

Tamkang University Academic Year 109, 2nd Semester Course Syllabus

Course Title	SCIENTIFIC COMPUTING	Instructor	MENG-YING CHOU
Course Class	TSXAD1A DOCTORAL PROGRAM IN APPLIED SCIENCES, 1A	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Selective ◆ One Semester
Relevance to SDGs	SDG4 Quality education		
Departmental Aim of Education			
To cultivate high-level spiritual talents demanded by industry and academia as well as with solid knowledge in material science and ability to do transnational and interdisciplinary research independently.			
Subject Departmental core competences			
<p>C. To obtain ability in innovation, independent thinking and independent research. (ratio:40.00)</p> <p>D. To have good oral and written skills as well as a good sense in teamwork.(ratio:40.00)</p> <p>E. To have a comprehensive understanding in professional morality and ethics.(ratio:20.00)</p>			
Subject Schoolwide essential virtues			
<p>1. A global perspective. (ratio:20.00)</p> <p>3. A vision for the future. (ratio:40.00)</p> <p>5. Independent thinking. (ratio:40.00)</p>			
Course Introduction	To learn the R programming language for scientific computing, and the application of statistical data analysis.		

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	To learn the R programming language for scientific computing, and the application of statistical data analysis.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	CDE	135	Lecture, Discussion, Experience	Study Assignments, Discussion(including classroom and online), Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	110/02/22 ~ 110/02/28	Introduction to Python	
2	110/03/01 ~ 110/03/07	Introduction to R	
3	110/03/08 ~ 110/03/14	Vector, matrix and array	
4	110/03/15 ~ 110/03/21	List and data frame	
5	110/03/22 ~ 110/03/28	Factor and table, R-markdown	
6	110/03/29 ~ 110/04/04	Teaching administration observation period (No classes)	
7	110/04/05 ~ 110/04/11	R programming structures	
8	110/04/12 ~ 110/04/18	Descriptive, inferential, and comparative statistics.	
9	110/04/19 ~ 110/04/25	Midterm report	
10	110/04/26 ~ 110/05/02	Midterm exams week (No classes)	

11	110/05/03 ~ 110/05/09	Doing math and simulation in R	
12	110/05/10 ~ 110/05/16	Input/output	
13	110/05/17 ~ 110/05/23	String manipulation and graphics	
14	110/05/24 ~ 110/05/30	Grouping: clustering, associative rules, decision trees	
15	110/05/31 ~ 110/06/06	Prediction: simple regression models	
16	110/06/07 ~ 110/06/13	KNN,classification.	
17	110/06/14 ~ 110/06/20	Final report	
18	110/06/21 ~ 110/06/27	Final exams week (No classes)	
Requirement	The lecture progress depends on the learning status of classmates.		
Teaching Facility	Computer, Projector		
Textbooks and Teaching Materials	The Art of R Programming: a tour of statistical software design. Matloff. No Starch Press. 2011. Making Sense of Data: a practical guide of exploratory data analysis. Glenn J. Myatt. Wiley. 2007.		
References	Deep Learning with R. Francois Chollet with J.J. Allaire. Manning. 2018.		
Number of Assignment(s)	(Filled in by assignment instructor only)		
Grading Policy	◆ Attendance : 10.0 % ◆ Mark of Usual : % ◆ Midterm Exam : 45.0 % ◆ Final Exam : 45.0 % ◆ 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.		