



YOGYAKARTA STATE UNIVERSITY
 FAKULTY OF MATHEMATICS AND NATURAL SCIENCE

SYLLABI

Faculty : Matematic and Natural Science
 Program : Physics Education
 Course/Code : Electricity and Magnetism/FIC.319
 Credits : Theory = 3 sks, Practice = -
 Smester : 3th (in physics), 4th (physics)-
 Prerequisite/Code :
 Lecturer :

I. Course Description

The subject discusses some electricity and magnetism concepts i.e : Coulomb law, the electric field, Gauss's law, electric potensial, special techniques in electrostatics, multipoles expansion, electrostatic field in matter, magnetostatics, magnetostatics field in matter.

II. Course Standard Competence

Student are able to understand and application the electric and magnetic concepts in daily problems.

III. Activities

Meeting	Basic Compotence	Essential Concept	Learning Strategy	Learning material	Character
1 th	To understand the vector analysis	Vector Algebra, The Vector Differential Operator	Presentation, discussion, exercise	A, C	Responsible, thinking
2 th	To understand the development of electrostatics	Point charge, Coulomb Law, continuous charge system	Presentation, discussion, exercise	A,B, C	Confident, complying, appreciating
3 th	To understand the Electric Field	Electric field of point charge, Electric field of continuous charge	Presentation, discussion, exercise	A, B, C	Responsible, thinking, logically, creatively, inovatively
4 th	To understand the Gauss's Law	Electric flux, Derivation Gauss Law, Application of Gauss's Law	Presentation, discussion, exercise	A, C	Responsible, thinking, logically, creatively, inovatively
5 th , 6 th	To understand the energy and electric	Work done on moving a point	Presentation, discussion,	A, B	Responsible, thinking,

	potential of charge system	charge, Electric Potential energy, Potential of a point charge, Potential of a charge distribution, Energy in Static electric fields, Capacitor, Energy stored in capacitor	exercise		logically, creatively, inovatively, dicipline
7 th	To understand the electric multipoles	The Multipole Expantion of scalar Potential, The Electric Dipole Field	Presentation, discussion, exercise	A, C	Responsible, thinking, logically, creatively, inovatively, dicipline
8 th	To understand the special techniques for calculating potentials	Laplace's Equation in one dimation, Laplace's Equation in two dimation, Boundary conditions and Uniqueness theorems, Separation of Variabel Methode	Presentation, discussion, exercise	A, C	Responsible, thinking, logically, creatively, inovatively, dicipline
9 th	Mid Term				
10 th	To understand the Electric Current	Current and Current densities, Ohm's law, Power and Joule's Law, Dielectric, Conductor, semi conductor, The equation of continuity	Presentation, discussion, exercise	A, B, C	Responsible, thinking, logically, creatively, inovatively, dicipline
11 th	To understand the Electrostatic fields in matter	Polarization, Electric displacement, linear dielectrics	Presentation, discussion, exercise	A, B	Responsible, thinking, logically, creatively, inovatively, dicipline
12 th , 13 th , 14 th	To understand Magnetostatic	Definition of Magnetic induction, Magnetic Force on a moving charge, Motion of a charge in magnetic field, Magnetic force on	Presentation, discussion, exercise	A, B, C	Responsible, thinking, logically, creatively, inovatively, dicipline

		electric current, Magnetic field Produced by closed current, Ampere's law			
15 th	To understand the electromagnetic Induction	Faraday's Law, Mutual Inductance, Self Induction, Energy in magnetic field	Presentation, discussion, exercise	A, B, C	Responsible, thinking, logically, creatively, inovatively, dicipline
16 th	To understand magnetostatic in matter	Magnetization, Field of magnetized object, Field H	Presentation, discussion, exercise	A, C	Responsible, thinking, logically, creatively, inovatively, dicipline

IV. Reference

- A. D.J. Griffith, 1995, *Introduction to Electrodynamics*, Second edition, New Delhi Prentice-Hill of India Private Limited
- B. JR. Reitz & FJ. Milford, 1990 *Foundation of Electromagnetics Theory*, Third edition, California, Addison-Wesley Publishing Company Reading Massachusetts Menlo Park California
- C. Roald K. Wangsness, 1979, *Electromagnetic Fields*, 2nd edition, New York, John Wiley & Sons, Inc

V. Assessment

No	Component	Weight (%)
1.	In-Class Participation	10%
2.	Assignments	40%
3.	Mid-Term Exam	25%
4.	Final Exam	25%
	Total	100%

Yogyakarta, November 30th 2013

Validator

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