UNIVERSITAS BAKRIE

LECTURER GUIDANCE and DETAIL DESCRIPTION

Subject : **CALCULUS 2**
Code Number : **TIF104**
Program : **S-1 Teknik Informatika**
Credit Semester : **2 (Two)**

Studying and Learning Process
a. The lecturers : Explain, give examples, discuss, give assignments / homework

b. The students : Listen, study, active in discussion and do the assignments / homework, presentation

Learning and Teaching Guidance for General Objective
1 Pre-Test
2 Brainstorming
3 Evaluation

Types of delivery the Specific Objectives
1 Introduction
2 Concept
3 Discussion
4 Conclusion
5 Role Play

Media :
a. LCD Projector
b. White Board
c. Text Book
d. Handout
e. Note book

Evaluation :
a. Mid Term Test (UTS) = 30%
b. Final Test (UAS) = 40%
c. Class Discussion / Participation, Assignments/Quiz/ Pretest = 30%

Main Reference : A. George B. Thomas, Maurice D. Weir, Joel R. Hass; Thomas' Calculus 12th Ed.; Pearson Education, Inc.; 2010.

Additional :

Session	General Objective (GO)	No	Specific Objective (SO)	Directions: Focus of delivery	Exercise: Section	Exercise: No.	Level of Difficulty	Lecturer's Remarks
CALCULUS 2								
I	Understanding the concept of sequences of numbers, the conditions under which they converge by using various tests	1	Understanding sequence, its representation, convergence, divergence, and calculating limits of sequences	Concept & Discussion	Ch. 10	2	Easy	Exercise Type: Problem
		2	Using Integral test to determine the convergence of sequence	Concept & Discussion	Ch. 10	4	Easy	
		3	Using Comparison tests to determine the convergence of sequence	Concept & Discussion	Ch. 10	6	Easy	
		4	Using Ratio and root tests to determine the convergence of sequence	Concept & Discussion	Ch. 10	8	Easy	
					Ch. 10	10	Medium	
					Ch. 10	12	Medium	
					Ch. 10	14	Hard	
					Ch. 10	16	Hard	
II	Understanding the meaning of infinite sum and series and the methods to calculate it	1	Understanding the concept of Infinite series	Concept & Discussion	Ch. 10	19	Easy	Exercise Type: Problem
		2	Identifying alternating series and its convergence	Concept & Discussion	Ch. 10	31	Easy	
		3	Applying the tests for Absolute and Conditional Convergence	Concept & Discussion	Ch. 10	44	Easy	
		4	Understanding power series and its convergence, radius of convergence, and operations on the power series	Concept & Discussion	Ch. 10	53	Easy	
		5	Understanding how functions that are infinitely differentiable generate power series called Taylor and Maclaurin series and studying its properties	Concept & Discussion	Ch. 10	55	Easy	
		6	Introducing the binomial series for estimating powers and roots of binomial expressions	Concept & Discussion	Ch. 10	66	Easy	
					Ch. 10	71	Medium	
					Ch. 10	74	Hard	
III	Introducing general differential equations involving first derivatives and methods for solving the equations by obtaining explicit formula for the solution		Understanding first-order linear equations and its solutions	Concept & Discussion	Ch. 9	1	Easy	Exercise Type: Problem
			Understanding the concept of Slope fields as a gemetric picture of the solutions to differential equations	Concept & Discussion	Ch. 9	8	Easy	
			Understanding Euler's method as a numerical methods for solving the differential equations	Concept & Discussion	Ch. 9	13	Easy	
					Ch. 9	19	Easy	
					Ch. 9	23	Medium	
					Ch. 9	27	Medium	
					Ch. 9	30	Easy	
					Ch. 9	31	Medium	
IV	Applying first-order differential equations and its solutions for various problems	1	Applications of first-order differential equations	Concept & Discussion	Ch. 9.4	9	Easy	Exercise Type: Problem
		2	Using multiple first-order differential equations in systems of equations	Concept & Discussion	Ch. 9.4	12	Easy	
		3	Introducing phase planes to understand systems througha graphical procedure	Concept & Discussion	Ch. 9.4	19	Medium	
					Ch. 9.5	5	Easy	
					Ch. 9.5	7	Medium	
					Ch. 9	35	Medium	
					Ch. 9	36	Hard	
V	Introducing second-order differential equations and methods for solving the equations	1	Understanding second-order linear equations in general and methods for solving them	Concept & Discussion	Ch. 17. 1	4	Easy	Exercise Type: Problem
		2	Solving nonhomogeneous linear equations	Concept & Discussion	Ch. 17. 1	16	Easy	
					Ch. 17. 1	36	Easy	
					Ch. 17. 1	42	Easy	
					Ch. 17. 1	56	Medium	
					Ch. 17.2	6	Easy	
					Ch. 17.2	16	Medium	
					Ch. 17.2	22	Easy	
					Ch. 17.2	34	Medium	
					Ch. 17.2	52	Medium	
VI	Applying second-order differential equations and its solutions for various problems	1	Applications of second-order differential equations	Concept & Discussion	Ch. 17.3	4	Easy	Exercise Type: Problem
		2	Using Euler equations as a general solution to second-order differential equations	Concept & Discussion	Ch. 17.3	16	Easy	
		3	Using power-series method for solving a second-order homogeneous differential equation	Concept & Discussion	Ch. 17.3	22	Medium	
					Ch. 17.4	6	Easy	
					Ch. 17.4	18	Medium	
					Ch. 17.4	20	Easy	
					Ch. 17.5	2	Easy	
					Ch. 17.6	6	Easy	
					Ch. 17.7	14	Medium	
VII	Review to go over materials before mid exam			Concept, discussion				
	MID SEMESTER TEST							
VIII	Introducing three-dimensional coordinate systems, vectors, and vector-valued functions, and apply/use vector valued integral for various calculations	1	Reviewing Vectors in a three-dimensional space	Concept & Discussion	Ch. 12	7	Easy	Exercise Type: Problem
		2	Calculating dot product and cross product	Concept & Discussion	Ch. 12	18	Easy	
		3	Understanding curves in space and tangents	Concept & Discussion	Ch. 12	30	Easy	
		4	Calculating integrals of vector functions	Concept & Discussion	Ch. 12	56	Medium	
					Ch. 13	4	Easy	
					Ch. 13	12	Medium	
					Ch. 13	22	Easy	
		5	Arc length in space	Concept & Discussion	Ch. 13	6	Easy	
		6	Curvature and normal vectors of a curve	Concept & Discussion	Ch. 13	10	Medium	
		7	Tangential and normal components of acceleration	Concept & Discussion	Ch. 13	16	Easy	
					Ch. 13	26	Easy	
					Ch. 13	30	Medium	
					Ch. 13	32	Medium	
IX	Understanding the concept of calculus of multi variables and their partial derivatives	1	Functions of several variables	Concept & Discussion	Ch. 14	1	Easy	Exercise Type: Problem
		2	Limits and continuity in higher dimensions	Concept & Discussion	Ch. 14	8	Easy	
		3	Partial derivatives	Concept & Discussion	Ch. 14	17	Easy	
		4	Chain rules	Concept & Discussion	Ch. 14	21	Easy	
		5	Directional derivatives and gradient vectors	Concept & Discussion	Ch. 14	24	Easy	
					Ch. 14	31	Medium	
					Ch. 14	35	Medium	
					Ch. 14	39	Medium	
					Ch. 14	42	Medium	
X	Using partial derivatives for various problems	1	Tangent planes and differentials	Concept & Discussion	Ch. 14	45	Easy	Exercise Type: Problem
		2	Extreme values and saddle points	Concept & Discussion	Ch. 14	48	Easy	
		3	Lagrange multipliers	Concept & Discussion	Ch. 14	61	Medium	
					Ch. 14	65	Easy	
					Ch. 14	72	Medium	
					Ch. 14	81	Medium	
					Ch. 14	90	Medium	
					Ch. 14	92	Easy	
					Ch. 14	96	Medium	
XI	Understanding multiple (double and triple) integrals and its calculations	1	Double integral over rectangles	Concept & Discussion	Ch. 15	2	Easy	Exercise Type: Problem
		2	Double integral over general regions	Concept & Discussion	Ch. 15	6	Easy	
		3	Area by double integration	Concept & Discussion	Ch. 15	12	Easy	
					Ch. 15	14		
					Ch. 15	18		
		4	Triple integrals in rectangular coordinates	Concept & Discussion	Ch. 15	24	Easy	
		5	Moments and center of mass	Concept & Discussion	Ch. 15	26	Easy	
		6	Substitutions in multiple integrals	Concept & Discussion	Ch. 15	28	Easy	
					Ch. 15	30	Medium	
					Ch. 15	32	Medium	
					Ch. 15	35	Medium	
XII	Introducing line integrals, its calculations, and its applications	1	Line integrals and vector fields	Concept & Discussion	Ch. 16	2	Easy	Exercise Type: Problem
		2	Path independence	Concept & Discussion	Ch. 16	4	Easy	
		3	Conservative fields	Concept & Discussion	Ch. 16	7	Easy	
		4	Potential functions	Concept & Discussion	Ch. 16	9	Medium	
		5	Green's Theorem	Concept & Discussion	Ch. 16	10	Medium	
XIII	Introducing surface integrals, its calculations, and its applications	1	Surfaces and area	Concept & Discussion	Ch. 16	13	Easy	Exercise Type: Problem
		2	Surface integrals	Concept & Discussion	Ch. 16	14	Easy	
		3	Stokes' Theorem	Concept & Discussion	Ch. 16	18	Medium	
		4	Divergence Theorem	Concept & Discussion	Ch. 16	21	Easy	
					Ch. 16	26	Medium	
XIV	Review to go over materials before final exam			Concept, discussion				
	FINAL SEMESTER TEST							

Jakarta, 1 April 2016

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