


 FPMIPA UPI	<b>SILABUS</b>	No. Dok. : FPMIPA-SE-SL-09
	<b>Mathematics for Science SE 302- 2 credits 2<sup>nd</sup> semester IPSE</b>	Revisi : 00 Tanggal : 19 Januari 2011 Halaman : 1 dari 3
Dibuat Oleh :  (Siti Fatimah, Ph.D)	Diperiksa Oleh :  (Dr. Diana R. )	Disetujui Oleh :  (Dr. phil. Ari Widodo)

### Description

The course is a compulsory on 2<sup>nd</sup> semester IPSE students. It is expected, that students have context knowledge and good understanding on various mathematical techniques on sciences and able using it to solve problems both on mathematics and sciences. The course content consists of Linear Equations, Matrices and Determinants, Differentiation and Integration of Functions, Partial Differentiation, Multiple Integrals, Vectors and Vector Analysis, Infinite Series ; Power Series, Ordinary Differential Equations, and Special Functions. The subject is conducted interactively through speech, discussion, and with mathematics exercise on science application. Personal assignment, chapter paper test are used as instrument evaluation with main references are Boas, M. L. (1983). *Mathematical Methods in The Physical Science*, John Wiley & Sons Inc., Singapore, Wospakrik, H. J. (1993). *Dasar-Dasar Matematika untuk Fisika*, Dirjen Dikti, Depdiknas, Jakarta.

### Syllabus

#### 1. Course identity


- |                   |   |
|-------------------|---|
| a. Course Name    | : Mathematics for Science                               |
| b. Code           | : SE 302  |
| c. Credit (s)     | : 2 credits   |
| d. Grade          | : 2 <sup>nd</sup> of grade, on 3 <sup>rd</sup> semester |
| e. Classification | : Concentration Competencies Course                     |
| f. Program        | : IPSE-FPMIPA/S-1                                       |
| g. Statue         | : compulsory  |
| h. Prerequisite   | : Foundation of Mathematics (SE 201)                    |
| i. Lecturer       | : Siti Fatimah, Ph.D, Dkk.                              |

#### 2. Objectives

The aims of the course is students have context knowledge and good understanding on various mathematical techniques on sciences and able using it to solve problems both on mathematics and relevant sciences

#### 3. Contents

The course content consists of Linear Equations, Matrices and Determinants, Differentiation and Integration of Functions, Partial Differentiation, Multiple Integrals,

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Vectors and Vector Analysis, Infinite Series ; Power Series, Ordinary Differential Equations, and Special Functions

#### 4. Learning Activities

- Approcahe(s) : Ekspositori
- Method(s) : Speech, discussion, exercises
- Tugas : Regular assisgnment
- Media : Powerpoint slides


#### 5. Assessment

Homework , chapter paper test and also based on lecturer's policy.

#### 6. Meeting's Agenda

- 1<sup>st</sup> and 2<sup>nd</sup> Week: Description of course syllabi; rules of course, evaluation and learning materials  
Linear Equations: Matrices and Determinants (Matrices, Set of Linear Equations; row reduction, Determinants; Cramer's rule, Matrix Operations, Special matrices)
- 3<sup>rd</sup> and 4<sup>th</sup> Week: Differentiation and Integration of Functions (Techniques of differentiation of functions, Techniques of integration of functions)
- 5<sup>th</sup> Week : Partial Differentiation (Introduction and Notation, Total Differential, Approximate Calculations Using Differential, Chain rule or Differentiating a Function of a Function, Implicit Differentiation, More Chain rule)
- 6<sup>th</sup> Week : Multiple Integrals (Double and Triple Integrals, Application of Integration ; Single and Multiple Integrals)
- 7<sup>th</sup> , 8<sup>th</sup> and 9<sup>th</sup> Week : Vectors and Vector Analysis (Vectors, Algebra of Vector, Application of Vector Multiplication, Triple Product, Calculus of Vector, Nabla (Del) Operator; Gradient, Divergence, and Curl, Directional Derivative, Some Other Expressions Involving Nabla (Del), Line Integrals, Green's Theorem in The Plane, Divergence Theorem, Stokes Theorem)
- 10<sup>th</sup> and 11<sup>th</sup> Week : Infinite Series ; Power Series (Definitions and Notation, Testing For Series Convergence, Useful Fact about Series Power Series, Expanding Function in Power Series, Techniques for Obtaining Power Series Expansions, Some Uses of Series)
- 12<sup>th</sup>, 13<sup>th</sup> and 14<sup>th</sup> Week : Ordinary Differential Equations (Definitions and Notation, Techniques for Solving First-order Differential Equations, Second-order Linear Equations with Constant Coefficients and Zero Right-hand Side, Second-order Linear Equations with Constant Coefficients and Right-hand Side Not Zero, Some Application in Science, Series Solutions of Differential Equations)



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15<sup>th</sup> and 16<sup>th</sup> Week: Special Functions (The Factorial Functions, Gamma Functions and Its Applications, Beta Functions and It Applications, The Error Functions, Zeta-Riemann's Functions, Stirling's Formula, Elliptic Integrals and Its Applications)

## 7. References

Main Book:

1. Boas, M. L. (1983). *Mathematical Methods in the Physical Science*, John Wiley & Sons Inc., Singapore
2. Wospakrik, H. J. (1993). *Dasar-Dasar Matematika untuk Fisika*, Dirjen Dikti, Depdiknas, Jakarta.

Other (s):

1. Murray R. Spiegel (1985) *Analisis Vektor*, Erlangga, Jakarta.