YOGYAKARTA STATE UNIVERSITY

FACULTY OF MATHEMATICS AND NATURAL SCIENCES

SYLLABI

Faculty : Mathematics and Natural Science

Study Program : Mathematics Education

Course / Code : Differential Calculus / MAA304

Credits : Theory: 2 SKS   Practice: 1 SKS

Semester : 1st

Prerequisite/Code : -

Professor : Wahyu Setyaningrum, M.Ed.

I. Course Description   :

Differential calculus covers the topics of real number, plane coordinate, inequalities, absolute value, functions, limit, continuity, derivative functions, chain rules, maxima-minima, high order derivatives, implicit differentiation, concavity, and optimization problems.

II. Standard Competence:

Students are expected to be able to: (1) explain the real number system and plane coordinate, (2) determine the solution of inequalities and absolute value, (3) determine the functions, limit, and continuity of functions, (4) determine the derivative of functions, (5) apply the chain rules, (6) determine the maxima and minima of the functions, (7) determine high order derivatives and implicit differentiation, (8) solve problems related to the derivative.

III. Activity:

Meeting	Basic Competence	Essentials Concept	Learning Strategy	References	Character
1	Explaining real number system and plane coordinate	Real number system and coordinate plane	Group discussion and presentation.	[A]: 4– 6 [B]: 4– 6	5 & 6
2	Determining the solution of inequalities	Inequalities	Group discussion and presentation.	[A]: 3 – 4 [B]: 6– 10	5, 6 & 18
3 – 4	Determining the	Absolute value	Group	[A]: 3 – 4	5, 6 & 18

	solution of the absolute value		discussion and presentation.	[B]: 11– 16	
5	Determining the functions	Functions	Group discussion and presentation.	[A]: 22– 45 [B]: 49– 76	5, 6 & 18
6-7	Determining the domain of the functions	Functions and its domain	Group discussion and presentation.	[A]: 22– 45 [B]: 49– 76	5, 6 & 18
8	Graphing/sketching rational functions	Graph of rational functions	Group discussion, investigation and presentation.	[A]: 30– 33	4, 5, 6 & 18
9-10	Determining exponential and logarithm functions	Exponential and logarithm functions	Group discussion and presentation.	[C]:378– 416	4, 5, 6 & 18
11	Solving arithmetic operations of function and determining its domain	Arithmetic operations of function and its domain	Group discussion, investigation and presentation.	[C]:93 – 94	4, 5, 6 & 18
12	Solving arithmetic operations of function and determining its domain	Composite functions and their domains	Group discussion, investigation and presentation.	[C]:94 -96 [D]:24 – 27	4, 5, 6 & 18
13-14	Determining the limit of functions	Limits	Group discussion, investigation and presentation.	[A]: 68– 74 [B]:86– 157 [D]: 27 - 29	4, 5, 6 & 18
15-16	Determining continuity of functions	Continuity	Group discussion, investigation and presentation.	[A]: 74– 81 [D]: 29 - 32	4, 5, 6 & 18
17	**Exam 1**				5, 6, 13, 14
18	Determining the derivative of functions using the concept of limit	Limit and derivatives	Group discussion, and presentation.	[A]: 58– 62 [A]: 83–87 [B]:176– 224 [D]: 32– 34	4, 5, 6 & 18
19	Determining the derivative of functions using product rule and quotient rule	The derivatives	Group discussion, investigation and presentation.	[A]: 88– 92 [D]: 34 - 37	4, 5, 6 & 18
20	Determining the derivative of	The chain rule	Group discussion,	[A]: 92– 97 [B]:254–	4, 5, 6 & 18

				240 [D]: 37–39	
21-23	Solving problems related to the derivative of exponential, logarithmic, and trigonometric functions.	Derivatives of exponential, logarithmic, and trigonometric functions	Group discussion, investigation and presentation.	[C]:389–416 [D]: 39–44	4, 5, 6 & 18
24-25	Determining implicit differentiation	Implicit differentiation	Group discussion and presentation.	[A]:102–107 [B]:241-253	4, 5, 6 & 18
26	Determining high order derivatives	High order derivatives	Group discussion and presentation.	[A]:107–114 [B]:254-260	4, 5, 6 & 18
27	Determining the maxima and minima of the functions using its derivatives.	Maxima-Minima	Group discussion, investigation and presentation.	[A]:115–117 [B]:278-288	4, 5, 6 & 18
28	Determining the increasing/decreasing of the functions using its derivatives.	Increasing and decreasing and the derivative test	Group discussion, investigation and presentation.	[A]:117–119 [B]:302–334	4, 5, 6 & 18
29	Determining the concavity of the functions using its second derivatives.	Concavity and the second derivative test	Group discussion, investigation and presentation.	[A]:120–123	4, 5, 6 & 18
30-31	Determining the solution of problems related to optimization of functions	Optimization problems	Group discussion, investigation and presentation.	[A]:123–136	4, 5, 6 & 18
32	**Exam 2**				5, 6, 13, 14

IV. References:

[A] Simmons, GF. (1996). *Calculus with Analytic Geometry*. USA: McGraw-Hill Co.

[B] Leithold, L. (1986). *The Calculus with Analytic Geometry*. Harper & Row Publisher.

[C] Larson & Hostetler. (1987). *Brief Calculus with Applications.* USA: DC Heath & Co.

[D] Setyaningrum, W. (2010). *Handout: Differential Calculus.*

V. Evaluation :

No	Componen	Worth
1	Participation	15 %
2	Assignment	30 %
3	Exam 1 & 2	25%
4	Final Exam	30%
Total		100%

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