**Lesson Plan**

**Name of faculty: SHIV KUMAR , AP-ECE**

**Discipline: ECE**

**Semester: 4TH**

**Subject: ELECTROMAGNETIC THEORY**

Lesson Plan Duration: 15 weeks (from January, 2018 to April, 2018)

Work Load(Lecture/Practical) per week (in hours): Lectures: 03 hours, Tutorials:02hours

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| **Week** | **Theory** |
|  | **Lecture day** | **Topic(Including assignment/ test)** |
| 1st |  | **Unit-I: Electric Field and Current:** Introduction to Vectors: Addition, Subtraction, Multiplication &Differentiation.  |
|  | Coordinate Systems: Rectangular, Cylindrical & Spherical |
|  | Coulomb's law. Electric Field Intensity |
| 2nd |  |  Electric Potential, Field of a Line Charge |
|  | Field of a Sheet of Charge, Electric Flux Density |
|  | Electric Dipole, Current Density, Continuity of Current |
| 3rd |  | Gauss's Law and Applications  |
|  | Electric Field Behavior in Dielectrics, Boundary Conditions at Interface between Two Dielectrics  |
|  | Method of Images, Capacitance of Two Wire Line |
| 4th |  | Poisson's and Laplace’s Equations |
|  | Uniqueness Theorem |
|  | **Unit- II: Magnetic Field and Maxwell Equations:** Biot - Savart Law  |
| 5th |  | Ampere's law, Magnetic Vectorpotentials |
|  | Force on a moving charge, Differential Current Element  |
|  | Force and Torque on a Closed Circuit, Magnetic Boundary Conditions  |
| 6th |  | The Magnetic Circuit  |
|  | Faraday's Law |
|  | Maxwell's Equations in Point and Integral form for Free space,  |
| 7th |  | Good Conductors & Lossy Dielectric for Sinusoidal Time Variations& Static Fields  |
|  | ------------------ do---------------- |
|  | Retarded potentials |
| 8th |  | ------------------ do---------------- |
|  | **Unit-III** **The Uniform Plane Wave:** Plane Waves & its Properties |
|  | ------------------ do---------------- |
| 9th |  |  Wave Equation for Free Space andConducting Medium |
|  | ------------------ do---------------- |
|  | Propagation of Plane Waves in Lossy Dielectrics ,Good Dielectrics & Good Conductors  |
| 10th |  | ------------------ do---------------- |
|  | ------------------ do---------------- |
|  | The Poynting Vector and Power considerations, Skin Effect  |
| 11th |  | ------------------ do---------------- |
|  | Reflection of Uniform Plane Waves (Normal & Oblique Incidence) |
|  | ------------------ do---------------- |
| 12th |  | ------------------ do---------------- |
|  | **Unit-IV**: **Transmission Lines and Waveguides:** The Transmission Line Equations  |
|  | GraphicalMethods, Smith chart  |
| 13th |  | ------------------ do---------------- |
|  | Time-domain and Frequency- domain Analysis |
|  | Reflection in Transmission Lines, SWR. TE, TM, TEM waves |
| 14th |  | ------------------ do---------------- |
|  | ------------------ do---------------- |
|  | TE and TM modes in Rectangular and Circular Waveguides, Cut-off & Guided Wavelength, Wave Impedance and Characteristic Impedance, Dominant Modes, Power Flow in waveguides, Excitation of Waveguides |
| 15th |  | ------------------ do---------------- |
|  | ------------------ do---------------- |
|  | Dielectric Waveguides |