SEMESTER S7

ELECTROMAGNETIC COMPATIBILITY AND SIGNAL INTEGRITY

Course Code	PEEVT753	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. To provide an understanding of important concepts of Electromagnetic Compatibility which are fundamentalfor the design of electronics systems and devices in order to minimize electromagnetic interference.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction to Aspects of EMC**: EMI Sources, EMC units, Signalsource specification, Advantages of EMC Design, EMC Requirementsfor Electronic Systems, Measurement of Radiated and Conducted Emissions.	8
2	**Signal Integrity:** Transmission-Line Equations, High-Speed Digital Interconnects,Effect of Terminations, Matching Schemes, Effects of LineDiscontinuities. Non-ideal Behaviour of Components: Wires, resistors,capacitors, inductors, Printed Circuit Board (PCB), Effect of Component, Leads, Mechanical Switches	10
3	**Conducted Emissions and Conducted Susceptibility**: Measurement,Power Supplies, Filters, Placement. Radiated Emissions andConducted Susceptibility: Simple Emission Models for Wires and PCBLands, Simple Susceptibility Models for Wires and PCB Lands	8
4	**Crosstalk:** Three-Conductor Transmission Lines and Crosstalk, ShieldedWires, Twisted Wires. **Shielding**: Shielding Effectiveness- Far-FieldSources, Near-Field Sources; Low Frequency, Magnetic Field Shielding **System Design for EMC:**Common EMC Issues in Practice and Design Guidelines	9

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**

Course Outcomes (COs)

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

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Implement the various measurement techniques for electromagnetic interference and for electromagnetic compatibility	**K3**
CO2	Recognize the various agencies and standards associated with EMI/EMC	**K2**
CO3	Analyse various EM compatibility issues with regard to the design of PCBs and ways to improve the overall system performance	**K4**

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	**3**	**3**	**2**							**3**		**3**
CO2	**3**	**3**	**2**							**3**		**2**
CO3	**3**	**3**	**3**							**3**	**3**	**3**

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	Introductionto Electromagnetic Compatibility	C. R. Paul	John Wiley & Sons	3rd Edition,2022
2	Electromagnetic Compatibility Engineering	H. W. Ott	John Wiley & Sons	2nd Edition, 2009
3	Engineering EMC Principles, Measurementsand Technologies,	V. P. Kodali	Wiley-Blackwell	2nd Edition, 2001

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Electromagnetic Compatibility in Medical Equipment	W. D. Kimmel and D. Gerke	IEEE&Interpharm Press	1995

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://archive.nptel.ac.in/courses/108/106/108106138/
2	https://onlinecourses.nptel.ac.in/noc24_ee67/preview
3	https://archive.nptel.ac.in/content/syllabus_pdf/108106138.pdf
4	https://www.digimat.in/nptel/courses/video/108106138/L28.html