Syllabus of Fall Semester, 2021

Course Title	다변량통계학(II)	Course Code	ST27518	Section	032
Department	Statistics	Level	3	Credit - Theory - Practice	3.0 - 3.0 - 0.0
Class Hours & Classroom	Tue. 10:30(75) 313-104,Thu. 10:30(75) 313-104				
Lecturer	CHOI,YONG-SEOK	Office		Office Hours	2:00 pm, Tue or Thu
		Telephone		E-mail	

Methodology of Instruction	online Teacher-centered learning, ETC(With practice times, we will be experienced in results' interpretations and visualizations of mul
Evaluation and Grading	Total Score = Attendance(10%) + Reports(10%) + Exam(50%) + Term Project(30%) * Students with disabilities can request an extension of the exam hour, and they can take exams by getting writing assistance or by using a computer.
Prerequisites	- Matrix Algebra (I), (II) - R
Course Objectives	In Multivariate Statistics (II), our aim is to study some statistical analysis techniques (Discrimination and Classification Analysis(DCA), Multidimensional Scaling(MDS), Correspondence Analysis(CRA), Biplots), In particular, MDS, CRA and Biplost are very useful multivariate visualization techniques which can be applied in Big Data and Data Mining. In addition, we have two special lectures for Machine Learnings : SVM(Support Vector Machine) and ANN(Artficial Neural Network). Moreover in this lecture, we have a good chance to learn R-codes for programing some algorithms related with DCA, MDS, CRA, SVM and ANN.

Course Description	Lecture 6. Discriminant Analysis and Classification Analysis(DA and CLA)
	    6.1 Introduction
	    6.2 DCA with two clusters
	    6.3 DCA with two clusters following multivariate normality
	    6.4 DCA with several clusters
	    6.5 DCA with several clusters following multivariate normality
	    6.6 Evaluating classification function
	    6.7 Fisher's Linear DCA of several populations
	    6.11 R for DCA: Practice Time
	
	Lecture 7. Multidimensional Scaling(MDS)
	    7.1 Introduction
	    7.2 Metric MDS
	    7.3 Non-metric MDS
	    7.6 R for MDS: Practice Time
	
	Lecture 8. Correspondence Analysis(CRA)
	    8.1 Introduction
	    8.2 Simple CRA
	    8.3 Independence and homogeneity in CRA
	    8.4 Multiple CRA
	    8.5 MCRA of classification variables data
	    8.6 R for CRA: Practice Time
	
	Special Lectures for Machine Learnings
	1. SVM: Support Vector Machine
	2. ANN: Artficial Neural Network
	
	 * Students with disabilities can negotiate with the Disabled Student's Academic Support Center regarding course materials and assignments.

Relationship between Courses and Core Competencies							
8 Core Competencies of PNU	Global- Cultural Competency	Communication Competency	Convergence Competency	Application Competency	Community Service Competency	Human Character Competency	Foundation Knowledge Competency	High-order Thinking Competency
		0	0	0		0	0	

Core Competencies Based on Courses and Educational Methods	
Core Competencies of Department	Educational Methods
1	Ability of applying statistical knowledge and software to solving problems	Practice Time for each lectures
2	Ability of data analysis and statistical testing for the given hypothesis	Practice Time for each lectures and Final examination
3	Ability of identifying statistical problems and their generalizations	Term Project
4	Ability of applying statistics to other academic fields	Term Project
5	Ability of contribution to solving statistical problems as a member of team	Term Project

Textbooks and References	
Required Textbooks	Choi, Y.S.(2021). Multivariate Data Analysis with R, 1st Edition 2nd Printing, Kyungmoon, Seoul (in Korean).
References	[1] Anderson, T.W.(1984). An Introduction to Multivariate Statistical Analysis (2nd ed.), John Wiley, New York. [2] Chatfield, C. and Collins, A. J. (1980). Introducton to Multivariate Analysis, Chapman and Hall, London. [3] Choi, Y.S. and Shin, S.M.(2013). Understanding of Biplot Analysis using R, Free Academy, Seoul. [4] Choi, Y.S.(2014). Understanding Statistics with R, Kyobo, Seoul. [5] Choi, Y.S.(2014). Walk in Multidimensional Scaling, Free Academy, Seoul. [6] Dillon, W. R. and M. Goldstein (1984). Multivariate Analysis -Methods and Applications-, John Wiley & Sons, New York. [7] Jobson, J. D. (1992). Applied Multivariate Data Analysis, Springer-Verlag, New York. [8] Johnson, R. A. and Wichern, D. W. (2002). Applied Multivariate Statistical Analysis, 5th Edition, Prentice Hall Inc, London. [9] Rencher, A. V. (1995). Methods of Multivariate Aanlysis. John Wiley & Sons, Inc., New York. [10] Srivastava, M.S. (2002). Methods of Multivariate Statistics, Wiley-Interscience, John Wiley & Sons, Inc., USA.

Weekly Schedule of Classes		
Week No.	Course Material	Assignments and Other Notes

Week 1	[Orientation and Education on Academic Misbehavior(e.g. Cheating, Plagiarism) and Safety Education on Experiment and Practice] Lecture 6. Discrimination and Classification Analysis(DCA)
	   6.1 Introduction
	   6.2 DCA with two clusters
		Home work shall be given in practice time .

Week 2	6.3 DCA with two clusters following multivariate normality	
Week 3	6.3 DCA with two clusters following multivariate normality	
Week 4	6.4 DCA with several clusters	
Week 5	6.4 DCA with severalclusters following multivariate normality 6.5 Evaluating classification function	
Week 6	6.11 R for DCA: Practice Time	
Week 7	Lecture 7. Multidimensional Scaling(MDS) 7.1 Introduction	
Week 8	7.2 Metric MDS	
Week 9	7.3 Non-metric MDS 7.6 R for MDS: Practice Time	
Week10	Lecture 8. Correspondence Analysis(CRA) 8.1 Introduction 8.2 Simple CRA	
Week11	8.3 Independence and homogeneity in CRA 8.4 Multiple CRA	
Week12	8.5 MCRA of Classification Variables Data	
Week13	8.6 R for CRA: Practice Time	
Week14	Special Topics for Machine Learnings 1. SVM	
Week15	2. ANN	
Week16	Fianal Examination/Term Projects	Submit your projects
Attachment		