RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VI-Semester

Elective-II EC- 6005 (2) RFID

UNIT I. : Introduction: Automatic Identification Systems, a Comparison of Different ID Systems,Components of an RFID System.**Differentiation Features of RFID Systems:** FundamentalDifferentiation Features, Transponder Construction Formats, Frequency, Range and Coupling,Information Processing in the Transponder, Selection Criteria for RFID Systems.

UNIT II : Fundamental Operating Principles: 1-Bit Transponder, Full and Half Duplex Procedure,
Sequential Procedures.**Physical Principles of RFID Systems:** Magnetic Field, Electromagnetic Waves, Surface Waves.

UNIT III : Frequency Ranges and Radio Licensing Regulations: Frequency Ranges Used, European Licensing Regulations, National Licensing Regulations in Europe, National Licensing Regulations. **Standardisation:** Animal Identification, Contactless Smart Cards, ISO 69873 — Data Carriers for Tools and Clamping Devices, ISO 10374 — Container Identification, VDI 4470 — Anti-theft Systems for Goods, Item Management.

UNIT IV : Coding and Modulation: Coding in the Baseband, Digital Modulation Procedures. **Data**
Integrity: The Checksum Procedure, Multi-Access Procedures — Anticollision. **Data Security :**Mutual Symmetrical Authentication, Authentication Using Derived Keys, Encrypted Data Transfer.

UNIT V : Sensors & sensing technology and interfacing Techniques, Transponder with Memory Function, HF interface, Example circuit — load modulation with subcarrier, Example circuit — HF interface for ISO 14443 transponder, Address and security logic, Read-only transponder, Writable transponder, Transponder with cryptological function, Segmented memory, MIFARE_ application directory, MIFARE_ plus, Modern concepts for the dual interface card, Measuring Physical Variables, Transponder with sensor functions, Measurements using microwave transponders, Sensor effect in surface wave transponders.
Readers: Data Flow in an Application, Components of a Reader, Low Cost Configuration — Reader IC U2270B, Connection of Antennas for Inductive Systems, Reader Designs.
Applications: Contactless Smart Cards, Public Transport, Ticketing, Access Control, Transport Systems, Animal Identification, Electronic Immobilisation, Container Identification, Sporting Events, Industrial Automation, Medical Applications. Interfacing technology, Zigbee

Textbooks:
1. Klaus Finkenzeller"RFIDHandbook"Second Edition John Wiley & Sons Ltd.
2. STEPHEN B. MILES, SANJAY E. SARMA, JOHN R. WILLIAMS"RFID Technology and Applications" Cambridge
University Press 2008.
3. Yan Zhang and Paris Kistos "Security in RFID and sensor networks" CRC press 2009.