



# OPTICAL WIRELESS COMMUNICATIONS FOR BEYOND 5G NETWORKS AND IOT

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**PRE-REQUISITES :** Signals and Systems

**INDUSTRY SUPPORT :** Sterlite Technologies Ltd., Tejas Networks, BSNL - other Telecom companies, BEL, ITI etc

### COURSE OUTLINE :

Optical Wireless Communications (OWC) has become a promising technology for supporting high-data-rate 5G communication and the massive connectivity of IoT. This course broadly covers the four important aspects of OWC systems: (a) the fundamental principles of OWC, (b) devices and systems, (c) modulation techniques and (d) channel models and system performance analysis. The course also covers different challenges encountered in OWCs as well as outlining possible solutions and current research trends. The course will also involve MATLAB® simulations to help students understand the topic under discussion and to be able to carry out extensive simulations.

### ABOUT INSTRUCTOR :

Prof. ANAND SRIVASTAVA has done M.Tech. and Ph.D. from IIT Delhi. Before joining IIIT Delhi, he was Dean & Professor in School of Computing and Electrical Engineering at Indian Institute of Technology Mandi, HP, India and also Adjunct faculty at IIT Delhi. Prior to this, he was with Alcatel-Lucent-Bell Labs, India as solution architect for access and core networks. Before joining Alcatel Lucent, he had a long stint (~ 20 years) with Center for Development of Telematics (CDOT), a telecom research center of Govt. of India where he was Director and member of CDOT Board. During his stay in CDOT, he provided technical leadership and motivation to extremely qualified team of engineers engaged in the development of national level projects in the areas of Telecom Security Systems, Network Management System, Intelligent Networks, Operations Support Systems, Access Networks (GPON) and Optical Technology based products. Majority of these projects were completed successfully and commercially deployed in the public network. He was also closely involved with ITU-T, Geneva in Study Group 15 and represented India for various optical networking standards meetings. His research work is in the area of optical core and access networks, Vehicle to vehicle communications, Fiber-Wireless (FiWi) architectures, optical signal processing, and Visible Light Communications. He has published over 100 papers in peer reviewed journals and conferences.

### COURSE PLAN :

**Week 1:** Introduction: Optical Wireless Communication Systems

**Week 2:** Optical Sources

**Week 3:** Detectors

**Week 4:** Indoor Optical Wireless Communication Channel Modelling

**Week 5:** Outdoor Optical Wireless Communication Channel Modelling

**Week 6:** Modulation Schemes

**Week 7:** System Performance Analysis: Indoor OWC links

**Week 8:** System Performance Analysis: Outdoor OWC links

**Week 9:** Hybrid RF/FSO Communications

**Week 10:** Visible Light Communications (VLC)

**Week 11:** MIMO in OWC

**Week 12:** Standardization in OWC