1.	Title of the course	Computational Electromagnetics
2.	Course number	EE560L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	New
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	January 2023
8.	Prerequisite	CoT
9.	**Course Objective(s):** To use advanced computational techniques to solve partial differential equations and integral equations encountered in electromagnetic boundary value problems.	
10.	**Course Content:** Fundamental concepts: review of Maxwell's equations and boundary conditions; Green's functions: Green's function technique for the solution of partial differential equations, classification of Green's functions, various methods for the determination of Green's functions including Fourier transform technique, determination of Green's functions for free space, transmission lines, waveguides, and microstrips; Integral Equations: formulation of typical problems in terms of integral equations: wire antennas, scattering, apertures in conducting screens and waveguides, discontinuities in waveguides and microstrip lines; Solution of Integral equations: general Method of Moments (MoM) for the solution of integro-differential equations, choice of expansion and weighting functions, application of MoM to typical electromagnetic problems; Finite element method: typical finite elements, solution of two-dimensional Laplace and Poisson's equations, solution of scalar Helmholtz equation; Finite-difference time-domain method: finite differences, finite difference representation of Maxwell's equations and wave equation, numerical dispersion, Yee's finite difference algorithm, stability conditions, programming aspects, absorbing boundary conditions.	
11.	**Textbook(s):** 1. Booton R C, *Computational Methods for Electromagnetics and Microwaves*, (1992). 2. Garg R, *Analytical and Computational Methods in Electromagnetics*, Artech House (2008).	
12.	**Reference(s):** 1. Itoh T, *Numerical Techniques for Microwave and Millimetre-wave Passive Structures,* Wiley-Interscience (1989). 2. Peterson A F, Ray S L and Mittra R, *Computational Methods for Electromagnetics,* Wiley-IEEE Press (1998). 3. Sadiku M N O, *Numerical Techniques in Electromagnetics*, 2nd Edition, CRC Press (2001). 4. Taflov A and Hagness S C, *Computational Electrodynamics*, 3rd Edition, Artech House (2005).	