1.	Title of the course	Nanoelectronic Devices
2.	Course number	EE524L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To EE5038/12
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce concepts of electronic transport in nanoscale devices. To introduce nanoscale spintronic devices.	
10.	**Course Content:** Quantum mechanical tunneling with device applications: introductory quantum mechanics, tunneling, field emission, gate oxide tunneling and hot electron effects in MOSFETs, scanning tunneling microscopes, scattering matrices, resonant tunneling devices, quantum wells, wires and dot devices; Transport: band structure and density of states, graphene and CNTs, current flow through nanoscale devices, nano transistors, molecular transport, ballistic and diffusive transport, quantum transport, self-energy and Greenâ€™s function, spectral function, correlation function, inflow/outflow and current calculations, Coulomb blockade and single electron transistor devices; Spintronics: Stern-Gerlach experiment, spin matrices and rotation, LLG equation, spin transfer torque, spin valves, magnetic tunnel junctions.	
11.	**Textbook(s):** 1. Datta S, *Quantum Transport: Atom to Transistor*, 2nd Edition, Cambridge University Press (2005). 2. Datta S, *Lessons from Nanoelectronics: A New Perspective on Transport*, 2nd Edition, World Scientific Publishing Company (2018).	
12.	**Reference(s):** 1. Griffiths D J, *Introduction to Quantum Mechanics*, 2nd Edition, Pearson Education (2015). 2. Hanson G W, *Fundamentals of Nanoelectronics*, 1st Edition, Pearson Education (2009).	