
Seminar Title	: Design and Analysis of Multi-User VLC System Under Mobile Environment
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Abstract	: VLC is one of the green technologies that support unlicensed spectrum, high security, high speed, no health hazards, low cost, and ease of installation. These attractive features of VLC provide a viable solution to the last-mile problem in broadband wireless transmission for indoor communication. VLC communication remains sensitive to indoor environmental conditions, distance of the transceiver, and field of view (FoV) despite many advantages. The design of VLC communication must consider all the above channel impairments. The work focuses on designing reliable and available VLC communication under different channel conditions. The design of a time-varying VLC system is analyzed different estimates define the scope of this work. An ACO-OFDM VLC system is devised and implemented alongside a non-orthogonal multiple access (NOMA) system. This integration facilitates an effective power domain analysis within the NOMA framework, enhancing spectral efficiency for both Line-of-Sight (LoS) and Non-Line-of-Sight (NLoS) links. The proposed system is designed and analyzed using Optisystem, accounting for varied ambient noise levels and transceiver distances to comprehensively evaluate its performance. A novel technique for time-varying channel estimation is introduced, specifically tailored for ACO-OFDM in VLC. Traditional channel estimation methods often degrade in performance in high-mobility environments. To address this issue, we derive channel responses within a scattered indoor mobile environment by employing basis functions resulting from Doppler effects in multipath propagation. Using the basis expansion model (BEM), we model the VLC channel in both frequency and time domains, accommodating scenarios of LoS and NLoS communication. A comprehensive simulation analysis integrates both frequency and time domain aspects of the ACO-OFDM VLC system with BEM-based time-varying channel modeling. Finally, we present and compare the Mean Square Error (MSE) for channel estimation and the Bit Error Rate (BER) of the proposed system against existing methodologies.