

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**  
**Course Schedule: June - November 2024**

**Department** : Physics  
**Name/s of the Faculty** : Dr. Annie Vinosha. P  
**Course Title** : Electromagnetism  
**Course Code** : 19PH/MC/EM54  
**Shift** : I

| <b>Week &amp; No. of hours</b>             | <b>Units &amp; Topics</b>   | <b>Teaching Methodology</b>            | <b>Text &amp; References</b>  | <b>Method of Evaluation</b>                                  |
|--|---|--|---|--|
| Jun 19 – 26, 2024<br>(Day Order 1 - 6)     | <b>Unit 1</b><br><b>Electrostatics</b><br>1.1. Electrostatic field - Coulomb's Law – divergence and curl of electrostatic field – Gauss's law – application – cylindrical charge distribution<br>1.2. Electric potential - Poisson's equation | Lecture                                | Electricity and Magnetism by Tewari K.K                                       | Questioning on the topic                                     |
| Jun 27 – July 4, 2024<br>(Day Order 1 - 6) | 1.2 Laplace's equation – work done in moving a charge – energy of a point charge distribution- energy of continuous charge distribution – electrostatic boundary conditions.  | Lecture and solving numerical problems | Electricity and Magnetism by Tewari K.K<br>Electricity and magnetism – Sehgal | Quiz   |
| July 5 – 12, 2024<br>(Day Order 1 - 6)     | <b>Unit2 Electrostatic Fields In Matter</b><br>2.1. Polarization - induced dipoles – alignment of polar molecules 2.2. Capacitors - parallel plate capacitors -.  | Lecture                                | Electricity and Magnetism - Sehgal  | Questioning on the topic                                     |
| July 15 – 23, 2024<br>(Day Order 1 - 6)    | 2.2 Field inside a dielectric – Gauss's law in the presence of dielectrics<br><br><b>Unit 3</b><br><b>Magnetostatics</b> 3.1. Biot – Savart law – steady currents   | Lecture                                | Electricity and Magnetism - Sehgal  | Questioning on the topic<br><br>Third Comp T1<br>Theory Test |

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|   | Magnetic fields due to steady currents flowing (i) in a long straight wire at a point near it. (ii) along a circular coil at a point on its axis                                       |         |                                    |                          |
| July 24 – 31, 2024<br>(Day Order 1 - 6) | 3.1 (iii) along a solenoid at a point on its axis-<br>Divergence and curl of <b>B</b> - straight line currents   | Lecture | Electricity and Magnetism - Sehgal | Questioning on the topic |
| Aug 1 – 5, 2024<br>(Day Order 1 - 3)    | 3.2. Ampere's law<br>(i) Magnetic field at a point near a long straight wire carrying steady current. – (ii) magnetic field of a long solenoid (iii) Magnetic field of a toroidal coil | Lecture | Electricity and Magnetism - Sehgal | Questioning on the topic |
| Aug 6 – 10, 2024                        | <b>C.A. Test – I</b>   |         |                                    |                          |

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| Aug 12 – 14, 2024<br>(Day Order 4-6)    | 3.2 comparison of magnetostatics and electrostatics - Magnetic vector potential -  | Lecture                                | Electricity and Magnetism - Tewari K.K   | Questioning on the topic          |
| Aug 16 – 23, 2024<br>(Day Order 1-6)    | 3.2 Ampere's law in terms of vector potential – magnetostatic boundary conditions  | Lecture and solving numerical problems | Electricity and Magnetism,<br>Tewari K.K | Third Comp II                     |
| Aug 27 – Sep 3, 2024<br>(Day Order 1-6) | <b>Unit4 Magnetostatic Fields in Matter</b><br>4.1.Magnetic properties of Materials – Torque and Forces on Magnetic Dipoles- Magnetization | Lecture                                | Electricity and Magnetism<br>Sehgal      | Questioning on the topic          |
| Sep 4 – 11, 2024<br>(Day Order 1-6)     | 4.2 Magnetic field and its equations (i) $B = \mu_o (H+M)$ (ii) $\mu = \mu_o (1+\chi_m)$ (iii) $\mu_x = 1+\chi_m$                          | Lecture and solving numerical problems | Electricity and Magnetism<br>Sehgal      | Quiz                              |
| Sep 12 - 20, 2024<br>(Day Order 1-6)    | <b>Unit 5 Electrodynamics</b><br>5.1. Faraday's Laws – electromagnetic induction   | Lecture and solving numerical problems | Electricity and Magnetism<br>Sehgal      | Third Comp II<br>Quiz and Problem |
| Sep 23 - 26, 2024<br>(Day Order 1-4)    | 5.1 inductance - self inductance - Mutual inductance – energy in magnetic fields   | Lecture and solving numerical problems | Electricity and Magnetism<br>Sehgal      | Model Presentation                |
| Sep 27 – Oct 3, 2024                    | <b>C.A. Test – II</b>  |  |  |                                   |
| Oct 4 – 5, 2024<br>(Day 5 & 6)          | 5.2.Maxwell's equations  | Lecture and solving numerical problems | Electricity and Magnetism<br>Sehgal      | Questioning on the topic          |
| Oct 7 - 15, 2024<br>(Day Order 1 to 6)  | 5.2.Maxwell's equations inside matter - boundary conditions  | Lecture and solving numerical problems | Electricity and Magnetism,<br>Tewari K.K | Questioning on the topic          |

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| Oct 16 - 22, 2024<br>(Day Order 1 to 6) | 5.2.boundary<br>conditions | Lecture and solving<br>numerical problems | Electricity and<br>Magnetism,<br>Tewari K.K | Questioning on the<br>topic |
| Oct 23 - 24, 2024<br>(Day Order 1 to 2) | <b>REVISION</b>            |   |   |                             |