix 2**. Teachers may include the information relevant to the AI use approach in the course outline.

Teachers may refer to the CUHK Library website on AI in Education
https://libguides.lib.cuhk.edu.hk/c.php?g=917899&p=6975970

Use of generative AI tools
(Teachers should include information relevant to the approach to be adopted in the course here)

Approach 1 - All use of AI tools is prohibited in assignments and assessment tasks.

August 2023

Appendix 1

Teaching Modes for Courses in Taught Programmes at CUHK

1. On-site face-to-face
   - ☐ The default teaching mode for all courses.
   - ☐ Students attend on-site face-to-face classes conducted by teachers.
   - ☐ A one-unit course represents one on-site face-to-face classroom contact hour per week.
   - ☐ The course can be supported by use of online Learning Management Systems or platforms for the purpose of uploading of course materials or assignment/assessment submissions.
   - ☐ It includes flipped classroom i.e., delivering a part of the course content and instruction via digital or online media, thus leaving more time for interactive activities in class, with no reduction in on-site face-to-face contact hours.
   - ☐ If assessment in the form of examination is to be adopted, it should be conducted on-site with invigilation.

2. Online synchronous (or online face-to-face/remote face-to-face)
   - ☐ In general, the arrangements are the same as on-site face-to-face mode, except that classes are conducted using video-conferencing tools like "Zoom" (the delivery mode adopted in Term 2 of 2019-20).
   - ☐ A one-unit course represents one online face-to-face contact hour per week.
   - ☐ It includes flipped classroom in which there is no reduction in online face-to-face contact hours.
   - ☐ Video-taping of lectures should not be counted as face-to-face contact hours.
   - ☐ If assessment in the form of examination is to be adopted, on-site examination with invigilation is preferred, except under very special circumstances.

3. Online asynchronous (or online course)
   - ☐ All course materials will be posted online. The on-site or online face-to-face contact hour is replaced by video lectures or series of micro-modules.
   - ☐ In general, there is no interaction between teachers and students.
   - ☐ There could be reduction of contact hours, but students' total learning hours (e.g. assigned readings) remain to be 117 – 146 hours for a 3-unit course.
   - ☐ To enhance students' learning, there should be online synchronous or on-site face-to-face tutorials as far as practicable.
   - ☐ If assessment in the form of examination is to be adopted, on-site examination with invigilation is preferred, except under very special circumstances.

4. Mixed mode (teaching modes 1 + 2)
   - ☐ In view of physical constraints, e.g., quarantine arrangement under the pandemic, or overseas internship courses, arrangement can be made so that some students attend on-site face-to-face lecture, while the other students of the same class attend online face-to-face lecture.
   - ☐ There is no reduction on the on-site or online face-to-face contact hours.
   - ☐ If assessment in the form of examination is to be adopted, on-site examination with invigilation is preferred, except under very special circumstances.

5. Blended mode (teaching modes 1 + 3, or 2 + 3)
   - ☐ It refers to a combination of on-site face-to-face and online asynchronous teaching modes, *or* online synchronous and online asynchronous teaching modes.
   - ☐ There could be not more than 75% reduction in on-site or online face-to-face contact hours. Otherwise, the course should be classified as an online asynchronous course.
   - ☐ Students' total learning hours (e.g. assigned readings) should remain to be 117 – 146 hours for a 3-unit course.
   - ☐ If assessment in the form of examination is to be adopted, on-site examination with invigilation is preferred, except under very special circumstances.

6. Hybrid mode (teaching modes 1 + 2 + 3)
   - ☐ A combination of on-site face-to-face, online synchronous and online asynchronous teaching modes.
   - ☐ There could be reduction of contact hours, but students' total learning hours (e.g. assigned readings) remain to be 117 – 146 hours for a 3-unit course.
   - ☐ If assessment in the form of examination is to be adopted, on-site examination with invigilation is preferred, except under very special circumstances.

Appendix 2

Approach 1 (by default) – Prohibit all use of AI tools

In assessing the level of achievement of learning outcomes and students' performance, students are expected to produce their own work independently without any collaboration with the use of AI tools.

All use of AI tools is prohibited in assignments and assessment tasks

For assignments and assessment tasks that count towards the final course grades, students are not allowed to submit work which is produced with the collaboration of or supported by the use of any generative AI tools (e.g. ChatGPT)*.

Any breach of the regulations will be considered an act of academic dishonesty and will be handled according to the University's *Procedures for Handling Cases of Academic Dishonesty.*

In case of queries, students should seek advice from the course teacher.

* Teachers may add examples of AI tools relevant to their disciplines.

Approach 2 – Use only with prior permission

If teachers find it appropriate for students to use some AI tools in some in-class activities and assignments, students should be clearly informed of (1) which AI tools are allowed; (2) when, how and why these tools can / cannot be used; and (3) how the tools should be cited and acknowledged. Students should also be informed of the limits and appropriate use of these tools.

Use of some AI tools is allowed

Students may use some AI tools in some in-class activities and assignments on the following conditions:

1. The AI tools to be used are restricted to the following tools: (*Specify the AI tools that are allowed. Teachers may also specify which AI tools are not allowed*) ;
2. The specified AI tools will only be allowed for the following types of class activities and assignments: (*Specify the activities and / or assignments*)
3. Collaboration of AI tools is only allowed for the following purposes / tasks: (*Specify the purposes / tasks for which the AI tools can be used or used with certain restrictions, if any*);
4. The input contributed by the AI tools are properly acknowledged and cited ; and
5. The input together with the prompts used to elicit the AI responses should be highlighted or included as appendices wherever appropriate.

Acknowledging support from AI tools

Students are required to acknowledge all functional uses of a generative AI tool and cite it when they paraphrase, quote, or incorporate into their own work any content (whether it is text, image, data, or other format) that was created by it.

i. An example of acknowledgement

'I acknowledge the use of (name of AI tool – e.g. ChatGPT (https://chat.openai.com/) to (specify the support, e.g. plan my essay, generate some ideas for the content, ask for examples of data collection instruments, get the dates of historical events, etc.).

ii. An example of citation

OpenAI. (2023). *ChatGPT* (Mar 20 version). https://chat.openai.com/chat

(Students are reminded that due to the rapid developments of generative AI tools, some citation formats may be updated regularly.)

iii. An example of including texts generated by an AI tool in their work

"The following text was generated by an AI tool / language model (ChatGPT):"
[Insert the text generated by ChatGPT here.]

iv. An example of including texts generated by an AI tool and the prompts that were used to elicit the text from the AI tool

"[The prompt], as generated by an AI language model (ChatGPT):"
[Insert the text generated by ChatGPT in response to the prompt.]

Students are reminded to learn and use the AI tools responsibly and ethically and be aware of the limitations.

Students are reminded to clarify with the course teacher and obtain permission if necessary when in doubt.

Approach 3 - Use only with explicit acknowledgement

In courses where students are allowed or expected to collaborate with or use AI tools for in-class learning activities or assignments, students should be reminded to make explicit acknowledgement of the use of these tools. Teachers may show students examples regarding how to acknowledge and make citations. Students should also be informed of the limitations and appropriate use of these tools.

Use of AI tools is allowed with explicit acknowledgement and proper citation

Students may use some AI tools in some class activities and assignments on the condition that they make explicit acknowledgement and proper citations of the input from AI tools.

Acknowledging support from AI tools
Students are required to acknowledge all functional uses of a generative AI tool and cite it when they paraphrase, quote, or incorporate into their own work any content (whether it is text, image, data, or other format) that was created by it.

i. An example of acknowledgement

'I acknowledge the use of (name of AI tool – e.g. ChatGPT (https://chat.openai.com/) to (specify the support, e.g. plan my essay, generate some ideas for the content, ask for examples of data collection instruments, get the dates of historical events, etc.).

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"The following text was generated by an AI tool / language model (ChatGPT):"
[Insert the text generated by ChatGPT here.]

iv. An example of including texts generated by an AI tool and the prompts that were used to elicit the text from the AI tool

"[The prompt], as generated by an AI language model (ChatGPT):"
[Insert the text generated by ChatGPT in response to the prompt.]

Students are reminded to learn and use the AI tools responsibly and ethically and be aware of the limitations.

Students are reminded to clarify with the course teacher and obtain permission if necessary when in doubt.

Approach 4 – Use of AI tools is freely permitted with no acknowledgement

In courses where students are allowed or expected to frequently collaborate with or use AI tools when engaging in learning activities and completing assignments, teachers may decide that students are not required to acknowledge and cite explicitly the use of these tools. Details on which AI tools are to be used should be stated clearly in the course outline. Students should also be reminded of the limitations and appropriate uses of these tools.

Use of some AI tools is allowed with no acknowledgement

Students may use the following AI tools in some in-class activities and assignments: (*Specify the AI tools that are allowed*).

Students are reminded to learn and use AI tools responsibly and ethically and be aware of the limitations.