SEMESTER S7

INDUSTRIAL NETWORKING

Course Code	PERUT741	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	None	Course Type	Theory

Course Objectives:

1. Basic knowledge about networking in industries.
2. Understand the evolution of computer networks using the layered network architecture.
3. Understand the concepts of data communications
4. Be familiar with the Transmission media and Tools

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Modern instrumentation and control systems – OSI model – Protocols – Standards – Common problems and solutions – Grounding/shielding and noise - EIA-232 interface standard – EIA-485 interface standard – Current loop and EIA-485 converters. FIBRE OPTICS: Introduction – Fibre optic cable components and parameters – Basic cable types – Connection fibres – troubleshooting	9
2	**MODBUS** Overview – Protocol structure – Function codes – Modbus plus protocol – Data Highway – AS interface (AS-i) –**Device Net:** Physical layer – Topology – Device taps – **Profibus PA/DP/FMS:** Protocol stack – System operation	9
3	**ETHERNET SYSTEMS** IEEE/ISO standards – Medium access control – frames – Reducing collisions – Auto negotiation – LAN system components – Structured cabling – Industrial Ethernet – Troubleshooting Ethernet. CAN BUS: Concepts of bus access and arbitration – CAN: Protocol-Errors: Properties – detection – processing – Introduction to CAN 2.0B	9
4	**WIRELESS COMMUNICATIONS** Radio spectrum – Frequency allocation – Radio modem – Intermodulation – Implementing a radio link – RFID: Basic principles of radio frequency identification – Transponders – Interrogators. **APPLICATIONS** Automotive communication technologies – Design of automotive X-by-Wire systems (Assignment only)	9

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

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Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Apply the concepts of data communications to design computer networks using subnetting and routing concepts	**K3**
CO2	Compare the various medium access control techniques.	**K2**
CO3	Compare and contrast the characteristics of the physical layer.	**K2**
CO4	Analyze the different protocols.	**K4**
CO5	Compare and contrast the different network components.	**K2**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	1	1	1							**1**
CO2	1	1	1	1	1							**1**
CO3												
CO4												
CO5												

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Practical Industrial Data Networks:Design, Installation and Troubleshooting	Steve Mackay, Edwin Wright, Deon Reynders and John Park	Newnes (Elsevier)	2004
2	Practical Filebus, DeviceNet and Ethernet for Industry	IDC Technology		2006

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Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	The Industrial Communication Technology Handbook	Richard Zurawski	Taylor and Francis	2005
2	Multiplexed Networks for Embedded Systems	Dominique Paret	John Wiley & Sons	2007
3	RFID Design Fundamentals and Applications	Albert Lozano-Nieto	CRC Press	2011