National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Investigations on Multiband Bandpass Frequency Selective Surface for RADAR and Satellite Communication Systems
Speaker	: Peela Ramanarjuna Srisatya (Rollno : 920ec5010)
Supervisor	: Prasun Chongder
Venue	: Seminar Hall (EC-303)
Date and Time	: 21 Apr 2025 (5:15 pm)
Abstract	: A Frequency Selective Surface (FSS) is a crucial structure, typically composed of a periodic array of metallic patches on a dielectric substrate or aperture elements in a metallic screen, designed to selectively allow a specific range of electromagnetic (EM) wave frequencies to pass through. Depending on the design of the array element, an incoming plane wave will be either fully or partially reflected or transmitted. Thus, an FSS is referred to as a spatial filter because it can either pass or block electromagnetic radiation at specific frequencies in free space. However, the electromagnetic behaviour of FSS structures depends on frequency, angle of incidence (AOI), and polarization of the incident waves, making them potential candidates for use as spatial filters in various microwave applications such as radomes, RADAR systems, wireless communication, and satellite communication systems. In the microwave regime of the electromagnetic spectrum, the development of novel geometrical shapes for FSS structures is an attractive area of research. In addition to this, miniaturization, as well as angular and polarization stability are key challenges. Therefore, it is necessary to design an FSS structure that provides stable bandpass filtering characteristics over a wide range of AOI and different polarization states. FSS structures have become indispensable components in modern electromagnetic applications, particularly for multiband systems that require efficient signal processing across a broad frequency range. This work examines the invention, improvement, and application of multiband bandpass FSS for RADAR and satellite communication systems using the aperture coupling concept. The design and implementation of a multiband bandpass FSS response are explored using High-Frequency Structure Simulator (HFSS 2020) software, Advanced Design System (ADS) software is utilized for designing equivalent circuits to simulate the behaviour of FSS filters. This study discusses the analytical, simulation, and experimentally tested performance of the newly proposed FSS structure in the microwave regime, particularly in the C, X, Ku- band of the electromagnetic spectrum.