TEACHING-LEARNING CONTRACT

LEARNING PROGRAM OUTLINE

LEARNING UNIT PROGRAM

MULTIVARIATE STATISTICS

PAS 135

STATISTICS STUDY PROGRAM OF MATHEMATICS DEPARTMENT
MATHEMATICS AND SCIENCE FACULTY
DIPONEGORO UNIVERSITY
SEMARANG
2007

TEACHING - LEARNING CONTRACT

Course Title : **MULTIVARIATE STATISTICS**
Code : **PAS 135**
Credit : **3**
Semester : **VI**

1. Course Advantage

Statistics have important role in many life aspect. Therefore this course is given so that student can know statistics specially related to multivariate statistics.

2. Course Description

This course studying bases which is used in problem of multivariate statistics, like multivariate random variable, multivariate normal distribution, multivariate normal random sampling, inferences about a multivariate normal mean vector, comparisons of several normal multivariate means, inferences about multivariat normal covariance matrix, principal component analysis, cluster analysis, and discriminant analysis.

3. General Instructional Aim

After studying this course, the student are expected to be able to explain multivariate random variable, multivariate normal distribution, multivariate normal random sampling, and apply inferences about a multivariate normal mean vector, comparisons of several normal multivariate means, inferences about multivariat normal covariance matrix, principal component analysis, cluster analysis, discriminant analysis.

4. Lecture Strategic

This lecturing uses three way teaching metods, that is lecturing, discuss, and task. Lecturing is given to explain the basic theories and followed by discussing some examples that illustrates its applications.

5. References

1. Johnson & Winchern, 2002, *Applied Multivariate Statistical Analysis*, Prentice.
2. Morrison, DF, 1983. *Multivariate Statistical Methods*. McGraw-Hill
3. Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor
4. Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

6. Scoring Criteria

Criteria of scoring in this course is

A	4
AB	3,5
B	3
BC	2,5
C	2
CD	1,5
D	1
E	0

Final score decision is based on this scoring indicator such as :

Quiz	10 %
Task	10 %
Midterm	30 %
Final Exam	30 %
Lab Work	20 %

8. Lecture Shedule

Week	Material	Reference
1	Multivariate Random Variable Task I	Johnson & Winchern (2002) Inda & Diah (2005)

2	Multivariate Normal Distribution Task II	Johnson & Winchern (2002) Inda & Diah (2005)
3	Multivariate Normal Random Sampling Task III	Johnson & Winchern (2002) Inda & Diah (2005)
4	Quiz I Inferences about a Multivariate Normal Mean Vector Task IV	Johnson & Winchern (2002) Inda & Diah (2005)
5	Comparisons of Several Multivariate Normal Means Task V	Johnson & Winchern (2002) Inda & Diah (2005)
6	Inferences about Multivariat Normal Covariance Matrix Quiz II Task VI	Morrison (1983) Inda & Diah (2005)
7	Lab work I : Comparisons of Several Multivariate Normal Means and Inferences about Multivariat Normal Covariance Matrix	Johnson & Winchern (2002) Inda & Diah (2005)
8	Midterm	
9	Principal Component Analysis Task VII	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)
10	Lab work II : Principal Component Analysis	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)
11 & 12	Cluster Analysis Task VIII	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)
13	Lab work III : Cluster Analysis	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)

14	Discriminant Analysis Quiz III Task IX	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)
15	Labwork IV : Discriminant Analysis	Bagus Sartono Johnson & Winchern (2002) Inda & Diah (2005)
16	Final Exam	

LEARNING PROGRAM OUTLINE

Course Title : Multivariate Statistics

Code / Credit : PAS 135 / 3

Course Description : This course studying bases which is used in problem of multivariate statistics, like multivariate random variable, multivariate normal distribution, multivariate normal random sampling, inferences about a multivariate normal mean vector, comparisons of several normal multivariate means, inferences about multivariat normal covariance matrix, principal component analysis, cluster analysis, and discriminant analysis.

General Instructional Aim : After studying this course, the student are expected to be able to explain multivariate random variable, multivariate normal distribution, multivariate normal random sampling, and apply inferences about a multivariate normal mean vector, comparisons of several normal multivariate means, inferences about multivariat normal covariance matrix, principal component analysis, cluster analysis, discriminant analysis.

No.	Specific Instructional Aim	Subject	Sub Subject	Duration	References
1.	After studying this course, the student are expected to be able to explain multivariate random variable	Multivariate Random Variable	▪ Multivariate Random Variable	150 minutes	[2] & [3]
2.	After studying this course, the student are expected to be able to explain multivariate normal distribution	Multivariate Normal Distribution	▪ The Multivariate Normal Density	150 minutes	[2] & [3]

3.	After studying this course, the student are expected to be able to explain multivariate normal random sampling	Multivariate Normal Random Sampling	▪ Maximum Likelihood and Unbias Estimation of Mean Vector ▪ Maximum Likelihood and Unbias Estimation of Covariance Matrix ▪ Wishart Distribution	150 minutes	[2] & [3]
4.	After studying this course, the student are expected to be able to apply Inferences about a multivariate normal mean vector	Inferences about Multivariate Normal Mean Vector	▪ Inferences about Multivariate Normal Mean Vector	150 minutes	[2] & [3]
5.	After studying this course, the student are expected to be able to apply comparisons of several multivariate normal means	Comparisons of Several Multivariate Normal Means	▪ One- Way MANOVA ▪ Two- Way MANOVA	270 minutes	[2] & [3]
6.	After studying this course, the student are expected to be able to apply inferences about multivariat normal	Inferences about Multivariat Normal Covariance	Inferences about Multivariat Normal Covariance Matrix	150 minutes	[2] & [4]

	covariance matrix	Matrix			
7.	After studying this course, the student are expected to be able to apply principal component analysis	Principal Component Analysis	▪ Population Principal Component Analysis ▪ Sample Principal Component Analysis ▪ The Number of Principal Component Analysis	270 minutes	[1],[2],dan [3]
8.	After studying this course, the student are expected to be able to apply cluster analysis	Cluster Analysis	▪ Hierarchical Clustering Methods ▪ Nonhierarchical Clustering Methods	420 minutes	[1],[2],dan [3]
9.	After studying this course, the student are expected to be able to apply discriminant analysis.	Discriminant Analysis	▪ Fisher's Method for Discriminating among Several Population ▪ The Minimum Expected Cost of Misclassificatio n Method	270 minutes	[1],[2],dan [3]

References:

1. Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor
2. Inda Aini Sichah and Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang
3. Johnson & Winchern, 2002, *Applied Multivariate Statistical Analysis*, Prentice.
4. Morrison, DF, 1983. *Multivariate Statistical Methods*. McGraw-Hill

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 1

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain multivariate random variable.
2. SPECIFIC : After studying this course, the student are expected to be able to explain multivariate random variable.

B. SUBJECT : Multivariate Random Variable

C. SUB SUBJECT : Multivariate Random Variable

D. TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the first meeting ▪ Describing about general and specific objectives competence ▪ Explaining about multivariate random variable	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about multivariate random variable ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss,asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS
CODE / CREDIT : PAS 135 / 3
DURATION : 150 MINUTES
WEEK : 2

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain multivariate normal distribution
2. SPECIFIC : After studying this course, the student are expected to be able to explain the multivariate normal density

B. SUBJECT : Multivariate Normal Distribution
C. SUB SUBJECT : The Multivariate Normal Density
D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the second meeting ▪ Describing about general and specific objectives competence ▪ Explaining about multivariate normal distribution.	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about multivariate normal density ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about	Discuss, asking,	White board and paper

	matter on the next meeting	observing, taking notes	

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

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LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 3

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain multivariate normal random sampling

2. SPECIFIC : After studying this course, the student are expected to be able to explain maximum Likelihood and unbias estimation of mean vector, maximum Likelihood and unbias estimation of covariance matrix, and Wishart distribution

B. SUBJECT : Multivariate Normal Random Sampling

C. SUB SUBJECT : Maximum Likelihood and Unbias Estimation of Mean Vector

Maximum Likelihood and Unbias Estimation of Covariance Matrix

Wishart Distribution

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the third meeting ▪ Describing about general and specific objectives competence ▪ Explaining about multivariate normal random sampling	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about maksimum Likelihood and unbias estimation of mean vector, maksimum Likelihood and unbias estimation of covariance matrix, and Wishart distribution. ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

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LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 4

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply inferences about multivariate normal mean vector

2. SPECIFIC : After studying this course, the student are expected to be able to apply inferences about multivariate normal mean vector

B. SUBJECT : Inferences about Multivariate Normal Mean Vector

C. SUB SUBJECT : Inferences about Multivariate Normal Mean Vector

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fourth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about multivariate normal mean vector	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about multivariate normal mean vector ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion	Discuss,	White board and

	▪ Giving description about matter on the next meeting	asking, observing, taking notes	paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 5

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply comparisons of several multivariate normal means

2. SPECIFIC : After studying this course, the student are expected to be able to apply One-Way MANOVA and Two- Way MANOVA

B. SUBJECT : Comparisons of Several Multivariate Normal Means

C. SUB SUBJECT : One-Way MANOVA
Two-Way MANOVA

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fifth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about comparisons several multivariate normal mean vector	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about one-way MANOVA and two-way MANOVA	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.

	▪ Giving examples as a study case and solving together		
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 6

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply inferences about multivariat normal covariance matrix

2. SPECIFIC : After studying this course, the student are expected to be able to apply inferences about multivariat normal covariance matrix

B. SUBJECT : Inferences about Multivariat Normal Covariance Matrix

C. SUB SUBJECT : Inferences about Multivariat Normal Covariance Matrix

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the sixth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about multivariate normal covariance matrix	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about multivariate normal covariance matrix	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.

	▪ Giving examples as a study case and solving together		
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Morrison, DF, 1983. *Multivariate Statistical Methods*. McGraw-Hill

Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

LEARNING UNIT PROGRAM

COURSE TITLE	: MULTIVARIATE STATISTICS
CODE / CREDIT	: PAS 135 / 3
DURATION	: 120 MINUTES
WEEK	: 7

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply comparisons of several multivariate normal means and inferences about multivariat normal covariance matrix by using software

2. SPECIFIC : After studying this course, the student are expected to be able to apply one-way MANOVA, two-way MANOVA and inferences about multivariat normal covariance matrix by using software

B. SUBJECT : Lab Work Comparisons of Several Multivariate Normal Means and Inferences about Multivariat Normal Covariance Matrix

C. SUB SUBJECT : Lab Work One-Way MANOVA,
Lab Work Two-Way MANOVA
Lab Work Inferences about Multivariat Normal Covariance Matrix

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the seventth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about comparisons of several multivariate normal means and inferences about multivariate normal covariance matrix by using software	Observing and taking notes	Computer, OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about one-way MANOVA, two-way MANOVA and inferences about multivariate normal covariance matrix by using software ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	Computer, OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

Morrison, DF, 1983. *Multivariate Statistical Methods*. McGraw-Hill

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LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 150 MINUTES

WEEK : 9

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply principal component analysis

2. SPECIFIC : After studying this course, the student are expected to be able to apply population principal component analysis, sample principal component analysis, and the number of principal component analysis

B. SUBJECT : Principal Component Analysis

C. SUB SUBJECT : Population Principal Component Analysis
Sample Principal Component Analysis
The Number of Principal Component Analysis

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the ninth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about principal component analysis	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	• Explaining about population principal component analysis, sample principal component analysis, and the number of principal component analysis ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

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Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS

CODE / CREDIT : PAS 135 / 3

DURATION : 120 MINUTES

WEEK : 10

A. INSTRUCTIONAL AIM

1 GENERAL : After studying this course, the student are expected to be able to apply principal component analysis by using software

2. SPECIFIC : After studying this course, the student are expected to be able to apply population principal component analysis and sample principal component analysis by using software

B. SUBJECT : Lab Work Principal Component Analysis

C. SUB SUBJECT : Lab Work Population Principal Component Analysis
Lab Work Sample Principal Component Analysis

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the tenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about principal component analysis by using soft ware	Observing and taking notes	Computer, OHP, transparancy, white board, reference book, and paper.

PRESENTATION	• Explaining about population principal component analysis and sample principal component analysis by using software ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	Computer, OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

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Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS
CODE / CREDIT : PAS 135 / 3
DURATION : 300 MINUTES
WEEK : 11 & 12

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply cluster analysis
2. SPECIFIC : After studying this course, the student are expected to be able to apply hierarchical clustering methods and nonhierarchical clustering methods

B. SUBJECT : Cluster Analysis
C. SUB SUBJECT : Hierarchical Clustering Methods
Nonhierarchical Clustering Methods

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the eleventh and twelfth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about cluster analysis	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about hierarchical clustering methods and nonhierarchical clustering methods	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.

	▪ Giving examples as a study case and solving together		
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

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Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS
CODE / CREDIT : PAS 135 / 3
DURATION : 120 MINUTES
WEEK : 13

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply cluster analysis by using software

2. SPECIFIC : After studying this course, the student are expected to be able to apply hierarchical clustering methods and nonhierarchical clustering methods by using software

B. SUBJECT : Lab Work Cluster Analysis

C. SUB SUBJECT : Lab Work Hierarchical Clustering Methods
Lab Work Nonhierarchical Clustering Methods

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the thirteenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about cluster analysis by using software	Observing and taking notes	Computer, OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about hierarchical clustering methods and nonhierarchical clustering methods by using software	Observing, asking, taking notes.	Computer , OHP, transparancy, white board, reference book, and paper.

	▪ Giving examples as a study case and solving together		
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

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Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS
CODE / CREDIT : PAS 135 / 3
DURATION : 150 MINUTES
WEEK : 14

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply discriminant analysis
2. SPECIFIC : After studying this course, the student are expected to be able to apply Fisher's method for discriminating among several population and the minimum expected cost of misclassification method

B. SUBJECT : Discriminant Analysis

C. SUB SUBJECT : Fisher's Method for Discriminating among Several Population
The Minimum Expected Cost of Misclassification Method

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fourteenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about discriminant analysis	Observing and taking notes	Computer, OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about Fisher's method for discriminating among several population and the minimum expected cost of misclassification method ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

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Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall

LEARNING UNIT PROGRAM

COURSE TITLE : MULTIVARIATE STATISTICS
CODE / CREDIT : PAS 135 / 3
DURATION : 120 MINUTES
WEEK : 15

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply discriminant analysis by using software

2. SPECIFIC : After studying this course, the student are expected to be able to apply Fisher's method for discriminating among several population and the minimum expected cost of misclassification method by using software

B. SUBJECT : Discriminant Analysis

C. SUB SUBJECT : Fisher's Method for Discriminating among Several Population
The Minimum Expected Cost of Misclassification Method

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fifteenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about discriminant analysis by using software	Observing and taking notes	Computer, OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about Fisher's method for discriminating among several population and the minimum expected cost of misclassification method by using software ▪ Giving examples as a study case and solving together	Observing, asking, taking notes.	Computer, OHP, transparancy, white board, reference book, and paper.
CLOSING	▪ Discussion ▪ Giving description about matter on the next meeting	Discuss, asking, observing, taking notes	White board and paper

E. ASSESSMENT : Giving problems to the students

F. REFERENCE : Bagus Sartono, Farid M. Affendi, Utami Dyah Syafitri, I Made Sumertajaya, Yenni Angraeni, *Buku Analisis Peubah Ganda*, Jurusan Statistika FMIPA-IPB Bogor

Inda Aini Sichah dan Diah Safitri, 2005. *Buku Ajar Statistika Multivariat*. Jurusan Matematika FMIPA UNDIP Semarang

Johnson,RA and Wichern,DW, 2002. *Applied Multivariate Statistical Analysis*. Prentice-Hall