Defence Seminar	
Seminar Title	: Design and Development of a Pre-Cooler Cum Disinfection Based Green Cold Storage Unit for Perishable Agricultural Commodities
Speaker	: Mahipal Singh Tomar (Rollno: 519fp1006)
Supervisor	: Rama Chandra Pradhan
Venue	: CH-113 (Department of Food Process Engineering) (& Hybrid Mode)
Date and Time	: 27 Feb 2025 (12.05 hr)
Abstract	Fruits and vegetables (F&Vs) are highly perishable and prone to microbial spoilage and quality degradation, largely due to inefficient storage methods, leading to significant losses. Most F&V storage systems do not have disinfection facilities and are entirely dependent on spoil during daylight hours. In the existing solar cold storage systems, electric batteries are often used to provide backup power during night-time, which increases the operating cost of the F&V storage system. Hence, there is a need to develop proper methods and equipment for effective disinfection and storage systems for F&Vs. In this study, operation, i.e., pre-cooling, disinfection, and low-temperature storage unit are designed and developed for preservation and shelf life enhancement during storage, utilizing solar energy as its power source. Various physical, textural, thermal and quality analyses of ankla (<i>Phyllanthus emblica</i>) futiu were investigated for designing the system. The bulk and true density of anha fruit were 661 and 1044 kg/m ³ , while thermal properties such as specific heat and thermal conductivity were 3.73 kJ/kg ^o C and 0.55 W/m ⁶ C, respectively. The physiochemical properties of anha fruits significantly changed during post-harvest storage. These quality changes were related to moisture and weight loss and decreased intercellular space in the microstructure. The equipment is fabricated with stainless steel (SS304L) for fruit contact parts and mild steel for the support structure of the equipment. The equipment consists of a pre-cooling cum disinfection system, low-temperature storage units, and a cold thermal energy storage system that stores cold energy uses during night-time or in the absence of solar energy. The developed system was tested on two different types of fresh produce: amla and tormato (Solanum lycopersicum). Both samples were independently tested in a developed precooling true to microstructure, and quality of fresh produce the escherichia coli (E. col) count by 2 and 3 log reductions from tomato