Department of Electronics Engineering

LECTURE PLAN

Name of Course with Code: Electromagnetic Theory (3140519)	**Class: B. Tech. Vth Year**	**Session: July-December 2025**

Teaching Session	**Content to be Covered**	**CO's**	**Blooms Level (BL)**	**% Coverage**	**Mode**
1.	Introduction to Coulomb's Law, Electric Field Intensity	CO1	L2	2%	Offline / Black Board Teaching/ Interactive Learning
2.	Numerical problems on Coulomb's Law and Electric Field Intensity	CO1	L3	2%	Offline / Black Board Teaching
3.	Coordinate Systems: Rectangular, Cylindrical and Spherical Coordinate Systems	CO1	L4	3%	Group based Learning
4.	Charge distribution: Line charge distribution	CO1	L3	2%	Offline / Black Board Teaching
5.	Electric Field Intensity due to Surface and Volume Charge Distribution	CO1	L3	2%	Offline mode
6.	Electric flux and flux density, Gauss law, Boundary relations	CO1	L4	3%	Offline / Black Board Teaching
7.	Curl of a vector field and Stoke's Theorem, Gradient of a Scalar function, Poisson and Laplace Equations	CO1	L3	3%	Offline / Black Board Teaching
8.	Conservative nature of Electrostatic Field and Equation of Continuity, Electric Field in dielectric and conductor	CO1	L3	3%	Offline / Black Board Teaching
9.	Static Magnetic Field, Lorentz force	CO2	L3	2%	Offline / Black Board Teaching
10	Magnetic Field Intensity-Biot-Savart's Law	CO2	L3	2%	Offline / Black Board Teaching
11	Magnetic Field due to a current element	CO2	L5	2%	Offline / Black Board Teaching
12	Ampere's Circuital Law and Magnetic Potentials	CO2	L5	3%	Offline / Black Board Teaching
13	Numerical problems on Magnetic field	CO2	L4	3%	Group based Learning
14	Magnetic force	CO2	L2	2%	Offline / Black Board Teaching
15	Force between current carrying wires	CO2	L2	3%	Offline / Black Board Teaching

16	Boundary conditions in magnetic field	CO3	L2	2%	Offline / Black Board Teaching
17	Scalar and vector potential	CO3	L2	2%	Offline / Black Board Teaching
18	Poisson's equation	CO3	L2	2%	Offline / Black Board Teaching
19	Magnetic Faraday law,	CO3	L2	3%	Offline / Black Board Teaching
20	Displacement Current	CO3	L2	3%	Offline / Black Board Teaching
21	Maxwell's equations for steady field	CO3	L2	3%	Offline / Black Board Teaching
22	Maxwell's equations for time varying field	CO3	L2	2%	Offline / Black Board Teaching
23	Maxwell's equations for time harmonic fields	CO3	L3	3%	Offline / Black Board Teaching
24	General wave equation	CO4	L3	3%	Offline / Black Board Teaching
25	Uniform plane wave in free space	CO4	L3	2%	Offline / Black Board Teaching
26	Uniform plane wave in Perfect dielectric medium	CO4	L3	2%	Offline / Black Board Teaching
27	Uniform plane wave in Lossy medium	CO4	L3	2%	Offline / Black Board Teaching
28	Uniform plane wave in conducting medium	CO4	L2	3%	Offline / Black Board Teaching
29	Concept of Skin depth	CO4	L3	2%	Online / Interactive Learning
30	Poynting vector	CO4	L3	3%	Offline / Black Board Teaching
31	Derivation of Poynting vector theorem	CO4	L5	3%	Offline / Black Board Teaching
32	Wave Polarization- Introduction, Linear, Elliptic polarization, Circular polarization	CO5	L3	3%	Offline / Black Board Teaching
33	Numerical problems on wave propagation	CO5	L4	2%	Group based Learning
34	Introduction to reflection of waves	CO5	L2	2%	Offline / Black Board Teaching
35	Reflection of uniform plane waves	CO5	L2	2%	Experimentation / Board Teaching
36	Normal Incidence and Oblique Incidence	CO5	L2	3%	Offline / Black Board Teaching
37	Total transmission phenomena, Total internal reflection	CO5	L5	3%	Offline / Black Board Teaching
38	Critical angle, Brewster angle	CO5	L5	2%	Offline / Black Board Teaching
39	Numerical problems on Reflection of waves	CO5	L5	3%	Group based Learning/ Activity based

Online	**Offline**				
	Black board teaching	**Group based Learning**	**Learning through experimentation**	**Activity based Learning**	**Onsite/field-based learning**
20%	62%	11%	4%	3%	0 %

Dr. Baljinder Kaur

Department of Electronics Engineering

LECTURE PLAN

Name of Course with Code: Data Science (3140511)	**Class: B. Tech. IIIth Year**	**Session: July-December 2025**

Teaching Session	**Content to be Covered**	**CO's**	**Blooms Level (BL)**	**% Coverage**	**Mode**
1.	Need for data science, benefits and uses, facets of data,	CO1	L1	2%	Offline / Black Board Teaching/ Interactive Learning
2.	Data science process	CO1	L1	5%	Open Discussions
3.	Introduction of basics python tool, Setting working Directory.	CO1	L1	3%	Offline / Black Board Teaching/ Interactive Learning
4.	Setting working Directory.	CO1	L1	4%	Open Discussions
5.	Creating and saving a script file, File execution	CO1	L1	2%	Offline / Black Board Teaching/ Interactive Learning
6.	Removing variables from environment, clearing environment, Commenting script files, Variable creation	CO1	L1	2%	Offline / Black Board Teaching/ Interactive Learning
7.	Commenting script files, Variable creation	CO1	L1	4%	Open Discussions
8.	Data types and associated operations,	CO1	L1	3%	Offline / Black Board Teaching/ Interactive Learning
9.	Arithmetic and logical operators	CO1	L1	2%	Activity based Learning
10	Control structures, Loop, Functions	CO2	L2	3%	Offline / Black Board Teaching/ Interactive Learning
11	Loop, Functions	CO2	L2	3%	Learning through demonstration
12	Data structures: Lists, Arrays, Tuples,	CO2	L2	3%	Offline / Black Board Teaching/ Interactive

	Dictionary, Sets,				Learning
13	NumPy library	CO2	L2	2%	Offline / Black Board Teaching/ Interactive Learning
14	Data Collection: Getting to know your data	CO2	L2	2%	Offline / Black Board Teaching/ Interactive Learning
15	Types of Data, Data collection strategies	CO2	L1	2%	Offline / Black Board Teaching/ Interactive Learning
16	Data Pre processing, Feature engineering	CO2	L2	2%	Learning through demonstration
17	Feature engineering	CO2	L1	3%	Offline / Black Board Teaching/ Interactive Learning
18	Exploratory data analysis	CO2	L2	3%	Activity based Learning
19	Descriptive Statistics	CO3	L2	3%	Offline / Black Board Teaching/ Interactive Learning
20	Mean, Standard Deviation, Skewness and Kurtosis,	CO3	L2	3%	Learning through demonstration
21	Inferential statistics: hypothesis testing	CO3	L3	2%	Offline / Black Board Teaching/ Interactive Learning
22	Probability: probability theory	CO3	L1	2%	Offline / Black Board Teaching/ Interactive Learning
23	Conditional probability.	CO3	L3	2%	Offline / Black Board Teaching/ Interactive Learning
24	Pandas library, data frame and data frame related operations	CO3	L2	3%	Offline / Black Board Teaching/ Interactive Learning
25	Data Cleaning and Preparation	CO4	L3	3%	Offline / Black Board Teaching/ Interactive Learning
26	Handling Missing Data	CO4	L3	3%	Offline / Black Board Teaching/ Interactive Learning
27	Data Transformations using pandas and sklearn library	CO4	L2	2%	Offline / Black Board Teaching/ Interactive Learning
28	Removing Duplicates ,Replacing Values	CO4	L1	3%	Offline / Black Board Teaching/ Interactive Learning
29	Detecting Outliers, Scatter plot, Line plot, Bar plot, Histogram, Box plot, Pair plot	CO4	L1	3%	Activity based Learning
30	Supervised learning: Regression	CO5	L2	4%	Online learning
31	Classification	CO5	L1	3%	Online learning
32	Linear regression, Logistic regression	CO5	L3	3%	Online learning
33	Decision tree, tree creation with entropy and information gain	CO5	L3	3%	Online learning

34	ID3 algorithm, Unsupervised learning: Clustering, Reinforcement learning	CO5	L2	3%	Online learning
35	Random forest, naïve bayes theorem	CO5	L2	3%	Online learning
36	Machine learning algorithm implementation	CO5	L4	2%	Learning through experiment

Online	**Offline**				
	Black board teaching	**Group based Learning**	**Learning through experimentation** / demonstration	**Activity based Learning**	Onsite/ field-based learning/Open Discussion
19%	50%	-	11%	7%	13%

Prof. Vandana T. Bhatt
Assistant Professor
Department of Electronics Engineering

Name of Course with Code: Digital Signal Processing (3140520)	**Class: B. Tech. Vth Year**	**Session: July-December 2025**

Department of Electronics Engineering

LECTURE PLAN

Teaching Session	**Content to be Covered**	**Course Outcomes (COs)**	**Bloom's Taxonomy Level**	**% Coverage**	**Mode of Teaching / Learning**
1	Introduction, Review of discrete-time signals: types & classifications	CO1	L1	1.5%	Black Board Teaching
2	Signal operations (scaling, shifting, folding)	CO1	L2	1.5%	Black Board Teaching
3	Properties of DTFT: linearity, shifting	CO1	L2	1.5%	Black Board Teaching
4	Properties of DTFT: convolution, Parseval's theorem	CO1	L3	1.5%	Black Board Teaching
5	Applications of DTFT in spectral analysis	CO1	L3	1%	Demonstration
6	Review of Z-transform: definition & ROC	CO1	L1	1.5%	Black Board Teaching
7	Z-transform: properties	CO1	L2	1.5%	Black Board Teaching
8	Inverse Z-transform methods	CO1	L3	1.5%	Black Board Teaching
9	Minimum & maximum phase systems	CO1	L4	1%	Black Board Teaching
10	Inverse systems: stability, causality, implementation	CO1	L5	1%	Black Board Teaching
11	Introduction to DFT and its properties (Part I)	CO2	L2	1.5%	Black Board Teaching
12	DFT properties (Part II)	CO2	L3	1.5%	Black Board Teaching

13	Circular convolution using DFT	CO2	L3	1%	Black Board Teaching
14	Decimation-in-Time FFT (Radix-2, Part I)	CO2	L3	1.5%	Project Based Learning
15	Decimation-in-Time FFT (Radix-2, Part II)	CO2	L4	1.5%	Project Based Learning
16	Decimation-in-Frequency FFT (Radix-2, Part I)	CO2	L3	1.5%	Black Board Teaching
17	Decimation-in-Frequency FFT (Radix-2, Part II)	CO2	L4	1.5%	Black Board Teaching
18	Radix-4 FFT algorithm	CO2	L3	1%	Black Board Teaching
19	Characteristics of practical frequency selective filters	CO3	L2	1%	Experimentation
20	IIR filter structures: Direct form-I & II	CO3	L3	1.5%	Black Board Teaching
21	IIR filter structures: cascade & parallel	CO3	L3	1.5%	Black Board Teaching
22	Signal flow graph representation of IIR filters	CO3	L3	1%	Group Based Learning
23	Filter approximations: Butterworth & Chebyshev I	CO3	L4	1.5%	Experimentation
24	Filter approximations: Chebyshev II & Elliptic	CO3	L5	1.5%	Experimentation
25	Impulse Invariant method for IIR design (Part I)	CO3	L3	1.5%	Project Based Learning
26	Impulse Invariant method for IIR design (Part II)	CO3	L4	1.5%	Project Based Learning
27	Bilinear Transformation method (Part I)	CO3	L3	1.5%	Black Board Teaching
28	Bilinear Transformation method (Part II)	CO3	L4	1.5%	Black Board Teaching
29	Introduction to FIR filters: properties & applications	CO4	L1	1%	Activity Based Learning
30	FIR structures: direct form & cascade	CO4	L3	1.5%	Black Board Teaching
31	FIR structures: parallel & lattice	CO4	L3	1.5%	Black Board Teaching

32	Symmetric & asymmetric FIR filters	CO4	L2	1%	Black Board Teaching
33	FIR design using window method: Rectangular, Hamming	CO4	L3	1.5%	Black Board Teaching
34	FIR design using window method: Hanning, Blackman, Kaiser	CO4	L4	1.5%	Black Board Teaching
35	FIR design using frequency sampling method	CO4	L3	2%	Black Board Teaching
36	Introduction to multirate DSP	CO5	L2	1%	Black Board Teaching
37	Decimation: concept & anti-aliasing filtering	CO5	L3	1.5%	Project Based Learning
38	Interpolation: concept & anti-imaging filtering	CO5	L3	1.5%	Black Board Teaching
39	Sampling rate conversion: rational factor, CIC filters	CO5	L4 / L6	2%	Projects and Blackboard
40	Polyphase structures & Applications of multirate DSP (audio, comm., image)	CO5	L3 / L5	2%	Black Board Teaching

Online	**Offline**						
	Black Board Teaching	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
-	**71.74%**	**2.17%**	**15.22%**	**2.17%**	**6.52%**	**2.17%**	-

Dr. Nidhi Saxena

Department of Electronics Engineering

LECTURE PLAN

Name of Course with Code: Mobile Communication & 5G Network (3140512)	**Class: B. Tech. Vth Sem**	**Session: July-December 2025**

Teaching Session	**Content to be Covered**	**CO's**	**Blooms Level (BL)**	**% Coverage**	**Mode**
1.	Introduction to cellular mobile systems: Basic Cellular System.	CO1	L2	2%	Offline / Black Board Teaching/ Interactive Learning
2.	Cellular communication infrastructure: Cells, Clusters, Cell Splitting	CO1	L2	2%	Offline / Black Board Teaching
3.	Frequency reuse concept, Cellular system components.	CO1	L2	3%	Offline / Black Board Teaching
4.	Fixed and dynamic, Cellular interferences: Co-Channel and adjacent channel and sectorization.	CO1	L3	2%	Offline / Black Board Teaching
5.	Operations of cellular systems, Handoff/Handover, Channel assignment	CO1	L3	2%	Offline mode
6.	Problem Solving Session	CO1	L3	3%	Offline / Black Board Teaching
7.	Properties of mobile radio channels – Intersymbol interference	CO1	L3	3%	Offline / Black Board Teaching
8.	Multipath and fading effects	CO1	L3	3%	Offline / Black Board Teaching
9.	Interleaving and diversity	CO2	L2	2%	Offline / Black Board Teaching
10	Multiple access schemes (TDMA, FDMA)	CO2	L2	2%	Offline / Black Board Teaching
11	CDMA, SDMA	CO2	L4	2%	Offline / Black Board Teaching
12	Interuser interference	CO2	L2	3%	Offline / Black Board Teaching
13	Traffic issues and cell capacity	CO2	L4	3%	Group based Learning
14	Problem Solving Session	CO2	L3	2%	Offline / Black Board Teaching
15	Pulse shaping, Linear and non-linear Modulation techniques	CO2	L2	3%	Offline / Black Board Teaching

16	Constant Envelop modulation,	CO3	L2	2%	Offline / Black Board Teaching
17	QPSK, MSK, GMSK	CO3	L2	2%	Offline / Black Board Teaching
18	Spread spectrum modulation techniques	CO3	L2	2%	Offline / Black Board Teaching
19	Direct sequence and Frequency Hopping Spread Spectrum and their applications.	CO3	L2	3%	Offline / Black Board Teaching
20	Problem Solving Session	CO3	L3	3%	Offline / Black Board Teaching
21	2G Architecture such as GSM and CDMA based – 2.5G	CO3	L2	3%	Offline & Experiment with problem solving in group based learning
22	GPRS: GPRS and its features	CO3	L2	2%	Offline / Black Board Teaching
23	3G standard details such as UMTS	CO3	L3	3%	Offline / Black Board Teaching
24	Introduction to LTE	CO4	L3	3%	Offline / Black Board Teaching
25	Basic concept of massive MIMO.	CO4	L3	2%	Offline / Black Board Teaching
26	5G potential and applications	CO4	L3	2%	Offline / Black Board Teaching
27	Usage scenarios: enhanced mobile broadband (eMBB),	CO4	L3	2%	Offline / Black Board Teaching
28	ultra reliable low latency communications (URLLC)	CO4	L2	3%	Offline / Black Board Teaching
29	massive machine type communications (MMTC)	CO4	L3	2%	Online / Interactive Learning
30	D2D communications,	CO4	L3	3%	Offline / Black Board Teaching
31	V2X communications; Spectrum for 5G and sharing	CO4	L5	3%	Offline / Black Board Teaching

Online	**Offline**				
	Black board teaching	**Group based Learning**	**Learning through experimentation**	**Activity based Learning**	**Onsite/field-based learning**
10%	72%	9%	3%	3%	3 %

Dr. Prateek Bhadauria

DEPARTMENT OF ELECTRONICS ENGINEERING

Multiple Mode Teaching Learning Pattern

Name of Course with Code: **VLSI Design** (3140515)	**Class:** B. Tech. III Year	**Session:** July- Dec.2025

S. No.	Unit	Content to be Covered	Teaching Session	Mode
1.	Unit 1	The Metal Oxide Semiconductor (MOS) Structure	1	Face to face Learning
2.		The MOS System under External Bias, Structure and Operation of MOS Transistor (MOSFET)	2-3	Face to face Learning
3.		MOSFET Current-Voltage Characteristics	4-5	Face to face Learning
4.		MOSFET Scaling and Small-Geometry Effects	6-7	Face to face Learning
5.		MOSFET Capacitances.	8-9	Face to face Learning
6.	Unit 2	Introduction, Voltage Transfer Characteristic (VTC)	10	Face to face Learning
7.		Noise Immunity and Noise margins Resistive-Load Inverter, Inverters with n-Type MOSFET Load and CMOS Inverter,	11-12	Online based learning
8.		DC Characteristics of CMOS Inverter, Calculation of VIL, VIH, VOL, VOH and Vth, Design of CMOS Inverters	13-14	Learning through experimentation
9.		Supply Voltage Scaling in CMOS Inverters, Power and Area considerations	15	Face to face Learning
10.	Unit 3	Switching Characteristics of CMOS Inverter- Delay-Time Definitions	16	Online based learning
11.		CMOS Propagation Delay	17	Online based learning
12.		Calculation of Delay times, Power Dissipation-Switching	18-19	Face to face Learning
13.		Short-Circuit and Leakage Components of Energy and Power, Power- Delay Product	20-24	Face to face Learning
14.		Combinational MOS logic circuits	25	Online based learning
15.		CMOS Logic circuits (NAND, NOR and Complex Logic Gates, Multiplexers etc.)	26	Learning through experimentation

16.	**Unit 4**	CMOS Transmission Gates (Pass Gates), CMOS n-Well Process,	27-29	Face to face Learning
17.		Layout design rules, layout design of CMOS Inverter, designing of stick diagram.	30-31	Group basedLearning
18.	**Unit 5**	Semiconductor memories: non-volatile and volatile memory devices, flash memories	32	Learningthrough projects
19.		SRAM cell design	33	Face to face Learning
20.		1T DRAM cell design, dynamic CMOS logic circuits ,domino logic CMOS circuits	34-35	Face to face Learning

Online	Offline						
	Face to face Learning	Group based Learning	Learning through projects	Learning through demonstration	Learning through experimentation	Activity based Learning	Onsite/field based learning
14.22%	67.74%	5.71%	2.85	%	8.54.%	%	%

Prof. Madhav Singh