Tamkang University Academic Year 112, 1st Semester Course Syllabus

Course Title	COMPUTING IN THE QUANTUM WORLD: FROM FINGER COUNTING TO QUANTUM COMPUTING	Instructor	WU, JUNYI
Course Class	TNUUB0A NATURAL SCIENCES, 0A	Details	◆ General Course ◆ Required ◆ One Semester
Relevance to SDGs	SDG4 Quality education SDG9 Industry, Innovation, and Infrastructure		

Departmental Aim of Education

By exploring natural laws and studying scientific methods, to let students understand the impact of science and technology on human life, and to cultivate in them the ability to think independently, and to discover, analyse and solve problems. Also, throu.

Subject Schoolwide essential virtues

1. A global perspective. (ratio:20.00)

2. Information literacy. (ratio:25.00)

3. A vision for the future. (ratio:10.00)

4. Moral integrity. (ratio:5.00)

5. Independent thinking. (ratio:25.00)

6. A cheerful attitude and healthy lifestyle. (ratio:5.00)

7. A spirit of teamwork and dedication. (ratio:5.00)

8. A sense of aesthetic appreciation. (ratio:5.00)

Course Introduction	In this course, one will learn the history of computing, the principle of quantum computing, and the current status and future challenges of quantum computing.

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	An overall understanding of computer science.	Cognitive
2	The scientific principle of classical computing and quantum computing	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1		12345678	Lecture, Discussion, Practicum	Study Assignments, Report(including oral and written)
2		12345678	Lecture, Discussion, Practicum	Study Assignments, Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	112/09/11～ 112/09/17	01 Introduction: what is information?	The syllabus is subject to further change or revision.
2	112/09/18～ 112/09/24	02 Finger counting and number systems	
3	112/09/25～ 112/10/01	03 Counting machines	
4	112/10/02～ 112/10/08	04 Electronic bits	
5	112/10/09～ 112/10/15	05 Q-electronic bits	
6	112/10/16～ 112/10/22	06 / 07 Algorithm and Cryptography	
7	112/10/23～ 112/10/29	06 / 07 Algorithm and Cryptography	
8	112/10/30～ 112/11/05	08 Quantum information with Qubit: let's talk about quantum a little bit	

9	112/11/06~112/11/12	Midterm Exam Week	
10	112/11/13~112/11/19	09 Entanglement and quantum communication	
11	112/11/20~112/11/26	10 Quantum computing	
12	112/11/27~112/12/03	11-13 Hello quantum world 你好，量子世界！我的第一個量子（電）路	
13	112/12/04~112/12/10	11-13 Hello quantum world 你好，量子世界！我的第一個量子（電）路	
14	112/12/11~112/12/17	11-13 Hello quantum world 你好，量子世界！我的第一個量子（電）路	
15	112/12/18~112/12/24	Group oral presentation 期末分組口頭報告	
16	112/12/25~112/12/31	Group oral presentation 期末分組口頭報告	
17	113/01/01~113/01/07	Final Exam Week	
18	113/01/08~113/01/14	Flex week	

Key capabilities	self-directed learning Information Technology Problem solving Interdisciplinary
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)
Distinctive teaching	
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking
Requirement	
Textbooks and Teaching Materials	Self-made teaching materials:Presentations

References	The Universal History of Computing: From the Abacus to the Quantum Computer (Georges Ifrah)
	Introduction to the History of Computing (Gerard O'Regan)
	Quantum Computation and Quantum Information (Nielsen and Chuang)
Grading Policy	◆ Attendance： 20.0 ％ ◆ Mark of Usual：30.0 ％ ◆ Midterm Exam： ％
	◆ Final Exam： 50.0 ％
	◆ Other〈 〉： ％
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.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 .
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