

RFID ENABLED SENSOR DESIGN AND APPLICATIONS

Course Code	19EC4601F	Year	III	Semester	II
Course Category	PE - II	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Sensors &IoT
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Describe the functions, rules and operations of an RFID components and systems	L3
CO2	Outline the performance characteristics of different types of RFID sensors and systems	L2
CO3	Analyze the different RFID enabled sensors	L4
CO4	Develop RFID for Healthcare, Wellness and Environmental Applications	L5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	2	1							2	2	1
CO2	3		2	2	1							2	2	1
CO3	3		2	2	1							2	2	1
CO4	3		2	2	1							2	2	1
Average* (Rounded to nearest integer)	3		2	2	1							2	2	1

Syllabus

Unit No.	Contents	Mapped CO
I	Fundamentals and Operating principles of RFID: Introduction-Barcode Systems, magnetic Strip Card, Smart cards, RFID systems- History of RFID. RFID Tag Components: Tag Antenna, Integrated Circuits, Substrate. RFID Tag Types: Passive Tags, Active Tags, The 1-Bit Transponder and Chip less Tags.	CO1, CO2
II	Communication Fundamentals in RFID Systems: Coupling Mechanisms-Data Encoding- Multipath Effect-Tag Reader and Sensor Communication-Passive Systems-Active Systems, UWB, Zigbee and Wi-Fi Tags.	CO1, CO2
III	Fundamentals and Operating principles of Sensors: Types of Sensors, Use of Sensors, Basic Considerations of Sensor Design, Requirements for Accuracy, Requirements for Resolution, Environment of the Sensor, Calibration, Wireless Sensors and Wireless Sensor Networks.	CO1, CO2

IV	Design of RFID-Enabled Sensors: RFID Antenna Design Challenges, Antenna Basics and the Dipole, Passive RFID Antennas Using Serial Stubs, Bowtie T-Match RFID Antenna, Passive RFID Antenna Using Inductively Coupled Feed Structure, Voltage Multiplier for RFID Integrated Circuits, Microcontroller for Active RFID-Enabled Sensor.	CO3
V	RFID Applications: Short range RFID applications: Access Control-Transportation Ticketing-Personnel identification – Vehicle identification-Production line monitoring. Long range RFID applications: Supply chain management-Mail and shipping-Clothing Tags-Food production control	CO4

Learning Resources

Text Books

1. V. Daniel Hunt, Alber Puglia, Mike Puglia, "RFID: A guide for radio frequency identification", Wiley & Sons, Inc., Publication, 2011
2. Amin Rida, LiYang, Manos Tentzeris, "RFID-Enabled Sensor Design and Applications". 2nd Edition, ARTECH HOUSE, 2010.

Reference Books

1. Steven Shepard, "Radio Frequency Identification", 1st Edition, McGraw Hill, 2011.