4th Semester	RAG4C003	Engineering Properties of Agricultural Produce	L-T-P 3-0-0	3 CREDITS

MODULE- I   (09 hrs)

General Introduction and Different Properties
General Introduction- classification and importance of engineering properties of agricultural produce, Different Properties: Physical properties- size, shape, roundness, sphericity, particle and bulk volume, density, porosity, specific gravity and surface area of grains and fruits and vegetables, methods of their measurement,

MODULE – II (09 hrs)

Thermal properties- basics of mode of heat transfer, heat capacity, specific heat, thermal conductivity, methods of their measurement, thermal diffusivity, surface heat transfer co-efficient, freezing point of depression and boiling point of elevation, heat of respiration, coefficient of thermal expansion, thermal emissivity, Friction in agricultural materials- static friction, kinetic friction, internal friction, angle of repose, methods of their measurement, rolling resistance, flow of bulk granular materials

MODULE - III   (09 hrs)

Aero Dynamics and Rheology - Aero Dynamics- concept and basics of aerodynamic properties drag coefficient and terminal velocity, methods of their measurement, Basic concepts of Rheology- stress, strain, shear rate, analysis of force deformation curve, bio-yield point, rupture point, elasticity, plasticity, degree of elasticity, Rheological properties- classical ideal materials, ideal elastic behavior, elastic properties, young's modulus, shear modulus, bulk modulus, Poisson's ratio; ideal plastic behavior, ideal viscous behavior, viscosity (kinematic and absolute) and its measurement

MODULE - IV   (09 hrs)

Visco-elasticity, Electromagnetic, Electrical and Dielectric Properties - Visco-elasticity- Basic mechanical elements, spring and dashpot, Maxwell model, kelvin model, electrical equivalence of mechanical models; Newtonian and non-Newtonian fluid, pseudoplastic, dilatant, thixotropic, rheopectic and Bingham plastic foods, flow curves;

MODULE-V   (09 hrs)

 Electromagnetic spectrum- Details of electromagnetic spectrum and the use, principle of colour measurement, hue, chroma and value; Electrical and dielectric properties- Measurement methods of resistance, capacitance, dielectric loss factor, loss tangent, and dielectric constant; Application of engineering properties in handling processing machines and storage structures.

Books :

- Suresh Chandra, Samsher, Suneet Kumar Goyal.2020. New India Publishing Agency
- Singhal OP and Samuel DVK. 2003. Engineering Properties of Biological Materials. Saroj Prakasan.NewDelhi
- Mohesin, N.N. 1980. Physical Properties of Plants & Animals. Gordon & Breach Science Publishers, New York.
- Rao, M.A. and Rizvi,S.H., 1995. Engineering Properties of Foods. Marcel Dekker Inc. New York.
- Stroshine, R. 1998. Physical Properties of Agricultural Materials and Food Products. Course Manual. Purdue University. USA.
- Serpil S and Servet G S.2005. Physical Properties of Foods. (Springer Science+Business Media, LLC, 233 Spring Street, New York,