Clase a Clase

Electromagnetismo Intermedio

LFIS322

Clase	Fecha	Tema/Lecturas	Detalle
1	24-08	Griffiths: Chapter 1 – skip section 1.1.5 **Tarea 1**	Introduction. Vectors, Index Notation for Scalar and Cross Products. The Symbols δ_{ij} and ε_{ijk}. Differential Vector Calculus. Gradient.
2	25-08	Griffiths: Finish reading Chapter 1	Divergence and Curl. Divergence of Curl, and Curl of Gradient. Gauss and Stokes Theorem. From $\vec{E}$ to Φ. Delta Functions as Singular Distributions of Charge.
3	31-08	**Tarea 2**	Properties of Delta Functions. Delta Function in Spherical Coordinates. The Laplacian of $1/r$. Coulomb's Law and Calculation of the Electric Field.
4	01-09	Griffiths: From p. 58 to 82	Deriving the Electrostatic Equations from Coulomb's Law. Scalar Potential, and E = -δV. Examples of use of Gauss's Law. Boundary Conditions for Electric Field. Conductors.
5	07-09	Griffiths: from p.82 to the end of chap 2. **Tarea 3**	Electrostatic Energy for Discrete and Continuous Charge Distributions. Energy as $f\|E\|^2$. Comments on Self Energy. Force Computed by the Method of Virtual Displacement. Generalized Capacitance, Capacitors.
6	08-09	Partial Material in Griffiths: p. 110-120 (you may consult Jackson sections 1.9 and 1.10, but it should not be really necessary)	Uniqueness of Solutions. Green's Theorem. Green's Functions for the Dirichlet, Neumann and Mixed BV Problems.
7	14-09	**Tarea 4**	Example of Dirichlet Green's Function. Mean Value Theorem. Images and Conducting Spheres. Separation of Variables for Laplace's Equation in Cartesian Coordinates.
8	15-09	Griffiths: p.121-137	Method of images – Separation of variables
	28-09	Primera Prueba	
9	29-09	Griffiths: p. 136 -145 **Tarea 5**	The Case of Axial Symmetry, Finding the Basic Solutions r^l P_l and $r^{-(l+1)}P_l$. Generating Function for Legendre

			Polynomials.
10	05-10	Griffiths: p.146-155 **Tarea 6**	Multipole expansion
11	06-10	Griffiths: p.202-232	Dipoles, Quadrupoles. Azimuthal Symmetry. Magnetostatics, Charge Conservation and Magnetic Force.
12	12-10	**Tarea 7**	Biot-Savart Law. Magnetic Potential for Loops. Deriving the Basic Equations from the "Inverse Square Law". The Vector Potential A and the Coulomb Gauge $\nabla . A = 0$.
13	13-10	Griffiths: p. 285-310	Ampere's Law. Boundary Conditions for Magnetic Fields. Multipole Expansion of the Magnetic Field, Magnetic Dipoles.
14	19-10	Griffiths: p. 310-328	Electromotive Force and Faraday's Law. Inductance, Energy in Magnetic Fields, Maxwell Equations.
15	20-10	J: p. 142-143, and J: p. 168-177	Energy in an External Electric Field. And Basics of Magnetostatics.
16	26-10	J: p.180-183	Magnetic multipoles. Relation between magnetic moment and angular momentum.
	27-10	Segunda Prueba	
17	09-11	J: p. 143-155	Dielectrics. The Polarization Vector *P* and the Effective Charge Density and Surface Charge. The Modified Gauss' Law in Terms of *D* and the Free Charge Density. Slits in Dielectrics. The Field of a Polarized Sphere. Clausius-Mossoti Equation.
18	10-11	Jackson: p. 187-191	Magnetic materials. Qualitative Discussion of Diamagnetism Paramagnetism and Ferro Magnetism. The Magnetization Vector *M* and its Effective Currents. The Magnetic Field Strength *H*.
19	16-11	Jackson: p. 191-197; p. 209-213	Boundary Value Problems in Magnetostatics with and without Magnetic Materials. Magnetic Potential Φ_M. A Uniformly Magnetized Sphere. And Faraday's Law for Fixed Circuits.
20	17-11	Jackson: p. 217-219; p.236-237	Faraday's Law for Moving Circuits. The Electromotive Force or emf. Maxwell's Equations. Energy Conservation, Energy in the Electromagnetic Field and Energy Flow. Poynting's Theorem and the Poynting Vector *S*.

21	23-11	Jackson: p. 238-239 **Tarea 8**	Momentum in the Electromagnetic Field. The Electromagnetic Stress Tensor T_{ij} . Examples: Pressure, Force on a Conductor and Force on a Solenoid. Derivation of the Conservation Law.
22	24-11		Example: Spinning up a Charged Cylinder. Conservation of Angular Momentum and Flux of Angular Momentum.
23	30-11	Jackson: p. 219-226 **Tarea 9**	Solutions of Maxwell Equations in Terms of Potentials. Gauge Transformations. The Lorentz Gauge and the Wave Equations for the Potentials. Green's Functions for the Wave Equation.
24	01-12	**Tarea 10**	Derivation of the Lienard-Wiechert Potentials. The Fields of an Arbitrarily Moving Charge. The Fields of a Charge Moving with Constant Velocity.
	07-12	Tercera Prueba	
25	14-12	Jackson: p. 391-394	Fields of a Charge Moving with a Constant Velocity $v \rightarrow c$. The Radiation Term. Radiation from Oscillatory Charges. The Expansion of the Vector Potential A in Powers of d/λ.
26	15-12	Jackson: p. 394-401	Electric Dipole Radiation. The Radiation Field, the Near Fields. Radiated Power. Example: Charge in Circular Motion.
27	21-12		Finish electric dipole radiation. Qualitative aspects of electric quadrupole and magnetic dipole radiation.
28	22-12	Recuperativa	
29	28-12	Prueba Especial	
30	29-12		