TEACHING-LEARNING CONTRACT

LEARNING PROGRAM OUTLINE

LEARNING UNIT PROGRAM

NONPARAMETRIC STATISTICS

PAS 115

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

TEACHING - LEARNING CONTRACT

Course Title : **NONPARAMETRIC STATISTICS**
Code : **PAS 115**
Credit : **3**
Semester : **IV**

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 nonparametric statistics

2. **Course Description**

   This course studying bases which is used in problem of nonparametric statistics, like elementary concept about nonparametric statistics, hypothesis testing, Binomial distribution, sign test, Wilcoxon signed rank test, Chi-square test, Kruskal-wallis test, Friedman test, Kolmogorov-Smirnov test, Spearman rank correlation coefficient, Kendall's Tau correlation coefficient.

3. **General Instructional Aim**

   After studying this course, the student are expected to be able to apply nonparametric statistics.

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. Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York
2. Daniel, W. W., alih bahasa Alex Tri Kantjono W, 1989, *Statistika Nonparametrik Terapan*, PT. Gramedia, Jakarta

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 :

Task	10 %
Midterm	35 %
Final Exam	35 %
Lab Work	20 %

8. Lecture Shedule

Week	Material	Reference
1	The basics of nonparametric statistics Task I	Conover, W. J. (1980) Daniel, W. W. (1989)
2	Hypothesis Testing Task II	Conover, W. J. (1980) Daniel, W. W. (1989)
3	Binomial Distribution Task III	Conover, W. J. (1980) Daniel, W. W. (1989)
4	Sign Test Task IV	Conover, W. J. (1980) Daniel, W. W. (1989)
5 & 6	Wilcoxon Signed Rank Test Task V	Conover, W. J. (1980) Daniel, W. W. (1989)

7	Chi-Square Test Task VI	Conover, W. J. (1980) Daniel, W. W. (1989)
8	Midterm	
9	Kruskal-Wallis Test Task VII	Conover, W. J. (1980) Daniel, W. W. (1989)
10	Friedman Test Task VIII	Conover, W. J. (1980) Daniel, W. W. (1989)
11	Kolmogorov-Smirnov Test Task IX	Conover, W. J. (1980) Daniel, W. W. (1989)
12 &13	Spearman rank correlation coefficient Task X	Conover, W. J. (1980) Daniel, W. W. (1989)
14 & 15	Kendall's tau correlation coefficient Task XI	Conover, W. J. (1980) Daniel, W. W. (1989)
16	Final Exam	

LEARNING PROGRAM OUTLINE

Course Title : Nonparametric Statistics

Code / Credit : PAS 115 / 3

Course Description : This course studying bases which is used in problem of nonparametric statistics, like elementary concept about nonparametric statistics, hypothesis testing, Binomial distribution, sign test, Wilcoxon signed rank test, Chi-square test, Kruskal-wallis test, Friedman test, Kolmogorov-Smirnov test, Spearman rank correlation coefficient, Kendall's Tau correlation coefficient.

General Instructional Aim : After studying this course, the student are expected to be able to apply nonparametric statistics.

No.	Specific Instructional Aim	Subject	Sub Subject	Duration	References
1.	After studying this course, the student are expected to be able to explain the basics of nonparametric statistics.	The Basics of Nonparametric Statistics.	▪ Introduction ▪ Measurement Scales	150 minutes	[2]
2.	After studying this course, the student are expected to be able to explain hypothesis testing	Hypothesis Testing	▪ Test statistics ▪ Critical Region ▪ Hypothesis Testing	150 minutes	[1] and [2]
3.	After studying this course, the student are expected to be able to explain Binomial	Binomial Distribution	▪ The Theory of Binomial Distribution ▪ Problem	150 minutes	[1] and [2]

	distribution		Solving Related to Binomial Distribution		
4.	After studying this course, the student are expected to be able to apply sign test	Sign Test	▪ Sign Test for One Sample ▪ Sign Test for Two Dependent Sample	150 minutes	[1] and [2]
5.	After studying this course, the student are expected to be able to apply Wilcoxon signed rank test	Wilcoxon Signed Rank Test	▪ Wilcoxon Signed Rank Test for One Sample ▪ Wilcoxon Signed Rank Test for Two Dependent Sample	300 minutes	[1] and [2]
6.	After studying this course, the student are expected to be able to apply Chi-square test	Chi-Square Test	▪ Chi-Square Test for Independence ▪ Chi-Square Test for Homogeneity	150 minutes	[1] and [2]
7.	After studying this course, the student are expected to be able to	Kruskal-Wallis Test	▪ Kruskal-Wallis Test ▪ Multiple	150 minutes	[1] and [2]

	apply Kruskal-Wallis test		Comparisons		
8.	After studying this course, the student are expected to be able to apply Friedman test	Friedman Test	▪ Friedman Test ▪ Multiple Comparisons	150 minutes	[1] and [2]
9.	After studying this course, the student are expected to be able to apply Kolmogorov-Smirnov test	Kolmogorov-Smirnov Test	▪ The Theory of Kolmogorov-Smirnov Test ▪ Problem Solving Related to Kolmogorov-Smirnov Test	150 minutes	[1] and [2]
10.	After studying this course, the student are expected to be able to apply Spearman rank correlation coefficient	Spearman Rank Correlation Coefficient	▪ The Theory of Spearman Rank Correlation Coefficient ▪ Problem Solving Related to Spearman Rank Correlation Coefficient	300 minutes	[1] and [2]
11.	After studying this	Kendall's Tau	▪ The Theory of	300	[1] and [2]

	course, the student are expected to be able to apply Kendall's Tau correlation coefficient	correlation coefficient	Kendall's Tau Correlation Coefficient ▪ Problem Solving Related to Kendall's Tau Correlation Coefficient	minutes	

References:

1. Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York
2. Daniel, W. W., alih bahasa Alex Tri Kantjono W, 1989, *Statistika Nonparametrik Terapan*, PT. Gramedia, Jakarta

LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS
CODE / CREDIT : PAS 115 / 3
DURATION : 150 MINUTES
WEEK : 1

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain the basics of nonparametric statistics.
2. SPECIFIC : After studying this course, the student are expected to be able to explain measurement scales and basics of nonparametric statistics

B. SUBJECT : The basics of nonparametric statistics
C. SUB SUBJECT : Introduction
Measurement Scales

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 basics of nonparametric statistics	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about introduction and measurement scales ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS
CODE / CREDIT : PAS 115 / 3
DURATION : 150 MINUTES
WEEK : 2

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain hypothesis testing
2. SPECIFIC : After studying this course, the student are expected to be able to explain test statistics, critical region, and hypothesis testing

B. SUBJECT : Hypothesis Testing
C. SUB SUBJECT : Test Statistics
Critical Region
Hypothesis Testing

E. 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 hypothesis testing	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about test statistics, critical region, and hypothesis testing. ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

Daniel, W. W., alih bahasa Alex Tri Kantjono W, 1989, *Statistika Nonparametrik Terapan*, PT. Gramedia, Jakarta

LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS
CODE / CREDIT : PAS 115 / 3
DURATION : 150 MINUTES
WEEK : 3

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to explain Binomial distribution.
2. SPECIFIC : After studying this course, the student are expected to be able to explain the theory of Binomial distribution and problem solving related to Binomial distribution

B. SUBJECT : Binomial Distribution
C. SUB SUBJECT : The Theory of Binomial Distribution
Problem Solving Related to Binomial Distribution

F. 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 Binomial distribution	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about the theory of Binomial distribution and problem solving related to Binomial 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS
CODE / CREDIT : PAS 115 / 3
DURATION : 150 MINUTES
WEEK : 4

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply sign test.
2. SPECIFIC : After studying this course, the student are expected to be able to apply sign test for one sample and sign test for two dependent sample.

B. SUBJECT : Sign Test

C. SUB SUBJECT : Sign Test for One Sample
Sign Test for Two Dependent Sample.

G. 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 sign testcs	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about sign test for one sample and sign test for two dependent sample ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS

CODE / CREDIT : PAS 115 / 3

DURATION : 300 MINUTES

WEEK : 5 AND 6

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Wilcoxon signed rank test.
2. SPECIFIC : After studying this course, the student are expected to be able to apply Wilcoxon signed rank test for one sample and Wilcoxon signed rank test for two dependent sample

B. SUBJECT : Wilcoxon Signed Rank Test

C. SUB SUBJECT : Wilcoxon Signed Rank Test for One Sample
Wilcoxon Signed Rank Test for Two Dependent Sample

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fifth and sixth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about Wilcoxon signed rank test	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about Wilcoxon signed rank test for one sample and Wilcoxon signed rank test for two dependent sample ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

Daniel, W. W., alih bahasa Alex Tri Kantjono W, 1989, *Statistika Nonparametrik Terapan*, PT. Gramedia, Jakarta

LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS

CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 7

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Chi-square test
2. SPECIFIC : After studying this course, the student are expected to be able to apply Chi-Square test for independence and Chi-Square test for homogeneity

B. SUBJECT : Chi-Square Test

C. SUB SUBJECT : Chi-Square Test for Independence
Chi-Square Test for Homogeneity

D. TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the seventh meeting ▪ Describing about general and specific objectives competence ▪ Explaining about Chi-Square test	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about Chi-Square test for independence and Chi-Square test for homogeneity ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 9

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Kruskal-Wallis test.
2. SPECIFIC : After studying this course, the student are expected to be able to apply Kruskal-Wallis test and multiple comparisons

B. SUBJECT : Kruskal-Wallis Test

C. SUB SUBJECT : Kruskal-Wallis Test
Multiple Comparisons

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 Kruskal-Wallis test	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about Kruskal-Wallis test and multiple comparisons ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS

CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 10

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Friedman test
2. SPECIFIC : After studying this course, the student are expected to be able to apply Friedman test and multiple comparisons

B. SUBJECT : Friedman Test

C. SUB SUBJECT : Friedman Test
Multiple Comparisons

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 Friedman test	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about Friedman test and multiple comparisons ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 11

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Kolmogorov-Smirnov test.
2. SPECIFIC : After studying this course, the student are expected to be able to explain the theory of Kolmogorov-Smirnov test and problem solving related to Kolmogorov-Smirnov test

B. SUBJECT : Kolmogorov-Smirnov test

C. SUB SUBJECT : The Theory of Kolmogorov-Smirnov Test
Problem Solving Related to Kolmogorov-Smirnov Test

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the eleventh meeting ▪ Describing about general and specific objectives competence ▪ Explaining about Kolmogorov-Smirnov test	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.
PRESENTATION	▪ Explaining about Kolmogorov-Smirnov test and problem solving related to Kolmogorov-Smirnov test ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS

CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 12 & 13

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Spearman rank correlation coefficient
2. SPECIFIC : After studying this course, the student are expected to be able to apply the theory of Spearman rank correlation coefficient and problem solving related to Spearman rank correlation coefficient

B. SUBJECT : Spearman Rank Correlation Coefficient

C. SUB SUBJECT : The Theory of Spearman Rrank Correlation Coefficient
Problem Solving Related to Spearman Rank Correlation Coefficient

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the twelfth and thirteenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about Spearman rank correlation coefficient	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about the theory of Spearman rank correlation coefficient and problem solving related to Spearman rank correlation coefficient ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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LEARNING UNIT PROGRAM

COURSE TITLE : NONPARAMETRIC STATISTICS

CODE / CREDIT : PAS 115 / 3

DURATION : 150 MINUTES

WEEK : 14 & 15

A. INSTRUCTIONAL AIM

1. GENERAL : After studying this course, the student are expected to be able to apply Kendall's Tau correlation coefficient.
2. SPECIFIC : After studying this course, the student are expected to be able to apply the theory of Kendall's Tau correlation coefficient and problem solving related to Kendall's Tau correlation coefficient

B. SUBJECT : Kendall's Tau Correlation Coefficient

C. SUB SUBJECT : The Theory of Kendall's Tau Correlation Coefficient
Problem Solving Related to Kendall's Tau Correlation Coefficient

D.TEACHING-LEARNING ACTIVITIES

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	▪ Describing about matter at the fourteenth and fifteenth meeting ▪ Describing about general and specific objectives competence ▪ Explaining about Kendall's Tau correlation coefficient	Observing and taking notes	OHP, transparancy, white board, reference book, and paper.

PRESENTATION	▪ Explaining about the theory of Kendall's Tau correlation coefficient and problem solving related to Kendall's Tau correlation coefficient ▪ 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 : Conover, W. J., 1980, *Practical Nonparametric Statistics 2 ed*, John Wiley & Sons, New York

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