Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NECD543	RFID	3	0	0	3

Course Objective

This course is designed to familiarize the students with radio frequency identification technique. At the end of the course the students will be able to design their own RFID systems for different applications.

Learning Outcomes

At the end of this module, students are expected to be able to

- Familiarized with RFID systems
- Applications of RFID
- International standard and applications.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Automatic Identification Systems, Comparison of Different ID Systems, Components of an RFID System, Fundamental Differentiation Features, Transponder Construction Formats, Frequency, Range and Coupling, Active and Passive Transponders, Information Processing in the Transponder, Selection Criteria for RFID Systems, 1-Bit Transponder, Full- and Half-Duplex Procedure, Sequential Procedures, Near-Field Communication (NFC).	12	Basic idea of electromagnetics and some useful theorem for basic understanding of the RFID.
2	Frequency Ranges and Radio Licensing Regulations, European Licensing Regulations, National Licensing Regulations in Europe – Germany, National Licensing Regulations – USA, Comparison of National Regulations, Full active transponders, Spectrum use and performance limitations, Data formats, encoding methods and standards, Data integrity and security for RFID,	10	Understanding of basics of RFID regulations in different countries.
3	Data Flow in an Application, Components of a Reader, Integrated Reader ICs, Connection of Antennas for Inductive Systems, Reader Designs, Near-Field Communication, Glass and Plastic Transponders.	10	Student will familiarize the application of RFID and its design.
4	ISO/IEC 69873 – Data Carriers for Tools and Clamping Devices, ISO/IEC 10374 – Container Identification, VDI 4470 – Anti-theft Systems for Goods, Item Management, Contactless Smart Cards, Public Transport, Contactless Payment Systems, NFC Applications, Electronic Passport, Ski Tickets, Access Control, Transport Systems, Animal Identification, FCC Rules for ISM Band, Identity, Standards, and Guidelines for Securing RFID Systems.	10	Students will able to understand different RFID standards.
	Total	**42**	

Text Book:
1. Klaus Finkenzeller, 'RFID Handbook', Wiley, 2nd edition, 2003.

Reference Books:
1. RFID Systems: Research Trends and Challenges, by Bolic M., Simplot-Ryl D., Stojmenovic I., 1st edition, 2011.
2. RFID Design Principles (Artech House Microwave Library), by Harvey Lehpamer, 1st edition, 2008.