Unit – I

Electrochemical double layer – types – Helmholtz Double Layer, Gouy-Chapman Double Layer - Mechanism - Capacitance of Electrochemical double layer and its calculations –energy density - power density - specific capacitance - specific energy - specific power.

Unit – II

EDLC Supercapacitors – electrode materials – nano carbon – types – Multi Wall Carbon Nano Tube (MWCNT) – Reduced Graphine Oxides (rGO) – Fullerene – Fabrication of nano carbon materials - Hummers' method.

Unit – III

Pseudo Capacitor – electrode materials – fabrication of pseudo capacitors – Electrodeposition of metal oxides and Sol-gel – physical vapour deposition (PVD) – chemical vapour deposition (CVD) – chemical precipitation (Top up approach) – characterisation techniques – XRD -FTIR – Raman Spectroscopy – SEM – TEM.

Unit - IV

Hybrid Supercapacitors – fabrication of electrode materials – merits of hybrid Supercapacitors – separators – polymer materials – dielectric constant – recent advancement – MXenes, chalcogenides.

Unit – V

Tesiting and measurements – Cyclic Voltametry – mechanism – Galvanostatic charging and discharging techniques – Electrochemical impedance spectroscopy – Polarisation and charge transfer resistance – Time constant measurements.