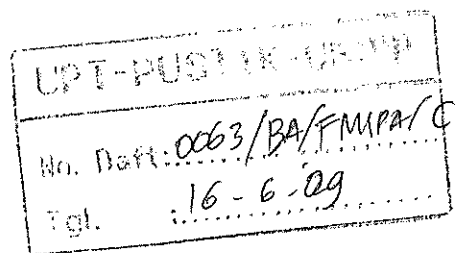




**TEACHING-LEARNING CONTRACT
LEARNING PROGRAM OUTLINE
LEARNING UNIT PROGRAM**

**MATHEMATICAL
STATISTICS I
PAS 206**



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

STUDYING CONTRACT

COURSE NAME : MATHEMATICAL STATISTICS I
COURSE CODE : PAS 206
SCU : 3
SEMESTER : III

I. Objective and Advantage of Course

In statistics needed theory and practice course. For that basic theories must be mathematical statistics I which is a course about statistics explained by mathematical. This course objectives as basics of learning method, definitions, study and analyze advanced statistics method. So this course used to observe good statistics with both theory and practice. In lecture will be given by theory and practice. Then the students expected able to absorb that good material and apply it to self develop on future times.

II. Course Description

This course is grand course on semester III. The materials of course are Probability Theory, Random Variable and Its distribution, Random Variable Transformation and Expected Value, Discrete Probability Distributions, Continuous Distributions, Bivariate Distributions and Random Variable Function Distributions, and Central Limit Theorem. These materials hoped use to aid problem solving in advanced statistics both study and daily life.

III. Instructional Objective

General Instructional Objective:

After attend this course the students hoped could know basic of theory statistics by mathematical and use it as foundation to build advanced statistics and able to solve statistics problem in daily life.

Special Instructional Objectives:

After follow this course, the students hoped could:

1. Define and use probability theory.
2. Define and difference both discrete and random variable, determine density function and its distributions.
3. Do random variable transformation, determine expected value and moment generator function.
4. Explain and apply discrete distributions.
5. Comment on background and history of gamma distribution, exponential and chi-square distributions.
6. Verify normal distribution properties and able to differentiate distribution parameter types.
7. Define bivariate random variable and verify independent random variables.
8. Explain meaning of statistics and random sample.
9. Apply continuous bivariate transformation and beta distributions.
10. Use t and F distributions.
11. Use moment generating function techniques to look for mean and standard deviation distributions.
12. Apply the central limit theorem.

IV. Lecture Strategic

Lecture method use presentation with solve problem, task and practice. Presentation done by lecture modul. Solve problem done to absorb material well, whereas the task is given by scheduled on last lecture for the subject. The task has been given, collected on meeting other time, that result will be returned to students for correction themselves. Well, other time done discussion about the task. The students hoped talk active in lecture or discussion, so they could absorb that material by good and true. Other thing to know by practically done by practise and so by computation can make program and see relevant software. General aims, in order to students see by theory and counting. Then on other time used to add capable building themselves by theory and practice at science forum so on.

V. References

The text books in this lecture are:

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.
3. Hogg, R.V. and Craig, A.T., *Introduction to Mathematical Statistics*, Fifth Edition, Prentice-Hall, Inc., New Jersey, 1995.

VI. Task and Practice

The task was given by:

Task I is given with individual, after first a half of material had been studied. Task submitting was done on tomorrow meeting. **Task result I** had been corrected will be return to students as feed back about material absorbing.

Task II is given with individual, after last a half of material had been studied. Task submitting was done on tomorrow meeting. **Task result II** had been corrected will be return to students as feed back about material absorbing.

The practice was given by:

The practice was done in Statistics Laboratory with present 5 times and 1 time to use response. The other hand, students must make practice result report by individual as practice complete conditional.

VII. Scoring Criteria

Scoring will be done by lecturer with use condition as follow:

Grade	Point	Range
A	4	$87,5 < x \leq 100$
AB	3,5	$75 < x \leq 87,5$
B	3	$62,5 < x \leq 75$
BC	2,5	$50 < x \leq 62,5$

C	2	$37,5 < x \leq 50$
CD	1,5	$25 < x \leq 37,5$
D	1	$12,5 < x \leq 25$
E	0	$0 < x \leq 12,5$

On determine final grade would be used weighted as follow:

Task	:	10 %
Practice	:	20 %
Midsemester Exam	:	35 %
Semester Final Exam	:	35 %

VIII. Meeting Schedule

Meeting	Scope Topics	Refences
1	1. Lecture Contract 2. Introduction of Probability 3. Combinatorics	[1], and [2]
2	4. Conditional Probability 5. Independent Event and Bayes Theorem	[1], and [2]
3	6. Random Variables 7. Descrete and Continuous Probability Distributions	[1], [2], and [3]
4	8. Univariate Transformation 9. Task I	[1], [2], and [3]
5	10. Jacobian Transformation and Expected Value 11. Moment Generating Functions 12. Problem Solving	[1] and [2]

6	13. Binomial Distribution 14. Hipergeometric Distribution	[1] and [2]
7	15. Geometric and Poisson Distributions 16. Uniform and Negative Binomial 17. Problem Solving	[1] and [2]
8	Midsemester Exam	
9	18. Gamma Distribution 19. Chi-square Distribution	[1], [2], and [3]
10	20. Normal Distribution	[1], [2], and [3]
11	21. Bivariat Distribution 22. Independent Random Variables 23. Problem Solving	[1], and [3]
12	24. Sampling Theory 25. Bivariate Transformations 26. Task II	[3]
13	27. Beta Distribution 28. Student and F Distributions	[3]
14	29. Moment Generating Function Technic	[1] and [3]
15	30. Mean and S Distribution 31. Central Limit Theorem	[3]
16	32. Task Discussing 33. Problem Solving	Modul
Scheduled	Semester Final Exam	

TEACHING PROGRAM OUTLINES

COURSE : MATHEMATICAL STATISTICS I

CODE / SCU : PAS 206 / 3

SHORT DESCRIPTION :

This course is grand course given in semester III. The objective is basic study to learn statistics by use mathematical. In order students could absorb statistics both theory and practice with well. The materials content about Probability Theory, Random Variable and It distributions, Random Variable Transformation and Expected Value, Descrete Probability Distribution, Continuous Probability Distribution, Bivariate Distribution and Random Variable Function Distribution, and then Central Limit Theorem. These materials hoped to use for help problem solving arise on advanced statistics as lecture as daily life.

GENERAL INSTRUCTIONAL OBJECTIVES:

After follow this course, the students hoped could know basic theory of statistics by mathematical and apply it as foundation for develop advanced course and able to solve statistics problems in daily life.

Nu.	Speffic Instructional Objectives	Subject Core	Sub Subject Core	Est. Time	References
1	2	3	4	5	6
1.	Students see this lecture contract and probability definition	Lecture Contract Expected Value	a. Lecture Contract b. Probility and Combinatorics	150	[1], and [2]
2.	Students able to talk about independent events	Independent Events	a. Independent Event b. Bayes Theorem	150	[1], and [2]
3.	Student hoped can difference descrete and continuous random variables	Random Variables	a. Random Variables b. Probability Distributions	150	[1], [2], and [3]
4.	Student hoped able to use transform random variables	Univariate Transformation	Univariate Transformation	150	[1], [2], and [3]
5.	Students could define moment generating function	Moment Generating Function	a. Expected Value b. Moment Generating Function	150	[1] and [2]

6.	Student could apply binomial and hipergeometric distributions	Binomial Distribution	a. Binomial Distribution b. Hipergeometric Distribution	150	[1] and [2]
7.	Students able to apply Poisson distribution	Poisson Distribution	a. Poisson Distribution b. Uniform Distribution	150	[1] and [2]
8.	Student expected could determine gamma distribution	Gamma Distribution	a. Gamma Distribution b. Chi-square Distribution	150	[1], [2], and [3]
9.	Student could use normal distribution	Normal Distribution	Normal Distribution Application	150	[1], [2], and [3]
10.	Student can explain bivariate distribution	Bivariate Distribution	a. Bivariate Distribution b. Independent Random Variables	150	[1], and [3]
11.	Student expected could do bivariate transformation	Bivariate Transformation	a. Sampling Theory b. Bivariate Transformation	150	[3]
12.	Student could analyze t distribution structure	Distribution-t	a. Beta Distribution b. t Distribution c. F Distribution	150	[3]
13.	Students able to use moment generating function	Moment Generating Function Technic	Moment Generating Function Technic	150	[1] and [3]
14.	Student expected could know central limit theorem	Central Limit Theorem	a. Mean Distribution b. S Distribution c. Central Limit Theorem	150	[3]
15.	The student could discus to solve arise problems	Discussion	Task Discussion and Problem Solving	150	Modul

REFERENCES:

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.
3. Hogg, R.V. and Craig, A.T., *Introduction to Mathematical Statistics*, Fifth Edition, Prentice-Hall, Inc., New Jersey, 1995.

LEARNING PROGRAM UNIT

COURSE	: MATHEMATICAL STATISTICS I
COURSE CODE	: PAS 206
SCU	: 3
DURATION	: 3 x 50 minutes
MEETING	: 1

A. Instructional Objectives

1. General:

After study this course, the students see learning contract which will be done and talked the material.

2. Specific:

After follow this course, the students could know learning contract and able to see probability, and combinatorics.

B. Subjects:

- Learning Contract
- Introduction Probability
- Combinatorics

C. Sub Subject:

- Studying System
- Law of Probability
- Combinatorics Computation

D. Teaching-Learning Activities:

Activity Stage	Lecturer Activities	Student Activities	Learning Media
Introduction	1. Give learning contract would be done 2. Explain material contains 3. Explain advantage to study probability and combinatorics	Seeing and writing	1. OHP 2. Transparency 3. White Board 4. Modul
Presentation	4. Explain studying system and grading 5. Define probability 6. Explain combinatoric computation 7. Give examples topics, respectively 8. Ask to students about random variable as feed back	Watching and asking	1. OHP 2. Transparency 3. White Board 4. Modul
Closing	9. Conclude all materials had been given in this meeting 10. Get general map about material to the next meeting 11. Get comment about good study	Seeing, writing and asking	White Board

E. Evaluation : —

F. References :

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.

LEARNING PROGRAM UNIT

COURSE	: MATHEMATICAL STATISTICS I
COURSE CODE	: PAS 206
SCU	: 3
DURATION	: 9 x 50 minutes
MEETING	: 2, 3 and 4

A. Instructional Objectives

1. General:

After study this course, the students could explain meaning of conditional probability, random variable and it transformation.

2. Specific:

After attend this meeting, the student could say independent events and Bayes theorem, and probability distribution.

B. Subjects:

- Conditional Probability
- Random Variable
- Random Variable Transformation

C. Sub Subjects:

- Definition of Conditional Probability
- Definition of Independent Event
- Bayes Theorem
- Definition of Random Variable
- Probability Distributions
- Univariate Random Variable Transformation

D. Teaching-Learning Activities:

Activity Stage	Lecturer Activities	Student Activities	Learning Media
Introduction	1. Explain the material would be said 2. Recall the relation material ago 3. Give example conditional probability and it distribution in real life	Seeing and writing	1. OHP 2. Transparency 3. White Board 4. Modul
Presentation	4. Explain conditional probability 5. Get independent events 6. Apply Bayes theorem 7. Explain probability distribution 8. Give examples the matter, respectively 9. Ask to student about random variables and their transformation as feed back	Watching and asking	1. OHP 2. Transparency 3. White Board 4. Modul
Closing	10. Conclude all the matter which had been given 11. Give inform next material for tomorrow meeting	Concerning, writing and asking	White Board

E. Evaluation : Give excercises and Task I for be done.

F. References :

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.
3. Hogg, R.V. and Craig, A.T., *Introduction to Mathematical Statistics*, Fifth Edition, Prentice-Hall, Inc., New Jersey, 1995.

LEARNING PROGRAM UNIT

COURSE	: MATHEMATICAL STATISTICS I
COURSE CODE	: PAS 206
SCU	: 3
DURATION	: 9 x 50 minutes
MEETING	: 5, 6 and 7

A. Tujuan Instruksional

1. Umum:

After finish this lecture, the students could know expected value, use binomial and Poisson distribution.

2. Specific:

After follow this meeting, the students able to determine Jacobian transformation, observe moment generating function and apply uniform distribution as negative binomial distributions.

B. Subjects:

- Expected Value
- Moment Generating Function
- Binomial Distribution
- Poisson Distribution

C. Sub Subjects:

- Jacobian Transformation
- Conditional Expected Value
- Binomial and Hipergeometric Distributions
- Geometric and Poisson Distributions
- Uniform and Negative Binomial Distributions

D. Teaching-Learning Activities:

Activity Stage	Lecturer Activities	Student Activities	Learning Media
Intriduction	1. Remind matter by short with last metting 2. Explain the matter would be done 3. Get chance asking, if there is a matter problem	Seeing and writing	1. OHP 2. Transparancy 3. White Board 4. Modul
Presentation	4. Define expected value 5. Determine meaning of moment generating function 6. Count and use binomial and Poisson distributions 7. Give example of the subjects, respectively 8. Ask to students about the matter as feed back 9. Get problem solving for good absorbtion of the materials	Watching, asking and discussing	1. OHP 2. Transparancy 3. White Board 4. Modul
Closing	10. Conclude all of the materials had been given 11. Give critics and propose studying result 12. Give informations about midsemester exam	Watching, writing, and discussing	White Board

E. Evaluation : Problem Solving and discussion.

F. References :

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.

LEARNING PROGRAM UNIT

COURSE	: MATHEMATICAL STATISTICS I
COURSE CODE	: PAS 206
SCU	: 3
DURATION	: 12 x 50 minutes
MEETING	: 9, 10, 11 and 12

A. Instructional Objectives

1. General:

After finish this course, the students could explain to order gamma with chi-square distributions, apply normal distribution, prove independent random variables, and do bivariate transformations.

2. Specific:

After attend this meeting, the students are able to analyze gamma distribution, determine chi-square and normal properties, apply sampling theory, and use bivariate transformations.

B. Subjects:

- Gamma Distribution
- Normal Distribution
- Bivariate Distributions
- Sampling Theory

C. Sub Subjects:

- Chi-square Distribution
- Independent Random Variables
- Random Samples
- Application of Bivariate Transformations

D. Teaching-Learning Activities:

Activity Stage	Lecturer Activities	Student Activities	Learning Media
Introduction	1. Short solve midsemester exam 2. Recall important matter on study ago 3. Explain the matter which will be discussion 4. Give ask time, if there is absorbing material problem	Watching and writing	1. OHP 2. Transparency 3. White Board 4. Modul
Presentation	5. Describe gamma and chi-square distributions 6. Apply Norman distribution 7. Explain bivariate distribution 8. Describe mean independent random variables 9. Use bivariate transformations 10. Ask to students as feed back	Seeing, asking, and discussing	1. OHP 2. Transparency 3. White Board 4. Modul
Closing	11. Conclude the matter had been given 12. Give motivations about good learning	Following, writing and discussing	White Board

E. Evaluation : Problem Solving and Task II.

F. References :

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Casella and Berger, *Statistics Inference*, Brooks/Cole Publishing Company, California, 1990.
3. Hogg, R.V. and Craig, A.T., *Introduction to Mathematical Statistics*, Fifth Edition, Prentice-Hall, Inc., New Jersey, 1995.

LEARNING PROGRAM UNIT

COURSE	: MATHEMATICAL STATISTICS I
COURSE CODE	: PAS 206
SCU	: 3
DURATION	: 12 x 50 minutes
MEETING	: 13, 14, 15 and 16

A. Instructional Objectives

1. General:

After meeting this course, hoped students able to describe beta distribution, define t and F distribution, use moment generating function technic, and apply central limit theorem.

2. Specific:

After finish this meeting, the students hoped can able to difference beta, t and F distributions, look for mean and S distributions, and use central limit theorem.

B. Subjects:

- Beta, t, and F Distributions
- Moment Generating Function Technic
- Central Limit Theorem

C. Sub Subjects:

- Properties of beta, t, and F Distributions
- Application of Moment Generating Functions
- Mean and S Distributions
- Application of Central Limit Theorem
- Problem Solving

D. Teaching-Learning Activities:

Activity Stage	Lecturer Activities	Student Activities	Learning Media
Introduction	1. Give chance to propose about the matter 2. Explain about that matter 3. Analyze student learning development	Watching and writing	1. OHP 2. Transparency 3. White Board 4. Modul
Presentation	4. Say meaning about beta, t, and F distributions 5. Explain moment generating function method 6. Verify mean and S distribution 7. Apply central limit theorem 8. Discus given task 9. Discussion and problem solving 10. Get question to student as feed back	Seeing, asking and discussing	1. OHP 2. Transparency 3. White Board 4. Modul
Closing	11. Conclude the given matter 12. Memotive students in order to good absorbing material 13. Give information about semester final exam	Seeing, writing, and discussion	White Board

E. Evaluation : Discussion, Doing Task and Problem Solving.

F. References :

1. Bain L.J., *Introduction to Probability and Mathematical Statistics*, Second Edition, Duxbury Press, Belmont California, 1991.
2. Hogg, R.V. and Craig, A.T., *Introduction to Mathematical Statistics*, Fifth Edition, Prentice-Hall, Inc., New Jersey, 1995.