

강의 계획서

2012학년도 제1학기

년도/ 학기	2012학년도 1학기
교과목명	전기자기학1
교수명	송봉식
수업유형	강의저장
언어	한국어
강의개요	정전계 및 정자계에 대한 이해를 목표로 한다. 전계의 세기, 전속밀도, 전위 등의 기본 성질을 가우스의 법칙, 발산의 법칙을 통하여 이해한다. 도체 및 절연체의 성질을 이해하고, 유전체, 정전용량을 도입한다. 전계계산을 라플라스 방정식 및 포아송 방정식을 이용하여 해석적으로, 또 수치해석적으로 구해 봄으로써 정전계에 대한 이해를 확실하게 한다. 끝으로, 비오-사바르 법칙을 소개하고 암페어의 법칙 및 스톡크의 법칙을 이용하여 정자계를 구하는 방법을 이해한다.
교재 및 참고도서	동영상 강의자료로 대체

강의 주제 및 내용	
1	Course Description 1- Dimension & Units- Introduction of Electromagnetics- Scalars and Vectors- Vector Algebra
2	Course Description 2 - Dimension & Units- Introduction of Electromagnetics- Scalars and Vectors- Vector Algebra
3	RectangularCoordinateSystem1-VectorComponentsandUnitVectors-VectorField-DotandCrossProduct-CircularCylindricalCoordinatesSystem-TheSphericalCoordinateSystem
4	RectangularCoordinateSystem2-VectorComponentsandUnitVectors-VectorField-DotandCrossProduct-CircularCylindricalCoordinatesSystem-TheSphericalCoordinateSystem
5	Experimental Law of Coulomb 1- Electric Field Intensity- Field Arising from a Continuous Volume Charge Distribution
6	Experimental Law of Coulomb 2- Electric Field Intensity- Field Arising from a Continuous Volume Charge Distribution
7	Electric Field of a Line Charge 1- Electric Field of a Sheet of Charge- Streamlines and Sketches of Electric Fields
8	Electric Field of a Line Charge 2- Electric Field of a Sheet of Charge- Streamlines and Sketches of Electric Fields
9	Electric Flux Density 1- Gauss's Law- Application of Gauss's Law: Some Symmetrical Charge Distributions
10	Electric Flux Density 2- Gauss's Law- Application of Gauss's Law: Some Symmetrical Charge Distributions
11	Application of Gauss's Law: Differential Volume Element 1- Divergence and Maxwell's First Equation- Vector Operator ∇ and the Divergence Theorem
12	Application of Gauss's Law: Differential Volume Element 2- Divergence and Maxwell's First Equation- Vector Operator ∇ and the Divergence Theorem
13	Energy Expended in Moving a Point Charge in an Electric Field- Line Integral- Definition of Potential Difference and Potential- Potential Field of a Point Charge
14	Potential Field of a System of Charges: Conservative Property- Potential Gradient- Electric Dipole- Energy Density in the Electrostatic Field

15	Current and Current Density- Continuity of Current- Metallic Conductors- Conductor Properties and Boundary Conditions
16	Method of Images - Semiconductors- Nature of Dielectric Materials- Boundary Conditions for Perfect Dielectric Materials
17	Capacitance Defined- Parallel-Plate Capacitor- Several Capacitance Examples- Capacitance of a Two-Wire Line
18	Using Field Sketches to Estimate Capacitance in Two-Dimensional Problems- Poisson's and Laplace's Equations- Examples of the Solution of Laplace's Equation- Example of the Solution of Poisson's Equation: the p-n Junction Capacitance
19	Biot-Savart Law 1- Amp`ere's Circuital Law- Curl- Stokes' Theorem
20	Biot-Savart Law 2- Amp`ere's Circuital Law- Curl- Stokes' Theorem
21	Magnetic Flux and Magnetic Flux Density 1- Scalar and Vector Magnetic Potentials- Derivation of the Steady-Magnetic-Field Laws
22	Magnetic Flux and Magnetic Flux Density 2- Scalar and Vector Magnetic Potentials- Derivation of the Steady-Magnetic-Field Laws