Tamkang University Academic Year 106, 1st Semester Course Syllabus

Course Title	FORMAL LANGUAGES & AUTOMATA THEORY	Instructor	YEN SHWU-HUEY
Course Class	TEIXM1A MASTER'S PROGRAM, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING, 1A	Details	◆ Selective ◆ One Semester ◆ 3 Credits

Departmental Aim of Education

Ⅰ. Cultivate the ability to conduct independent research and problem solving.

Ⅱ. Strengthen creativity and research capacity.

Ⅲ. Build profound professional knowledge in computer science and information engineering.

Ⅳ. Engage in self-directed lifelong learning.

Departmental core competences

A. Independent problem solving ability.

B. Independent innovative thinking ability.

C. Research paper writing and presentation ability.

D. Research&development (R&D) ability in information engineering.

E. Project execution and control ability.

F. Lifelong self-directed learning ability.

Course Introduction	The mathematical model of modern digital computer is studied. The purpose is to familiarize students with the foundations and principles of computer science, to teach material that is useful in subsequent courses, and to strengthen students' ability to carry out formal and rigorous mathematical arguments.

The Relevance among Teaching Objectives, Objective Levels and Departmental core competences

I.Objective Levels (select applicable ones) :

(i) Cognitive Domain : C1-Remembering, C2-Understanding, C3-Applying, C4-Analyzing, C5-Evaluating, C6-Creating

(ii) Psychomotor Domain : P1-Imitation, P2-Mechanism, P3-Independent Operation, P4-Linked Operation, P5-Automation, P6-Origination

(iii) Affective Domain : A1-Receiving, A2-Responding, A3-Valuing, A4-Organizing, A5-Charaterizing, A6-Implementing

II.The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :

(i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.

(ii) If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)

(iii) Determine the Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	Understand the finite automata	C4	AB
2	Understand the regular languages	C4	AB
3	Understand the context free languages	C4	AB
4	Understand the pushdown automata	C4	AB
5	Enhance students' ability to read/understand technical English	C5	ABDF

Teaching Objectives, Teaching Methods and Assessment

No.	Teaching Objectives	Teaching Methods	Assessment
1	Understand the finite automata	Lecture, Discussion	Written test, Participation, homework
2	Understand the regular languages	Lecture, Discussion	Written test, Participation, homework
3	Understand the context free languages	Lecture, Discussion	Written test, Participation, homework
4	Understand the pushdown automata	Lecture, Discussion	Written test, Participation, homework
5	Enhance students' ability to read/understand technical English	Lecture, Discussion	Written test, Participation

This course has been designed to cultivate the following essential qualities in TKU students

Essential Qualities of TKU Students	Description
◇ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◇ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◇ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◇ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◇ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◇ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◇ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◇ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

Course Schedule

Week	Date	Subject/Topics	Note
1	106/09/18 ~ 106/09/24	Introduction and Mathematical Background Review	
2	106/09/25 ~ 106/10/01	DFA	
3	106/10/02 ~ 106/10/08	NFA	
4	106/10/09 ~ 106/10/15	Regular Languages	
5	106/10/16 ~ 106/10/22	Regular Grammars	
6	106/10/23 ~ 106/10/29	Equivalence between different forms of Regular languages	
7	106/10/30 ~ 106/11/05	Properties of Regular Languages	
8	106/11/06 ~ 106/11/12	Pumping Lemma I	
9	106/11/13 ~ 106/11/19	Pumping Lemma II	
10	106/11/20 ~ 106/11/26	Midterm Week	
11	106/11/27 ~ 106/12/03	CFL	
12	106/12/04 ~ 106/12/10	CFG	

13	106/12/11 ~ 106/12/17	Parsing and Ambiguity	
14	106/12/18 ~ 106/12/24	Pushdown Automata	
15	106/12/25 ~ 106/12/31	Pushdown Automata & CFG	
16	107/01/01 ~ 107/01/07	national holiday (no class)	
17	107/01/08 ~ 107/01/14	Review	
18	107/01/15 ~ 107/01/21	Final Exam Week	

Requirement	This course is taught in English. Students should read the assigned materials before attending the course to minimize the language barriers.
Teaching Facility	Projector
Textbook(s)	An Introduction to Formal Languages and Automata (7th ed, by Linz)
Reference(s)	
Number of Assignment(s)	2 (Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 5.0 % ◆ Mark of Usual：15.0 % ◆ Midterm Exam： 35.0 % ◆ Final Exam： 35.0 % ◆ Other〈Homework〉：10.0 %
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 . **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**