1.	Title of the course	Theory and Design of Gyrotrons
2.	Course number	EE551L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5057/17
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To introduce the basic principles, foundations, underlying theoretical aspects and design traits of gyrotrons for clean energy and other scientific-industrial-medical (ISM) applications.	
10.	**Course Content:** Introduction and overview of millimeter wave sources/gyrotrons and allied transmission-line components; Basic principle of gyrotrons and their interactions structures; Theory of gyrotrons and practical design considerations; Design and analysis of electron optical system, beam guidance and beam dump for high power millimetre wave devices; Methods of taper analysis and synthesis; Basic principle of quasi-optical mode converters; Design of single/multi-layer and Brewster windows for high power millimetre wave sources; Gyrotrons and other millimeter wave and terahertz sources for plasma heating, medical spectroscopy, high power radars, industrial heating and other ISM applications.	
11.	**Textbook(s):** 1. Kartikeyan M V, Borie E and Thumm M K, *Gyrotrons: High Power Microwave and Millimeter Wave Technology*, 1st Edition, Springer (2004).	
12.	**Reference(s):** 1. Gilmour Jr. A S , *Klystrons, Traveling Wave Tubes, Magnetrons, Crossed-Field Amplifiers, and Gyrotrons*, 1st Edition, Artech House (2011). 2. Nusinovich G S , *Introduction to the Physics of Gyrotrons*, 1st Edition, John Hopkins University Press (2004).	