Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	THE ALGORITHMS IN DATA SCIENCE	Instructor	MENG-YING CHOU
Course Class	TSNXB4A DEPARTMENT OF APPLIED MATHEMATICS AND DATA SCIENCE, 4A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education		

Departmental Aim of Education

Ⅰ. To teach knowledge in mathematics.

Ⅱ. To train teaching professionals in mathematics.

Ⅲ. To develop independent and creative thinking.

Ⅳ. To establish ability to present oneself.

Ⅴ. To promote cooperative working spirit.

Ⅵ. To prepare self learning ability in multiple areas.

Subject Departmental core competences

A. To learn the fundamentals of mathematics.(ratio:10.00)

B. To develop independent and logical thinking ability.(ratio:10.00)

C. To learn basics of probability and statistic.(ratio:30.00)

D. To use the aid of computer in solving mathematical and statistical problems.(ratio:30.00)

E. To obtain the ability to collect and analyze data.(ratio:10.00)

F. To establish ability to pursue knowledge in advanced mathematics.(ratio:10.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:30.00)

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

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:10.00)

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:10.00)

Course Introduction	The algorithm in data science

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	Let students to learn the methods and algorithms in data science.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDEF	12345678	Lecture, Discussion	Testing, Study Assignments

Course Schedule

Week	Date	Course Contents	Note
1	114/02/17 ~ 114/02/23	Introduction to data science	
2	114/02/24 ~ 114/03/02	Data dictionaries with Python	
3	114/03/03 ~ 114/03/09	Data dictionaries with Python	
4	114/03/10 ~ 114/03/16	Data dictionaries with Python	

5	114/03/17 ~ 114/03/23	Similarity Measures	
6	114/03/24 ~ 114/03/30	The basic algorithms and statistics	
7	114/03/31 ~ 114/04/06	TKU Teaching Administration Observation	No lecturing
8	114/04/07 ~ 114/04/13	The basic algorithms and statistics	
9	114/04/14 ~ 114/04/20	The basic algorithms and statistics (Midterm Exam/Midterm Assessment Week)	
10	114/04/21 ~ 114/04/27	Hadoop and MapReduce	
11	114/04/28 ~ 114/05/04	Visualizing data	
12	114/05/05 ~ 114/05/11	Clustering methods	
13	114/05/12 ~ 114/05/18	Clustering methods	
14	114/05/19 ~ 114/05/25	The Naive Bayes Methods	
15	114/05/26 ~ 114/06/01	Graduate Exam/Graduate Assessment Week (teachers can adjust the week as needed)	
16	114/06/02 ~ 114/06/08		
17	114/06/09 ~ 114/06/15		
18	114/06/16 ~ 114/06/22		

Key capabilities	self-directed learning Information Technology
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	The midterm and final exam will also be the homework.

Textbooks and Teaching Materials	Self-made teaching materials:Presentations Using teaching materials from other writers:Textbooks Name of teaching materials: Brain Steele, John Chandler, and Swarna Reddy (2016). Algorithms for Data Science. Springer.
References	James, Gareth et al. An Introduction to Statistical Learning□: With Applications in Python. 1st ed. 2023. Cham: Springer International Publishing, 2023. Hastie, T., Tibshirani, R., & Friedman, J. (2017). The elements of statistical learning: data mining, inference, and prediction.
Grading Policy	◆ Attendance： 5.0 % ◆ Mark of Usual：55.0 % ◆ Midterm Exam： 20.0 % ◆ Final Exam： 20.0 % ◆ 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 . **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**