	IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP **TRANSPORT & SESSION LAYER PROTOCOLS** Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT **SERVICE LAYER PROTOCOLS & SECURITY** Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols– MAC 802.15.4 , 6LoWPAN, RPL, Application Layer.	**6** **5**
Total		**48**
Pedagogy:	lectures/ tutorials/assignments/self-study/Flipped classroom	
References/Readings	1. Jivan Parab etal., Exploring C for microcontroller (Springer 2007) 2. Lipovski G. J. Single and multiple Chip Microcontroller interfacing. Prentice Hall, USA 1998. 3. Beginning Android 4 Application Development 4. Professional Android 4 Application Development Learning Android Game Programming : A Hands-On Guide to Building Your First Android Game 1st Edition 5 .Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand,StamatisKarnouskos, David Boyle, **"**From Machine-to-Machine to theInternet of Things: Introduction to a New Age of Intelligence**",** 1st Edition, Academic Press, 2014. 8. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet ofThings", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer 9. Vijay Madisetti and ArshdeepBahga, **"**Internet of Things (A Hands-onApproach)**",** 1st Edition, VPT, 2014.	
Learning Outcomes	• Students will be able to develop their own embedded platform using ARM • They will be able to design android application for mobiles • understand where the **IoT**concept fits and possible future trends; understand the various network protocols used in Application	

Course Code: ELD201 **Title of the Course:** OPTICAL COMMUNICATION SYSTEMS

Number of Credits: 4

Prerequisites for the course:	The Knowledge of Electro statics and electromagnetics. Also, basic understanding of analog and digital communication is preferable.	
Objective:	The paper highlights importance of optical communication over existing copper cable and microwave communication. It also gives an elaborate view of electromagnetic spectrum usage for various applications starting from telephony till satellite communication. A strong theoretical base is created to understand the difference between ray theory and wave theory approach for passage of signal in optical fibers. The estimation of noise in optical detection is discussed in detail. The paper emphasizes the industrial needs in cabling technique and type of cable used. Different techniques of optical fiber manufacturing and measuring their characteristic are discussed.	
Content:	**Light Propagation in Optical Fiber**: Geometric picture, Pulse spread due to material dispersion, loss mechanism, Theory of Optical waveguides, methods of waveguides analyses , modes in steps and graded index fiber, new types of optical fibers **Fiber Optics Technology**: Glass fiber fabrication, cable design, coupling, splicing and connectors, splicing methods, connectors, fiber measurements. **Optical Sources**: LED and LDs, development of Laser diodes structures, transmitter circuits, Coupling efficiency of source to fiber. **Optical detectors**: Photodiodes, Avalanche diodes and other detectors. **Receiver sensitivity and BER**: Receiver design, Noise in detectors. **Communication System design**: System requirement, System design, Link analyses, Power budgeting. **Transmission**: TDM, Undersea fiber optics communication system , WDM and DWDM techniques	7 7 6 6 8 7 7
	Total	48
Pedagogy:	Lectures/Tutorials/Presentations /self-study	
References/Readings	1. Optical Fiber Communication by A. Selvarajan and etal TMH, . 2. Optical Fiber Communication by Gerd Keiser , MGH , . 3. Optical Electronics, 4th Edition by A. Yariv, HRW publication,	

Learning Outcomes	The students at the end of the paper, will have some knowledge of designing a point to point optical link for a given situation. They will also be able to choose the right type of components if an assignment of optical network design is given. The course is also useful for students who would like to join telecom industries, as many aspects of practical situation are discussed during course of study. They are also taught to monitor signal losses during course of signal transmission. The student from this course will be confident	

Course Code: ELD 202 **Title of the Course:** OPERATING SYSTEM AND RTOS
Number of Credits: 4

Prerequisites for the course:	Should have studied digital electronics at graduate level	
Objective:	This course develops to focus on concept of highlighting the various methods of improvising speed of computing machine through the operating system organization and various entity managements. Further the subject is developed to analyse the small embedded system developments through the Real Time Operating Systems for task management efficiency.	
Content:	Introduction to Computer Organization and Architecture : hardware vs. software -the virtual machine concept, concept of von Neumann architecture, hardware components and functions, trends in hardware development, system configurations and classifications. Process Description and Control: Processes, process states, processor modes, context switching, CPU scheduling algorithms, threads. Concurrency Control: Concurrent processes, critical section problem and solutions, mutual exclusion solution requirements, semaphores and monitors. Deadlocks: Characterization, detection and recovery, avoidance, prevention. Inter Process Communication: classical IPC problems and solutions, IPC techniques. The Input/Output and File Subsystem: I/O devices, controllers and channels, bus structures, 1/0 techniques (programmed, interrupt driven and DMA), I/O subsystem layers. Concepts of files and directories, issues and techniques for efficient storage and access of data. I/O and file system support for graphics, multimedia, databases, transaction	6 hours 5 hours 5 hours 5 hours 3 hours 6 hours