

**STUDYING CONTRACT
LEARNING UNIT PROGRAM
LEARNING PROGRAM OUTLINE**

CALCULUS I

COURSE CODE: PAM 100

3 SCU

SEMESTER 1



By:

**Dr. Widowati, M.Si
Robertus Heri, M.Si**

UPII-POSTAK-UNTUP	
No. Daft.	0098/BA/EMIPA/C1
Tgl.	:17-6-'09

**STATISTICS STUDY PROGRAM
MATHEMATICS AND NATURAL SCIENCES FACULTY
DIPONEGORO UNIVERSITY
SEMARANG**

CONTRACT OF LECTURING

Title of Course	: Calculus I
Code of Course	: PAM 100
Lecturer	: Dr. Widowati, M,Si Robertus Heri, M.Si
Semester	: I
Day/Time	: Tuesday, 07.30-09.10 Friday, 07.30-09.10
Place of Lecturing	: Room E 101 & B103

1. Utility of this Course

Matematika as used as [by] elementary science [of] appliance for the resolving of and solution of everyday life problem [is] including in it technology and science. Mathematics have many excellence: language and [his/its] order [of] definition better, systematic and clear its logic, and its structure very strong. With mathematics a[n] problem of reality can be made in a[n] model which [is] its precise and clear structure

Calculus represent a course elementary very require to well posted by each;every science student and technique, so that student have critical erudite patterned thinking,systematic and logical, can design simple mathematics model, skillful and also in is technical [of] standard mathematics pickaback by concept, logic, real correct method and formula.

2. Description of Lecturing

This course represent prerequisite for the course of Calculus of II and calculus of peubah a lot study number system of real, gathering, function, function limit and of kekontinuan, generation and [his/its] applying, integral, integral technique, and integral applying.

for discussion, and 40 minutes give opportunity to student to doing exaercises. Amount students are 60 students.

5. References

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeeneering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

6. Assignment

Assignment to be given to students after lecturing every subject (fundamental discussion)
Assignment is one of assessment component.

7. Criterion of Assessment.

Criterion of Assessment used is :

1. Score A : 91-100
2. Score AB : 81-90
3. Score B : 71-80
4. Score BC : 61-70
5. Score C : 51-60
6. Score CD : 41-50
7. Score D : 31-40
8. Score E : <30

Determination of final assessment is following

1. Assignment/Quis : 20 %
2. Middle exam : 40%
3. Final exam : 40 %

If after accumulation, total of third of component still less, score of student activity can accumulate, so opportunity a student get score less earn minimalize.

8. Schedule of Lecturing

WEEK	MATERIAL OF LECTURING	LECTURER
I	Introduction, Background, Scope, Competence of Calculus I.	Dr. Widowati, M.Si Robertus Heri, M.Si
II	Definition of set, Relation and Operation of set.	Dr. Widowati, M.Si Robertus Heri, M.Si
III-IV	Axiom of Field, Component of real number, axiom of ordered, General Form of inequality, Absolute value, Inequality in absolute value.	Dr. Widowati, M.Si Robertus Heri, M.Si
V-VI	System of Cartesian and Polar Coordinate, Definition of Function, Kind of Functions, operation of function, inverse function..	Dr. Widowati, M.Si Robertus Heri, M.Si
VII-VIII	Concept of limit function, Definition of limit function, limit of trigonometric function, limit of infinity, continuity of function.	Dr. Widowati, M.Si Robertus Heri, M.Si
IX	MID EXAM	Panitia Ujian.
IX	Knowledge Lecturing	Dr. Suryasatriya Trihandaru, M.Sc
X-XI	Problems of derivative, definition of derivative, Properties of derivative, geometryc interpretation of derivative, differential, differentiable, rule of chain, differential of algebra function.	Dr. Widowati, M.Si Robertus Heri, M.Si
XII-XIII	Max/Min value, decreasing/increasing function, concavity of function, depiction graphic of function, rectilinear motion, rate of change problems, Application of extreme value, Application in economics.	Dr. Widowati, M.Si Robertus Heri, M.Si
XIV-XV	Improper integral, formula of improper integral, technique of integration.	Dr. Widowati, M.Si Robertus Heri, M.Si
XVI	Proper integral, Fundamental theorem of Calculus, application of proper integral.	Dr. Widowati, M.Si Robertus Heri, M.Si
XVII	FINAL EXAM.	Exam Comitee

LEARNING PROGRAM OUTLINE (GBPP)

TITLE OF COURSE : CalculusI
 CODE NUMBER/CREDIT : PAM 100/ 3
 SHORT DISCRPTION : This course studying about system of real number, function and kinds of function, concept of limit, property of limit, derivative and its application, integration, technique of integration, and its application.
 GENERAL INSTRUCTIONAL AIM : After study this course (at the end of semester), student will be understand principal topics in Calculus (limit, differential, integration) with its theorems and properties.

No	Specific Instructional Aim	Subject	Sub Subject	Time Estimation	References
1	2	3	4	5	6
1	After studying this course (at the end of first lecturing), student can be explaining definition and operational of set.	Set	<ol style="list-style-type: none"> 1. Definition of Set 2. Relation and operation of set. 	1 weeks (100 minutes)	[1]-[5]
2	After studying this course (at the end of fourth lecturing), student can be explaining system of real number and its axioms, and finishing examples of ordinar and absolute inequality.	System of real number	<ol style="list-style-type: none"> 1. Field axiom. 2. Component of real number 3. Aksioma Urutan. 4. Aksioma Kelengkapan 5. General Form of Inequality. 6. Absolut Value. 7. Inequality in absolute value. 	3 weeks (2 x 100 minutes)	[1]-[5]
3	After studying this course (at the end of seventh lecturing), student can be explaining difference of system of cartesian and polar , and definition and kinds of functions.	System of Coordinate and Function.	<ol style="list-style-type: none"> 1. System of Cartesian Coordinate 2. System of Polar Coordinate 3. Definition of Function 4. Kinds of function 5. Operation of Function 6. Invers Function. 	3 weeks (100 minutes)	[1]-[5]
4	After studying this course (at the end of tenth lecturing), student can be explaining the right concept of limit and continuity, and	Limit and Continuity	<ol style="list-style-type: none"> 1. Concept of limit function 2. Definition of limit function 3. Limit of trigonometric 	32 weeks (2 x 100 minutes)	[1]-[5]

	relation of limit and continuity.		function 4. Limit of infinity. 5. Continuity of Function.		
5	After studying this course (at the end of fourteenth lecturing), student can be explaining congeniality of derivative as limit of function, relation of derivative and continuity, derivative of function.	Differential	1. Explaining of differential problems. 2. Definition of Differentiable 3. Properties of derivative 4. Differentiable 5. Law of Chain. 6. Derivative of functions	4 weeks (4 x 100 minutes)	[1]-[5]
6	After studying this course (at the end of seventeenth lecturing), student can be explaining using of derivative to obtaine max/min value, convex function, Rolle theorem, curving graphic, and rate of change problems.	Application of Differential	1. Max/Min Value. 2. Increasing/decreasing function. 3. Function of convex. 4. Curving of graphics functions 5. Rectilinear movement 6. Rate of Change problems. 7. L'Hospital Law 8. Application of extreem problems. 9. Application in economic	3 weeks (100 minutes)	[1]-[5]
7	After studying this course (at the end of 21 th lecturing) , student can be understanding of indefenit integral as a anti derivative, and solving test of functions.	Indefiite Integral and Technique of Itegration.	1. Indefinite Integration. 2. Indefinite Integration Formulas. 3. Integration of Partial. 4. Integration of trigonometric function 5. Integration of trigonometric substation. 6. Integration of rational function 7. Rationalitation of substitution.	4 weeks (3 x 100 minutes)	[1]-[5]
8	After studying this course (at the end of 25 th lecturing) , student can be explaining of	Definite Integral and its Application.	1. Definte Integral. 2. Theorem of Fundamental	4 weeks (2 x 100 minutes)	[1]-[5]

	<p>understanding of definite integral and its relation with indefinite integral, and theorem of fundamental Calculus, calculating area of region, volume of rotating region, length of arc, area of rotating region.</p>		<p>Calculus</p> <ol style="list-style-type: none"> 3. Application definit integral to calculating area of region. 4. Application definit integral to calculating rotating of area. 5. Application definit integral to calculating length of arc. 6. Application definit integral to calculating volume of rotating of region. 		
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References:

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 1
 Time of Lecturing : 100 minutes

A. Instructional Aim

1. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
2. Specific : After studying this subject (at the end of first lecturing), student will be able to explain definition and operation of sets.

B. Subject : Set.

- C. Sub Subject
1. Definition of set.
 2. Relation and Operation of set.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Explaining instructional aim	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	2. Explaining definition of set. 3. Explaining relation and operation of set.	Reviewing and discuss Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Closing	4. Giving oppurtunity to student for asking. 5. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation : Giving assignment to student as homework

- F. References
1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
 2. Frank Ayres, Calculus, Mac. Graw Hills, 1964

3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 2,3,4
 Time of Lecturing : 3 x 100 minutes

A. Instructional Aim

1. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
2. Specific : After studying this subject (at the end of first lecturing), student will be able to explain system of real number and axioms in it, also solving exercises of usual and absolute value inequations.

B. Subject : System of Real Number.

- C. Sub Subject
1. Axiom of Field.
 2. Component of real number.
 3. Axiom of Ordered.
 4. Axiom of Completely.
 5. General form of inequality.
 6. Absolute value.
 7. Inequality in absolute value.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing assignment of 1 th 2. Giving explanation ababout this subject for next lecturing.	Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	3. Explaining axiom of field. 4. Reviewing definition of multiplication and addition in R. 5. Explaining axioms in adding and multiplication in R.	Reviewing and Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

	6. Explaining component of real number. 7. Explaining axiom of ordered. 8. Explaining axiom of completely 9. Explaining General form of inequality 10. Explaining Absolute value and Inequality in absolute value	Paying attention Paying attention Reviewing and Paying attention Reviewing and replying question.		
Closing	1. Giving opportunity to student for asking. 2. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation : Giving assignment to student as homework

F. References

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeneering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 5, 6, 7
 Time of Lecturing : 3 x 100 minutes

A. Instructional Aim

2. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
3. Specific : After studying this subject (at the end of first lecturing), student will be able to explain difference of Cartesian and polar coordinate, and definition and kinds of function.

B. Subject : Function and System of Coordinate.

- C. Sub Subject
1. System of cartesian coordinate.
 2. System of polar coordinate.
 3. Definition of function
 4. Kind of function.
 5. Operation of function.
 6. Inverse function.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing of assignment previous lecturing.	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	2. Explaining understanding of cartesian and polar coordinate. 3. Explaining definition of function mathematically and graphically. 4. Explaining kind of functions. 5. Explaining composition of function and its properties and condition for inverse function.	Paying attention Paying attention dan doing examples Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

Closing	6. Giving opportunity to student for asking. 7. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
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E. Evaluation : Giving assignment to student as homework

F. References

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 7, 8, 9, 10
 Time of Lecturing : 4 x 100 minute

A. Instructional Aim

7. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
8. Specific : After studying this subject (at the end of first lecturing), student will be able to explain the right concept of limit and continuity, and relation between limit and continuity.

B. Subject : Limit and continuity of function.

- C. Sub Subject
1. Concept of limit function
 2. Definition of limit function.
 3. Limit of trigonometric function.
 4. Infinity Limit .
 5. Continuity of function.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing assignment 6 th	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	2. Explaining definition of limit. 3. Explaining the left and right limit 4. Explaining properties of limit 5. Explaining limit of trigonometric function. 6. Explaining forms limit. 7. Explaining definition of continuity function. 8. Explaining definition continuity of function on interval.	Paying attention Paying attention Paying attention dan doing Paying attention Paying attention Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

Closing	<ol style="list-style-type: none"> 1. Giving opportunity to student for asking. 2. Giving general description for next lecturing. 	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
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E. Evaluation : Giving assignment to student as homework

- F. References
1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
 2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
 3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
 4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
 5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM (SAP)

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 11, 12, 13, 14
 Time of Lecturing : 4 x 100 minutes

A. Instructional Aim

1. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
2. Specific : After studying this subject (at the end of first lecturing), student will be able to explain congeniality of derivative as a limit of function, relation between derivative and continuity, and derivative of functions.

B. Subject : Derivative

- C. Sub Subject
1. Explaining of rate of change problems..
 2. Definition of Derivative.
 3. Properties of Derivative
 4. Geometry Interpretation of Derivative
 5. Diferential
 6. Diferentiable
 7. Rule of chain
 8. Derivative of functions.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing assignment	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	1. Explaining that derivative is rate of change	Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

	2. Explaining congeniality of implicit function and derivative of implicit function. 3. Explaining derivative of transcendent function, cyclometry function, hyperbolic function.	Paying attention Paying attention dan doing		
Closing	1. Giving opportunity to student for asking. 2. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation : Giving assignment to student as homework

F. References

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 15, 16, 17
 Time of Lecturing : 3 x 100 minute

A. Instructional Aim

1. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
2. Specific : After studying this subject (at the end of first lecturing), student will be able to explain application of derivative for dterring max/min value, concavity function, Rolle theorem, depicting a curve, indefinite limit, rate of change problems.

B. Subject : Applicaion of derivative

- C. Sub Subject
1. Max/min value
 2. Decreasing/ increasing function.
 3. Concavity function.
 4. Depicting graphic of function
 5. Rectilinear motion.
 6. Interconnected rate of change.
 7. Indefinite limit and rule of L'Hospital
 8. Applicatin to extreme problems
 9. Applicatin to economic.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing assignment 13 th , 14 th	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	2. Explaining application of derivative to find max/min value and its examples in reality living.	Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

	3. Explaining rate of change with applying of derivative. 4. Explaining application of derivative to calculating limit. 5. Explaining applicaion of derivative to solvig real problems in daily problem and in economic.	Paying attention dan doing Paying attention dan doing Paying attention dan doing		
Closing	1. Giving oppurtunity to student for asking. 2. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation

F. References

: Giving assignment to student as homework

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 18, 19, 20, 21
 Time of Lecturing : 4 x 100 minute

A. Instructional Aim

1. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.

2. Specific : After studying this subject (at the end of first lecturing), student will be able to explain understanding indefinite integral as a anti derivative, solving exercices of integration of algebra function, trigonometric function, exponential function, logarithm function with technique of partial integration, substitution intrgration, rasional function integration, also understand technique of integration.

B. Subject : Indefinite Integral and technique integration.

- C. Sub Subject
1. Indefinite integral
 2. Indefinite integral formulas.
 3. Partial Integral
 4. Integral of trigonometric function
 5. Integral of trigonometric substitution
 6. Integral of rational function
 7. Substitution rationalizing.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing assignment 15 th , 16 th	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	1. Explaining definition of indefinite integral. 2. Explaining definition of definite integral 3. Explaining technique of partial integration. 4. Reviewing trigonometric function and then	Paying attention Paying attention dan doing Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

	give examples about it, and discussin. 5. Explaining technique of substitute integration 6. Explaining technique of rational function integration. 7. Giving difference examples and solving.	Paying attention Paying attention Paying attention dan doing		
Closing	1. Giving oppurtunity to student for asking. 2. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation : Giving assignment to student as homework

F. References

1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999

LEARNING UNIT PROGRAM

Title of Course : Calculus I
 Code of Title of Course : PAM 100
 Credit : 3 SKS
 Lecturing : 22, 23, 24, 25
 Time of Lecturing : 4 x 100 minutes

A. Instructional Aim

6. General : After studying this course, student will have conceptual understanding about principal calculus topics with its theorems and properties.
7. Specific : After studying this subject (at the end of first lecturing), student will be able to explain congeniality of definit integral and its relation with indefinite integral, solving examples of definite integral. Also application of efinite integral.

B. Subject : Application Integral

- C. Sub Subject
1. Definite Integral
 2. Fundamental theorem of Calculus.
 3. Application of integral to determining area of region.
 4. Application of integral to determining volume of region
 5. Application of integral to determining length of arc
 6. Application of integral to determining area of volume of rotation region.

D. Lecturing Activity

STEP	LECTURER ACTIVITY	STUDENT ACTIVITY	MEDIA/EQUIPMENT	METHOD
Introduction	1. Discussing 20 th 21 th assignment	Paying attention and discuss	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah
Presentation	2. Determining area of region under curve of function. 3. Determining volume of rotate region. 4. Determining area of rotate region surface. 5. Determining of length of arc	Paying attention Paying attention Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

	a. Determining application of definite integral to solve others science prolems.	Paying attention dan doing		
Closing	Giving oppurtunity to student for asking. Giving general description for next lecturing.	Asking Paying attention	OHP, Transparant, Blackboard, Chalk, and boardmaker	Ceramah

E. Evaluation : Giving assignment to student as homework

- F. References
1. Edwin J Purcell, Dale Varberg, Calculus With Analitic Geometry, Prentice-Hall. Inc, New York, 1987
 2. Frank Ayres, Calculus, Mac. Graw Hills, 1964
 3. Louis Leithold, Calculus With Analytic Geometri, Harper and Row Publisher, New York
 4. K.A. Stroud, Engeenering Mathematics, MacMillan Press Ltd, 1987.
 5. James Stewart, Calculus, Fourth Edition, Brooks/Cole Publishing Company, 1999