



**OUTLINE OF LEARNING PROGRAM
LEARNING PLAN UNIT
COURSE CONTACT**

**NUMERIC METHOD
(PAC 103)**

**COMPUTER SCIENCE STUDY PROGRAMS
MATHEMATICS DEPARTMENT
MATHEMATICS AND NATURAL SCIENCE FACULTY
DIPONEGORO UNIVERSITY**

LEARNING PLAN UNIT

Course Subject : Numeric Method
 Course Id : PAC 103
 Credits : 3
 Time Schedule : 14 x 100 minute

UPT-PUSTAK-KALIA
 No. Daft: 014/20/PM/MS/01
 Tgl. : 16-7-2009

Description: Defines approach solving of problem by using graphic and also applies approach of method numeric, and defines mistake numeric.

Week	Topics	Sub-Topics	Method	Media	Duty	Reference
1	1. Introduction Numeric Method	1.1. Understanding of Numerics Method -. Student recognizes modeling of mathematics from the problem and solution. -. Student comprehends motivation to apply of method to numeric in solving of a problem. -. Student recognizes approach solving of problem by using graph and also applies method to numeric 1.2. Approach and Error -. Student comprehends what is the meaning with approach -. Student comprehends that solving of problem with method numerics containing mistake. -. Student comprehends that mistake in calculation is important something to be paid attention. -. Student recognizes main type of mistake numerics : kesalahan rounding and cutting mistake. -. Student recognizes understanding of number, relative mistake, absolute mistake	Discourse Discussion	Whiteboard & OHP		Ref. 1, 2.

		- Student can calculate mistake from a solving of problem that is simple.				
2	<p>2. Solution of Non-Linear Function</p> <p>Purpose : Student can look for solution from equation of non-linear by using method akolade.</p>	<p>2.1. Non-Linear Equation</p> <ul style="list-style-type: none"> - Student recollects equation of non-linear rank 2 and its (the solution method). - Student comprehends what is the meaning with solution from an equation non-linear. <p>2.2. Bisection method</p> <ul style="list-style-type: none"> - Student recognizes method biseksi and can apply it to look for solution an equation non-linear. - Student comprehends clauses which must be fulfilled to be able to apply method biseksi. - Student comprehends conditions in method biseksi. - Student comprehends termination criterion in method biseksi. - Student can appraise mistake generated in calculation using method biseksi. - Student recognizes excess and insufficiency from method biseksi. <p>2.3. Regula Falsi Method</p> <ul style="list-style-type: none"> - Student recognizes method regula falsi and can apply it to look for solution an equation non-linear. - Student comprehends clauses which must be fulfilled to be able to apply method regula falsi. - Student comprehends difference and equation between methods biseksi and method regula falsi - Student comprehends termination criterion in method regula falsi. - Student can appraise mistake generated in calculation using method regula falsi. - Student recognizes excess and insufficiency from method regula falsi. Discourse. 	Discourse, Discussion,	Whiteboard & OHP	Practice of Problem Ref.1 Hal 66 Ref.2- Hal.160-163	Ref.1, 2.
3	2. Solution of Equation Non-	2.4. Methode of Newton-Raphson	Discourse,	Whiteboard & OHP	Practice of	Ref.1, 2.

	<p>linier</p> <p>TIU :</p> <p>Student can look for solution from equation of non-linier by using open method.</p>	<ul style="list-style-type: none"> - Student recognizes Newton-Raphson method and can apply it to look for solution an equation non-linier. - Student comprehends clauses which must be fulfilled to be able to apply Newton-Raphson method. - Student comprehends termination criterion in Newton-Raphson method. - Student can appraise mistake generated in calculation using Newton-Raphson method. - Student recognizes excess and insufficiency from Newton-Raphson method. <p>2.5 Secant Method</p> <ul style="list-style-type: none"> - Student recognizes secant method and can apply it to look for solution an equation non-linier. - Student comprehends clauses which must be fulfilled to be able to apply secant method. - Student comprehends object between secant methods with method regula falsi. - Student comprehends termination criterion in secant method - Student can appraise mistake generated in calculation using secant method. - Student recognizes excess and insufficiency from secant method. <p>Discourse.</p>	Discussion,		<p>Problem</p> <p>Ref.1</p> <p>Hal 68-88</p> <p>Ref. 2.</p> <p>Hal.190-193</p>	
4	<p>2. Solution of Equation Non-linier</p> <p>TIU :</p> <p>Student can look for solution from equation of non-linier by using</p>	<p>2.6. Fixed point Iteration Method</p> <ul style="list-style-type: none"> - Student recognizes fixed-point iteration and can apply it to look for solution an equation non-linier. - Student comprehends clauses which must be fulfilled to be able to apply fixed point iteration method. - Student comprehends termination criterion in fixed point iteration method - Student can appraise mistake generated in calculation using fixed 	Discourse, diakusi	Whiteboard & OHP		Ref. 3.

	open method.	point iteration method. - Student recognizes excess and insufficiency from fixed point iteration method.				
5 dan 6	3. Solution of Equation of Linear Simultan TIU: Student can look for solution from an linear equation systems by using elimination method of line shape Gaussian	3.1. Linear Equation Systems - Student comprehends what is the meaning with equation systems of linear. - Student can present an linear equation systems in the form of matrix. - Student can finalize equation systems of simple linear by using graph. 3.2. Elimination Method of Line shape Gaussian. - Student comprehends background to apply of elimination method of line shape Gaussian. - Student can finalize linear equation systems by using elimination method of line shape Gaussian. - Solvent student of determinant by using elimination method of line shape Gaussian. - Student comprehends elimination method snares of line shape Gaussian, like : division by zero, rounding mistake, lame condition system, and effect by it. - Student knows pivoting at elimination of line shape Gaussian. - Student recognizes and can apply some techniques to improve;repair mistake.	Discourse, discussion,	Whiteboard & OHP	Practice of Problem: Ref.1 Hal 200-251 Ref.2. Hal. 286-289.	Ref .1,2.
7	3 Solution of Equation of Linear Simultan TIU: Student can look for solution from an linear equation systems applies	3.3. Gauss-Jordan Method. - Student comprehends equation and difference between elimination methods of line shape Gaussian with method Gauss-Jordan. - Student can finalize linear equation systems by using Gauss-Jordan elimination method. - Solvent student of mengkitung inverse matrix by using Gauss-Jordan elimination method. 3.4. Gauss-Seidel Iteration.	Discourse, discussion,	Whiteboard & OHP	Practice of Problem Ref.2. Hal.310-312.	Ref.2.

	method Gauss-Jordan and Iterasi Gauss-Seidel	<ul style="list-style-type: none"> - Student can finalize linear equation systems by using Iterasi Gauss-Seidel. - Student comprehends convergence criterion for line shape Gaussian method Seidel. 				
8	Mid Semester Test					
9 dan 10	4. Interpolation TIU: Student can do interpolation	<p>4.1. Presentation of Function</p> <ul style="list-style-type: none"> - Student recognizes some function presentations. - Student understands to what is the meaning with approach of a function. <p>4.2. Polynomial Interpolation</p> <ul style="list-style-type: none"> - Student comprehends meaning of interpolation. - Student comprehends difference between interpolations and extrapolation. - Student understands to what is the meaning with polynomial interpolation. - Student knows usefulness of polynomial interpolation. <p>5.3. Interpolation of Newton Divided Difference.</p> <ul style="list-style-type: none"> - Student recognizes linear interpolation and can do it. - Student recognizes kwadratic interpolation and can do it. - Student recognizes form of interpolation polynomial public Newton. - Student comprehends to what is the meaning with difference divided is finite degree of nitrogen (divided diffrence) and its(the menggunakann can to determine coefficients in polynomial of Newton. <ul style="list-style-type: none"> - Student can form tables and applies tables to look for difference divided finite of degree n. - Student comprehends valuation of mistake of interpolation polynomial Newton 	Discourse, discussion,	Whiteboard & OHP	Practice of Problem : Ref.2. Hal 432-433.	Ref.2.
11	5. Interpolation	4.3. Interpolation Lagrange	Discourse,	Whiteboard	-- sda --	-- sda --

	TIU: Student can do interpolation	<ul style="list-style-type: none"> - Student recognizes form of Lagrange polynomial public - Solvent student of interpolation a function is using Lagrange polynomial. - Student comprehends valuation of mistake of interpolation polynomial. 	discussion,	d & OHP		
12	5. Integration Numerics TIU : Student can calculate integration a function by using method numerics	<p>5.1. Integration</p> <ul style="list-style-type: none"> - Student recollects meaning of integration a function. - Student can do approach to appraise quickly result of integration a function. - Student comprehends motivation to apply of method to numeric to calculate integration a function. <p>5.2. Rectangle Method.</p> <ul style="list-style-type: none"> - Student can apply rectangle method to appraise result of integration a function. - Student comprehends weakness of rectangle method. <p>5.3. Trapezium Method</p> <ul style="list-style-type: none"> - Student can apply trapezium method to appraise result of integration a function . - Student comprehends difference between rectangle methods and trapezium method. - Student comprehends mistake arising with usage of trapezium method. 	Discourse, discussion,	Whiteboard & OHP	Practice of Problem Ref.2. Hal.516-519	Ref. 2.
13	5. Integration Numerics TIU : Student can calculate integration a function by using method numerics	<p>5.4. Simpson Method</p> <ul style="list-style-type: none"> - Student recognizes order Simpson to appraise is integral a function. - Student can apply method Simpson to calculate integration a function. - Student knows valuation of mistake generated in usage of method Simpson. 	Discourse, discussion,	Whiteboard & OHP	Practice of Problem Ref.2. Hal.516-519	Ref. 2.

14	<p>5. Integration Numerics</p> <p>TIU :</p> <p>Student can calculate integration a function by using method numerics</p>	<p>5.5. Kwadratur Line shape Gaussian Method</p> <ul style="list-style-type: none"> - Student recognizes method kwadratur line shape Gaussian to appraise is integral a function. - Student can apply method kwadratur line shape Gaussian to calculate integration a function. - Student knows difference between methods Simpson and method kwadratur line shape Gaussian. 	Discourse, discussion,	Whiteboard & OHP	Practice of Problem Ref.2. Hal.542-543	Ref. 2.
15	Final Test					

Reference: :

1. Kendal Atkinson, *Elementary Numerical Analysis*, John Wiley & Son, 1976.
2. Steven C. Chapra dan Raymond P. Canale, *Metode Numerik untuk Teknik dengan Penerapan pada Komputer Pribadi*, (Terjemahan), UI-Press, Jakarta, 1991.
3. Suryadi H.S., *Pengantar Metode Numerik*, Seri Diktat Kuliah, Gunadarma, Jakarta, 1990.