

Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	DATA STRUCTURES	Instructor	CHIEN-HO YEN
Course Class	TKFXB2A DEPARTMENT OF ARTIFICIAL INTELLIGENCE, 2A	Details	◆ General Course ◆ Required ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education		
D e p a r t m e n t a l A i m o f E d u c a t i o n			
I . Students may analyze problems in applied science based on the fundamental knowledge of programming, mathematics, and artificial intelligence. II. Students may plan and implement an AI system following the procedures of problem analysis, experiment testing, data visualizing, derivation and deduction. III. Educate the students to be AI engineers who may accomplish their missions indepedently and may collaborate with their colleagues in the workplace. IV. Students may have basic skills and global competence for career diversification, and may keep lifelong learning.			
Subject Departmental core competences			
A. Professional analysis.(ratio:40.00) B. Practical application.(ratio:30.00) C. Professional attitude.(ratio:25.00) D. Global Mobility.(ratio:5.00)			
Subject Schoolwide essential virtues			
1. A global perspective. (ratio:10.00) 2. Information literacy. (ratio:20.00) 3. A vision for the future. (ratio:10.00) 4. Moral integrity. (ratio:5.00) 5. Independent thinking. (ratio:30.00) 6. A cheerful attitude and healthy lifestyle. (ratio:10.00) 7. A spirit of teamwork and dedication. (ratio:10.00) 8. A sense of aesthetic appreciation. (ratio:5.00)			

Course Introduction	The main objective of this course is to integrate the topics of "Computational Thinking and Programming" with the introduction of fundamental concepts of "Data Structures," accompanied by practical implementation using Python to enhance students' abilities in computer applications and programming. This course adopts a topic-based approach, emphasizing a step-by-step progression from basic to advanced concepts. In addition to covering the theoretical foundations of data structures, it also includes hands-on Python programming exercises, highlighting the close integration of theory and practice.
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The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	The primary objective of this course is to equip students with a fundamental understanding of data structures and their applications through Python programming. Students will learn how to analyze algorithm efficiency using time complexity, and how to design, implement, and apply various data structures, including arrays, linked lists, stacks, queues, trees, graphs, and AVL trees.	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCD	12345678	Lecture, Discussion	Testing, Study Assignments, Discussion(including classroom and online), Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	114/09/15 ~ 114/09/21	Introduction & Time Complexity	
2	114/09/22 ~ 114/09/28	Python Data Structures	

3	114/09/29 ~ 114/10/05	Array	
4	114/10/06 ~ 114/10/12	Array	
5	114/10/13 ~ 114/10/19	Linked List	
6	114/10/20 ~ 114/10/26	Linked List	
7	114/10/27 ~ 114/11/02	Stacks and Queues	
8	114/11/03 ~ 114/11/09	Stacks and Queues	
9	114/11/10 ~ 114/11/16	Midterm Exam	
10	114/11/17 ~ 114/11/23	Tree Structures	
11	114/11/24 ~ 114/11/30	Tree Structures	
12	114/12/01 ~ 114/12/07	Graph Structures	
13	114/12/08 ~ 114/12/14	Graph Structures	
14	114/12/15 ~ 114/12/21	AVL Trees	
15	114/12/22 ~ 114/12/28	AVL Trees	
16	114/12/29 ~ 115/01/04	Final Week of Diverse Assessments	
17	115/01/05 ~ 115/01/11	Final Week of Diverse Assessments/Flexible Teaching Week for Teachers	
18	115/01/12 ~ 115/01/18	Flexible Teaching Week for Teachers	
Key capabilities		self-directed learning Information Technology Problem solving	
Interdisciplinary		STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)	
Distinctive teaching		Special/Problem-Based(PBL) Courses	
Course Content		Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking	

Requirement	If a student is absent from class three times without a valid reason, their attendance grade will be zero.
Textbooks and Teaching Materials	Self-made teaching materials:Presentations, Handouts Using teaching materials from other writers:Textbooks Name of teaching materials: Yuan-Hsiang Chang, Data Structures – Implementation with Python, 2025; Publisher: Chuan Hwa Book Co., Ltd.; ISBN: 9786264012058
References	None
Grading Policy	◆ Attendance : 10.0 % ◆ Mark of Usual : 30.0 % ◆ Midterm Exam : 30.0 % ◆ Final Exam : 30.0 % ◆ Other < > : %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at https://web2.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php. ※"Adhere to the concept of intellectual property rights" and "Do not illegally photocopy, download, or distribute." Using original textbooks is advised. It is a crime to improperly photocopy others' publications.