1. **Title:** Electromagnetic theory

2. **Credit Structure (L-T-P-Cr):** 3 1 0 4

3. **Course Code:** SC217

4. **Semester:** III

5. **Category:** Foundation (Core) Course

6. **Prerequisites:** Calculus, Vector Algebra

7. **Foundation for:** Higher level Communication and optics courses.

8. **Abstract Content:**
The primary aim of this course is to introduce students to the basics of electromagnetic theory. The ultimate goal is to arrive at a basic understanding of electromagnetism so that the students are able to attempt dynamical problems which are of paramount interest and importance in communication.

9. **Suggested Text/s:**
1. Introduction to Electrodynamics, 3rd Edition, David. J. Griffiths

10. **Detailed Contents:**

   **I. Vector Calculus**
   
   A. Vector Analysis, Curvilinear Coordinates
   
   B. Div-Grad-Curl etc.

   **II. Electrostatics**
   
   A. Coulomb's Law, Charge Distributions, Fields
   
   B. Gauss’ Law
   
   C. Electrostatic Potential, Work Energy
   
   D. Multipole Expansion
   
   E. Conductors and Capacitance
   
   F. Laplace’s Equation: Boundary Value Problems
   
   G. Electrostatics in Dielectrics

   **III. Magnetostatics**
   
   A. Lorentz Force Law, Motion of charged particles
B. Electric Currents: Continuity Equation
C. Biot-Savart Law
D. Ampère’s Law
E. The Vector Potential, Magnetic multipoles
F. Magnetic fields in matter

IV. Intro. to Electrodynamics
A. Ohm’s Law and Electromotive Force
B. Faraday’s Law, Inductance, and Energy in Magnetic Fields
C. Maxwell's equations, propagation of EM waves

11. Evaluation (tentative): There will be two midterms each of 20% weightage and a final exam worth 40%. The remaining 20% will be divided between quizzes, tutorials and attendance. The quiz will be of pop type and will be conducted either in the tutorials or regular lectures. The responsibility to attend the lectures and tutorials regularly is completely on the student.

12. Exam Policy: There is absolutely NO re-exam policy for the course.

13. Attendance Policy: For students having less than 75% attendance in lectures and/or tutorials grades will be reduced by one.