K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2020-2021)

Name	:	**S. Jabeen**	**Year/Sem**	:	**B. Tech V sem ECE A, B & C Sections (R18)**
Subject	:	**ANTENNAS AND WAVE PROPAGATION**	**Hours Required**	:	
Code	:	**1804506**	**Hours Planned**	:	**49**
PO's	:	**1,2,3,4,5,7**	**Prerequisite**		**EMTL, EMF**

COURSE OBJECTIVE:

- The student will learn the fundamental principles of transmission line theory related to communications including the propagation of signals on a transmission line and in free space.

COURSE OUTCOMES (CO)

CO	
CO301.1	Define various antenna parameters.
CO301.2	Describe the radiation mechanisms of various antenna.
CO301.3	Analyze characteristics of antenna arrays.
CO301.4	Calculate Various parameters of antenna.
CO301.5	Analyze the effects of the atmosphere on wave propagation.

MAPPING OF PO AND CO

Course Outcomes (CO)	Programme Outcomes (PO) and Programme Specific Outcome (PSO)															
	PO 1 (a)	PO 2 (b)	PO 3 (c)	PO 4 (d)	PO 5 (e)	PO 6 (f)	PO 7 (g)	PO 8 (h)	PO 9 (i)	PO1 0 (j)	PO1 1 (k)	PO1 2 (l)	PSO1 (m)	PSO2 (n)	PSO3 (o)	PSO 4 (p)
CO301.1	2			1												2
CO301.2		2		3	1								3		1	
CO301.3		2			3										1	
CO301.4		2			2								1			
CO301.5			1	2			2							3	1	

Influence of the course outcome (1-Low, 2-Medium, 3- High)

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Lesson plan

S.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
1	Syllabus, Pre-Requisites, Introduction of the subject	T1 & R1	1	1
2	Introduction to Co-ordinate systems, Maxwell's equations	T1 & T2	1	2
3	**UNIT 1:** Introduction to basic antenna parameters -Radiation patterns, beam area	T1 &T3	1	3
4	radiation intensity, Beam efficiency, directivity – gain - resolution	T1	1	4
5	Field regions, types of antennas Antenna apertures, FBR, Problems	T1	2	6
6	Effective length, fields of oscillating dipole, Friis Transmission formula	T1	2	8
7	Helmholtz theorem	T1	2	10
8	Short electric dipole antenna, its parameters	T1 &T3	2	12
9	Half wave dipole antenna, its parameters, examples	T1 & T3	2	14
10	Quarter wave monopole antenna, its parameters	T1& T3	2	16
11	Natural current distributions, far fields, problems	T1& T3	2	18
12	**UNIT 2: Antenna arrays**	T1& T3	1	19

	Introduction, Types of arrays, Arrays of 2-point sources			
13	Pattern multiplication, Arrays of n-point sources-BSA	T1 & T3	2	21
14	Arrays of n-point sources-EFA	T1	1	22
15	Hansen-wood yard EfA, BSA non uniform amplitude distribution	T1	1	23
16	Binomial arrays, problems	T1	2	25
17	**UNIT 3: VHF, UHF & MICROWAVE ANTENNAS** Arrays with parasitic elements – Yagi Uda antenna, Examples	T1 &T3	1	26
18	Folded dipole antenna, Examples	T1& T3	1	27
19	Helical antenna, Problems	T1 & T3	1	28
20	Horn antenna, Problems	T1 & T3	1	29
21	Parabolic reflector antenna, Examples	T1 & T3	1	30
22	Micro Strip antenna	T1, T3 & R1	1	31
23	Antenna Gain measurement (by comparison, Absolute and 3-Antenna Methods).	T1, T3 & R1	2	33
24	Directivity measurement, problems	T1, T3 & R1	1	34
25	**UNIT 4: Wave Propagation-I:** Introduction to wave propagation, different modes, ray/mode concepts	T1&R1	1	35
26	Ground wave propagation, Plane earth reflections	T1&R1	1	36

27	Curved earth reflections, Space and surface waves	T1&R1	1	37
28	Wave tilt, Space wave propagation-Introduction, field strength variation with distance and height, problems	T1&R1	2	39
29	Effect of earth's curvature, absorption, Super refraction.	T1&R1	1	40
30	M-curves, Duct propagation, Scattering phenomena	T1&R1	1	41
31	Tropospheric propagation Fading and Path loss calculations.	T1&R1	1	42
32	**UNIT -5: Wave Propagation-II:** Sky wave propagation-Introduction, Structure of Ionosphere	T1&R1	1	43
33	Refraction and reflection of sky waves by Ionosphere, ray path	T1&R1	1	44
34	Critical frequency, MUF, LUF OF, Examples	T1&R1	1	45
35	Virtual height and Skip distance Relation between MUF and Skip distance, problems	T1&R1	2	47
36	Multi-HOP propagation Energy loss in Ionosphere	T1&R1	1	48
37	Summary of Wave Characteristics in different frequency ranges.	T1&R1	1	49

Text books:

1. John D. Kraus, Ronald J. Marhefka and Ahmad S. Khan, "Antennas and wave propagation", TMH, New Delhi, 4th Edition, (Special Indian Edition), 2010
2. E.C. Jordan and. Balmain, "Electromagnetic Waves and Radiating Systems", PHI, 2nd Edition, 2000.

3. C.A. Balanis, "Antenna Theory" John Wiley & Sons, 2nd Edition, 2001.

Reference Books:

1. K.D. Prasad, "Antennas and Wave Propagation", Satya Prakashan, Tech India Publications, New Delhi, 2001
2. F.E. Terman, "Electronic and Radio Engineering," McGraw-Hill, 4th Edition, 1955

Link Sheets: (Provide additional references apart from prescribed text books, if any)

1. https://youtu.be/Q6Ub2KJxV7A - Antenna Fundamentals
2. https://youtu.be/yxMomKLGjxM - Antenna design using software tools and fabrication.

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K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2021-2022)

Name	:	**K. Divyalakshmi**	**Year/Sem**	:	**IV/ VII**
Subject	:	**CMOS Design**	**Hours Required**	:	**45**
Code	:	**1804706**	**Hours Planned**	:	**45**
PO's	:	a,b,c,d,i,j,k,l	**Pre-Requisite**		**EDC,DICA**

COURSE OBJECTIVE:

- To provide a rigorous foundation in MOS and CMOS digital circuits.
- To train the students in transistor budgets, clock speeds and the growing challenges of power consumption and productivity.

Course Outcomes (CO)

CO	
C406.1	Analyze the CMOS circuit and its use.
C406.2	Estimate the circuit Performance.
C406.3	Design Various CMOS logic design circuits
C406.4	Understand the design of a systems and its methods
C406.5	Design various subsystems

MAPPING OF PO AND CO

Course Outcomes (CO)	Programme Outcomes (PO) and Programme Specific Outcome (PSO)														
	PO1 (a)	PO2 (b)	PO3 (c)	PO4 (d)	PO5 (e)	PO6 (f)	PO7 (g)	PO8 (h)	PO9 (i)	PO10 (j)	PO11 (k)	PO12 (l)	PSO1 (m)	PSO2 (n)	PSO3 (O)
C406.1	3	3										1	1		1
C406.2	3	3							1		1	1	1		1
C406.3	3	3	1						1	1	1		2	1	
C406.4	3	3	2							1	1		2	1	
C406.5	3	3	2	2							1	1	2	1	

Influence of the course outcome (1-Low, 2-Medium, 3- High)

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Lesson plan

Sl.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
1	**UNIT I INTRODUCTION TO CMOS CIRCUITS** MOS Transistors	T1 & R1	1	1
2	MOS Transistors switches	T1 & R1	1	2
3	CMOS logic circuit and System representations	T1 & R1	2	4
4	MOS Transistor theory – Introduction MOS device design equation,	T1 & R1	1	5
5	The complementary CMOS inverter – DC characteristics	T1 & R1	1	6
6	Static Load MOS inverters	T1 & R1	1	7
7	The differential inverter	T1 & R1	1	8
8	The transmission gate	T1 & R1	1	9
9	The Tri state inverter, Bipolar Devices..	T1 & R1	1	10
10	**UNIT-II: CIRCUIT CHARACTERISATION AND PERFORMANCE ESTIMATION** Introduction, Resistance estimation	T1	1	11
11	Capacitance estimation, Inductance estimation	T1	1	12
12	Switching characteristics of CMOS gate.	T1	1	13
13	Transistor Sizing, Power Dissipation	T1	1	14
14	Sizing Routing conductors	T1	1	15
15	Charge sharing	T1	1	16
16	Design Margining, Reliability.	T1	1	17
17	**UNIT III CMOS CIRCUIT AND LOGIC DESIGN :** CMOs Logic Gate design	T1 & R2	1	18
18	Basic Physical Design of simple gate	T1 & R2	2	20

19	CMOS Logic structures	T1 & R2	2	22
20	clocking strategies.	T1 & R2	2	24
21	I/OStructures, Low Power Design	T1 & R2	1	25
22	**UNIT-IV** **SYSTEMS DESIGN AND DESIGN METHOD** Design Strategies CMOS chip Design options	T1 & R2	1	26
23	Design Methods, Design Capture Tools	T1 & R2	2	28
24	Design Verification Tools	T1 & R2	1	29
25	Design Economics, and Data Sheets	T1 & R2	1	30
26	CMOS Testing – Manufacturing Test Principles	T1 & R2	1	31
27	Design Strategies for Test	T2 & R1	1	32
28	Chip level Test Techniques,	T2 & R1	1	33
29	System Level Test Techniques	T2 & R1	1	34
30	Layout Design for Improved Testability	T2 & R1	1	35
31		T2 & R1	1	36
32	**UNIT-V:** **CMOS SUB SYSTEM DESIGN 1** Data path operations	T2 & R1	1	37
33	Addition/Subtraction party generators	T2 & R1	1	38
34	Comparators. Zero/one Detectors	T2 & R1	1	39
35	Binary Counters	T2 & R1	1	40
36	ALU's, Multiplication shifters	T2 & R1	1	41
37	Memory Elements,Control FSM	T2 & R1	2	43
38	Control Logic Implementation.	T2 & R1	2	45

Text Books:

1. N.H.E.Weste &D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective", 4th Edition, Pearson, 2011.

2. J.Rabey& B. Nikolic, "Digital Integrated circuits", 2 ndEdition,Pearson, 2003.1

Reference books:

1. P.E.Allen&D.R. Holberg, "CMOS Analog Circuit Design", 3rd Edition, Oxford University Press, 2011.

2. R. Jacob Baker, "CMOS Circuit Design, Layout, and Simulation", 3rd Edition, Wiley, 2010

Links:

www.nptel.ac.in

FACULTY INCHARGE

HOD/ECE

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K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2021-2022)

Name	:	I. Srinivasula Reddy	**Year/Sem**	:	IV / VII
Subject	:	Design & Detailing of Reinforced Concrete Structures – 2	**Hours Required**	:	46
Code	:	1801702	**Hours Planned**	:	46
PO's	:	a, b, c, d, e, f & g	**Pre-Requisite**		Design & Detailing of Reinforced Concrete Structures – 1

COURSE OBJECTIVE:

- To understand the importance of limit state serviceability.
- To design stair slabs under different support mechanisms.
- To calculate the loadings on structural walls & retaining walls and their design.
- To give exposer on types of foundations and their design.
- To analyse and design rectangular and circular water tanks.

Course Outcomes (CO)

CO	
CO 1	Design all the basic structures for limit state of serviceability.
CO 2	Design and detailing of different RCC stair cases.
CO 3	Design load bearing walls, structural walls and cantilever earth retaining walls.
CO 4	Design square and rectangular isolated footings, different combined footings and pile foundation.
CO 5	Design the Underground and Over the Ground Supported water tanks.

MAPPING OF PO AND CO

Course Outcomes (CO)	Programme Outcomes (PO) and Programme Specific Outcome (PSO)														
	PO1 (a)	PO2 (b)	PO3 (c)	PO4 (d)	PO5 (e)	PO6 (f)	PO7 (g)	PO8 (h)	PO9 (i)	PO10 (j)	PO11 (k)	PO12 (l)	PSO1 (m)	PSO2 (n)	PSO3 (o)
CO 1	3	3	3	2	1	2	1	2	1				3		1
CO 2	3	3	3	2	1	2	2	2	2			1	3		1
CO 3	3	3	3	2	1	2	2	2	2			1	3		1
CO 4	3	3	3	2	1	2	2	2	2			1	3		1
CO 5	3	3	3	2	1	2	2	2	2			1	3		1

Influence of the course outcome (1-Low, 2-Medium, 3- High)

Lesson plan

Sl.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
1	**UNIT-I** **Serviceability Limit State Method:** Short-term deflections-Load deflection behavior of RCC beam	T1&R1	1	1
2	factors influencing deflection	T1&R1	1	2
3	deflection of simply supported and continuous beams	T1&R1	1	3
4	Long-term Deflection-due to creep, shrinkage and temperature	T1&R1	2	5
5	Deflection of slabs; Cracking in RCC members-types of cracks	T1&R1	2	7
6	Mechanism of cracking, Limiting the crack width, crack control provisions.	T1&R1	2	9
7	Problems	T1&R1	1	10
8	**UNIT – II** **Design of stair cases:** Types of staircases, loads on stair cases,	T1&R1	2	12
9	design of stair slabs spanning transversely & longitudinally	T1&R1	2	14
10	Helicoidally stair cases.	T1&R1	2	16
11	Problems	T1&R1	1	17
12	**UNIT – III** **Design of RC Walls** Types of RC walls, Loading bearing walls	T1& R2	1	18
13	Braced and un-braced walls, eccentricities	T1& R2	2	20
14	slenderness ratio & effective height of walls	T1& R2	2	22
15	design of walls subjected to horizontal and vertical loads; Structural walls	T1& R2	2	24
16	Types and design of structural walls.	T1 & R2	1	25
17	**Retaining Walls**- Types of retaining walls	T1 & R2	1	26
18	theory of earth pressure, stability	T1 & R2	2	28
19	Soil bearing pressure requirements, design of cantilever retaining wall.	T1 & R2	2	30
20	**UNIT – IV** **Design of Footings** Types of footing, soil pressure under footing	T2 & R2	1	31
21	Isolated Footings -shear, bending moment & development length considerations	T2 & R2	2	33

22	design of square and rectangular footing	T2 & R2	2	35
23	Combined Footings -Design of two-column rectangular	T2 & R2	2	37
24	Trapezoidal & T-shaped footings.	T2 & R2	1	38
25	Design of piles - Behavior of piles.	T2 & R2	1	39
26	Static formula for pipe capacity, pile grouping, design of under reamed piles.	T2 & R2	1	40
27	**UNIT – V Design of Water Storage Tanks** Types of water tanks	T2 & R2	2	42
28	design of circular and rectangular water tanks	T2 & R2	1	43
29	design of circular and rectangular water tanks	T2 & R2	1	44
30	Design of underground water tanks.	T2 & R2	1	45
	Design of underground water tanks.	T2 & R2	1	46

Textbooks:

1. N. Subramanian "Design of Reinforced Concrete Structures", Oxford University Press, New Delhi.
2. P.C. Varghese "Advanced Reinforced Concrete Design", Prentice-Hall of India private Limited, New Delhi.

Reference Books:

1. M L Gambhir "Fundamentals of Reinforced Concrete Design", PHI Learning Pvt. Limited, New Delhi.
2. P C Varghese "Limit State Design of Reinforced Concrete", PHI Learning Pvt. Limited, New Delhi.
3. IS 456-2000 "Indian Standard Code of Plain and Reinforced Concrete – Code of Practice", Bureau of Indian Standards, New Delhi.
4. IS 3370-2009 "Indian Standard Code of Concrete Structures for Storage of Liquids – Code of Practice", Bureau of Indian Standards, New Delhi.

FACULTY INCHARGE

HOD/CIVIL

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K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2020-2021)

Name	:	**Dr. Kumar Reddy Cheepati**	**Year/Sem**	:	**I/II Semester**
Subject	:	**Electronic Devices and Circuits**	**Hours Required**	:	**60**
Code	:	2004204	**Hours Planned**	:	**60**
PO's	:	**PO1,PO2,PO3**	**Pre-Requisite**		**Engineering Physics**

COURSE OBJECTIVE:

The objective of the course is to learn the basic principles of all semiconductor devices, to diode circuits, and amplifier circuits, biasing and small signal equivalent circuits of amplifiers, compare the performance of BJTs and MOSFETs and design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

Course Outcomes (CO)

CO	Description
C113.1	Understand principle of operation, characteristics and applications of Semiconductor diodes, Bipolar Junction Transistor and MOSFETs.
C113.2	Applying the basic principles solving the problems related to Semiconductor diodes, BJTs, and MOSFETs.
C113.3	Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs
C113.4	Design of diode circuits and amplifiers using BJTs, and MOSFETs.
C113.5	Compare the performance of various semiconductor devices.

MAPPING OF PO AND CO

Course Outcomes (CO)	Programme Outcomes (PO) and Programme Specific Outcome (PSO)													
	PO1 (a)	PO2 (b)	PO3 I	PO4 (d)	PO5 (e)	PO6 (f)	PO7 (g)	PO8 (h)	PO9 (i)	PO10 (j)	PO11 (k)	PO12 (l)	PSO1 (m)	PSO2 (n)
C113.1	3												3	
C113.2	2												2	
C113.3	1	3	1											3
C113.4	1	2	3											3
C113.5	3												3	

Influence of the course outcome (1-Low, 2-Medium, 3- High)

Lesson plan

Sl.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
UNIT I-Review of Semiconductors				
1	Intrinsic semiconductors and Doped Semiconductors	T1 & R1	1	1
2	Current Flow in Semiconductors, PN Junction with Open Circuit	T1 & R1	1	2
3	PN Junction with Applied Voltage	T1 & R1	1	3
4	Capacitive Effects in PN Junction.	T1 & R1	1	4
5	The Ideal Diode – current voltage characteristic	T1 & R1	1	5
6	Diodes: Introduction, , rectifier	T1 & R1	1	6
7	diode logic gates,	T1 & R1	1	7
8	Terminal Characteristics of Junction Diodes– forward bias, reverse bias, and breakdown regions	T1 & R2	1	8
9	Modelling the Diode Forward Characteristics- exponential model	T1 & R1	1	9
10	graphical analysis and Iterative analysis using the exponential model	T1 & R1	1	10
11	Constant voltage drop model, the small signal model.	T1 & R1	1	11
UNIT II- Zener Diodes & Bipolar Junction Transistors(BJTs)				
12	Zener diode Characteristics	T1 & R1	1	12
13	Voltage shunt regulator, Temperature Effects	T1 & R1	1	13
14	Rectifier Circuits– half-wave, full-wave	T1 & R1	1	14
15	Bridge rectifier circuits, rectifier with a filter capacitor, C-L-C filter	T1 & R1	1	15
16	Clipping and Clamping Circuits– limiter circuit	T1 & R3	1	16
17	The clamped capacitor, voltage doubler	T1 & R1	1	17
18	Special Diode Types– UJT, Schottky barrier diode, Varactor diode, photo diode, light emitting diode(LED)	T1 & R1	1	18
19	Problem Solving.	T1 & R1	1	19
20	Bipolar Junction Transistors(BJTs): Physical Operation	T1 & R1	1	20
21	simplified structure and modes of operation	T1 & R4	1	21

22	Operation of the npn, and pnp transistors	T1 & R1	1	22
23	cutoff, active, and saturation modes	T1 & R1	1	23
24	V-I Characteristics- of different configurations	T2 & R1	1	24
25	graphical representation of transistor characteristics	T1 & R1	1	25
26	dependence of collector current on collector voltage, the Early Effec	T1 & R1	1	26
UNIT III: Bipolar Junction Transistors (BJTs)				
27	BJT circuits at DC, Applying the BJT in Amplifier Design	T1 & R1	1	27
28	Voltage Amplifier, Voltage Transfer Characteristic (VTC)	T1 & R1	1	28
29	Small-Signal Voltage Gain, determining the VTC by Graphical Analysis	T1 & R1	1	29
30	Q-point, Small-signal operation and models	T1 & R1	1	30
31	The trans conductance, input resistance at the base, input resistance at the emitter, Voltage gain	T2 & R1	1	31
32	separating the Signal and the DC Quantities, The Hybrid-π Model	T1 & R1	1	32
33	the T Model, Basic BJT Amplifier Configurations - Common-Emitter (CE) amplifier without and with emitter resistance	T1 & R3	1	33
34	Common-Base (CB) amplifier, Common-Collector (CC) amplifier or Emitter Follower	T2 & R4	1	34
35	Biasing in BJT Amplifier Circuits- Fixed bias, Self bias, voltage divider bias circuits	T1 & R1	1	35
36	biasing using a Constant-Current Source, CE amplifier – Small signal analysis and design	T1 & R1	1	36
37	Transistor breakdown and Temperature Effects	T1 & R1	1	37
38	Problem solving.	T1 & R1	1	38
UNIT IV: MOS Field-Effect Transistors (MOSFETs)				
39	Introduction, Device Structure and Physical Operation, creating a channel for current flow	T1 & R1	1	39
40	device structure, operation with zero gate voltage	T1 & R3	1	40
41	operation for different drain to source	T1 & R1	1	41

	voltages			
42	the P-channel MOSFET	T2 & R1	1	42
43	CMOS,	T1 & R1	1	43
44	V-I characteristics–iD - vDS characteristics, iD – vGS characteristics	T1 & R1	1	44
45	finite output resistance in saturation, characteristics of the p-Channel MOSFET	T1 & R1	1	45
46	MOSFET Circuits at DC, Applying the MOSFET in Amplifier Design – voltage transfer characteristic	T2 & R3	1	46
47	biasing the MOSFET to obtain linear amplification, the small signal voltage gain	T1 & R1	1	47
48	graphical analysis, the Q-point	T1 & R1	1	48
49	Problem solving	T1 & R1	1	49
UNIT V: MOSFET Small Signal Operation Models				
50	The dc bias, separating the DC analysis and the signal analysis	T2 & R3	1	50
51	Small signal equivalent circuit models, the transconductance	T2 & R3	1	51
52	The T equivalent circuit model, Basic MOSFET Amplifier Configurations	T2 & R3	1	52
53	three basic configurations, characterizing amplifiers, common source(CS) amplifier without and with source resistance, common gate (CG) amplifier	T2 & R3	2	54
54	source follower, the amplifier frequency response	T2 & R3	1	55
55	Biasing in MOSFET Amplifier Circuits– biasing by fixing VGS with and without source resistance	T1 & R3	2	57
56	biasing using drain to gate feedback resistor, biasing using constant current source	T2 & R3	1	58
57	Common Source Amplifier using MOSFETs – Small signal analysis and design	T2 & R3	1	59
58	Body Effect, Problem Solving.	T2 & R3	1	60

TEXT BOOKS:

1. Adel S. Sedra and KennethC. Smith, "Microelectronic Circuits – Theory and Applications", 6th Edition, Oxford Press, 2013.
2. Donald A Neamen, "Electronic Circuits – analysis and design", 3rd Edition, McGraw Hill (India), 2019.

REFERENCE BOOKS:

1. J. Milliman and C Halkias, "Integrated electronics", 2nd Edition, Tata McGraw Hill, 1991..
2. Behzad Razavi, "Microelectronics", Second edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th Edition, Pearson, 2006.
4. Jimmie J Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3rd edition, McGraw-Hill (India), 2010.

Link Sheets: (*Provide additional references apart from prescribed text books, if any*)

1. https://www.youtube.com/watch?v=MBGzMEqJWGU&list=PL_7TnvieI-KOHUmyTzcwlMM9h9hGLt9mR
2. https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html

FACULTY INCHARGE

HOD/EEE

K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
(AUTONOMOUS)
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

LESSON PLAN (ACADEMIC YEAR 2021-2022)

Name	:	**K.Kalyan Kumar**	**Year/Sem**	:	**IV sem**
Subject	:	**Induction Motors & Synchronous Machines**	**Hours Required**	:	**45**
Code	:	**2002403**	**Hours Planned**	:	**49**
PO's	:	**a,b,c,d,e,f,l,j,l**	**Pre-Requisite**		Engineering Physics, Electrical Circuits

COURSE OBJECTIVE:

The objective of the course is to learn principle, operation, construction, characteristics of dc machines, and transformers

Course Outcomes (CO)

CO	On successful completion of this course, the students will be able to
CO214.1	Understand Constructional details, operation and performance of induction motors and synchronous machines.
CO214.2	Distinguish torque-speed curves of induction motors and starting methods of synchronous machines and induction motors.
CO214.3	Analyze the regulation, synchronization, hunting of synchronous machines and power factor improvement.
CO214.4	Evaluate the performance of three phase induction machines and synchronous machines by direct and indirect tests.

MAPPING OF PO, PSO AND CO

Course Outcomes (CO)	Programme Outcomes (PO) and Programme Specific Outcome (PSO)														
	PO1 (a)	PO 2 (b)	PO 3 (c)	PO4 (d)	PO5 (e)	PO6 (f)	PO7 (g)	PO8 (h)	PO9 (i)	PO1 0 (j)	PO 11 (k)	PO 12 (l)	PS O1 (m)	PS O2 (n)	PS O3 (o)
CO214.1	1	1	1						1			1	1		
CO214.2	2	1							1				2	1	
CO214.3	2	1		2	1	1			1	1				3	
CO214.4		2		3	1									2	

Influence of the course outcome (1-Low, 2-Medium, 3- High)

Lesson plan

Sl.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
I				
1	Introduction	T1	1	1
2	Production of RMF	T1	1	2
3	Construction, Principle of operation	T1	2	4
4	Slip, Rotor EMF, current, frequency - problems	T1	2	6
5	Torque equation, Torque-slip characteristics	T1&T3	2	8
6	Equivalent circuit & phasor diagram	T1&T2	1	9
7	Losses & efficiency - Problems	T1	2	11
8	Circle diagram - problems	T1	3	14
II				
9	3-phase Induction motor Starting methods: Squirrel cage Induction motor - Problems	T1&T2	3	17
10	Slipring Induction motor starting	T1&T2	1	18
11	Double revolving field theory	T1&T2	1	19
12	1-phase Induction motor Starting methods	T2	2	21
13	Equivalent circuit – determination of equivalent circuit parameters	T3	2	23
III				
14	Construction details of Alternators	T1	1	24
15	Armature windings	T2	1	25
16	EMF equation - problems	T1	2	27
17	Armature reaction	T1	1	28
18	Synchronous reactance, equivalent circuit	T1	1	29
19	Phasor diagram - voltage regulation	T1	1	30
20	Synchronous impedance methods, MMF method-problems	T1	3	33
21	ZPF method-Problems	T1	2	35
IV				
22	Two reaction theory	T1	2	37
23	Slip test for determining X_d and X_q	T1	1	38
24	Power angle characteristics	T1	1	39
25	Synchronizing power and torque	T1	1	40

26	Parallel operation	T1	1	41
27	Load sharing-problems	T1	2	43
V				
28	Synchronous motor – principle of operation & starting methods	T1	1	44
29	Phasor diagram - problems	T2	1	45
30	V & inverted V curves	T1	1	46
31	Hunting	T1	1	47
32	Synchronous condenser	T1	2	49

TEXT BOOKS:

1. Electric Machines by I. J. Nagrath and D. P. Kothari, TMH Publishers, 4th Edition 2010.
2. Electrical Machines by P. S. Bimbhra, Khanna Publishers.
3. Electrical Machines by Abhijit Chakrabarti, Sudipta Debnath, Mcgraw Hill Education (INDIA) Private Limited.

REFERENCE BOOKS:

1. Theory of Alternating Current Machinery by Langsdorf, TMH Publishers, 2nd Edition
2. Electro mechanics – II& III (Induction Motors, Synchronous and Single Phase Machines) by S. Kamakshaiah, Overseas Publishers Private Ltd.
3. Electrical Machines by M. S. Sarma and M. K. Pathak, CENGAGE Learning.
4. The Performance and Design of AC Machines, M. G. Say, ELBS and Pitman & Sons.

Link Sheets: (*Provide additional references apart from prescribed text books, if any*)

1. https://nptel.ac.in/courses/108/105/108105131/
2. https://nptel.ac.in/courses/108/106/108106072/
3. **https://nptel.ac.in/courses/108/102/108102146/**

K. Kalyan Kumar
FACULTY INCHARGE

HOD/EEE

K.S.R.M. COLLEGE OF ENGINEERING, KADAPA-516003
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2021-2022)

Name	:	Dr. I. Srinivasula Reddy	Year/Sem	:	IV
Subject	:	Structural Analysis-2	Hours Required	:	47
Code	:	1801603	Hours Planned	:	47
PO's	:	a, b & c	Pre-Requisite		Engineering Mechanics, Structural Analysis-1

COURSE OBJECTIVE:

- To make the students understand static and kinematic indeterminacies and forces calculation in indeterminate trusses
- To analyze the portal frames using slope deflection and moment distribution methods.
- To gain knowledge when different structural forms experienced the moving loads.
- To get knowledge on how to arrive maximum bending moment and its position when girders are subjected to different load cases.
- To differentiate stiffness and flexibility and its application to continuous beams under different loads.

Course Outcomes (CO)

CO	
CO 1	Compute the axial tensile and compressive forces of indeterminate trusses under nodal loads.
CO 2	Analyse portal frame with & without sway under different support and loading conditions using slope deflection and moment distribution methods.
CO 3	Analyse beams for maximum bending moment and shear force under different moving load conditions.
CO 4	Compute the position and magnitude of bending moment and shear force under different load conditions using influence lines.
CO 5	Analyse the continuous beams under different support and loading conditions using matrix methods.

MAPPING OF PO AND CO

CO/PO	PO 1 (a)	PO 2 (b)	PO 3 (c)	PO 4 (d)	PO 5 (e)	PO 6 (f)	PO 7 (g)	PO 8 (h)	PO 9 (i)	PO 10 (j)	PO 11 (k)	PO 12 (l)	PSO 1	PSO 2	PSO 3
CO 1	3	3	1	2	2				2	2	1	2	3		
CO 2	3	3	1	2	2				2	2	1	2	3		
CO 3	3	3	1	2	2				2	2	1	2	2		
CO 4	3	3	1	2	2				2	2	1	2	3		
CO 5	3	3	1	2	2				2	2	1	2	2		

Influence of the course outcome (1-Low, 2-Medium, 3- High)

Lesson plan

Sl.No	Topic proposed to be covered	TEXT/ REFERENCE BOOKS	No of Hours Planned	Cumulative Hours
1	**UNIT-I** **Analysis of Indeterminate Structures:** Indeterminate Structural Analysis	T1&R1	1	1
2	Determination of static and kinematic indeterminacies – Solution of trusses with one degree of internal or external indeterminacy	T1&R1	3	4
3	Determination of static and kinematic indeterminacies – Solution of trusses with two degrees of internal and external indeterminacy	T1&R1	4	8
4	Castigliano's second theorem.	T1&R1	1	9
5	**UNIT – II** **Slope Deflection and Moment Distribution Methods:** **Slope Deflection Method:** Analysis of single bay, single storey, portal frame including side sway.	T1&R1	5	14
6	**Moment Distribution Method:** Analysis of Single Bay Single Storey Portal Frames including side Sway	T1&R1	4	18
7	**UNIT – III** **Moving Loads:** Introduction – Maximum SF and BM at a Given Section and Absolute Maximum S.F. and B.M Due to Single Concentrated Load	T1&R1	2	20
8	U. D Load Longer than the	T1&R1	2	22
9	Span – U. D Load Shorter than the Span	T1&R1	2	24
10	Two-Point Loads with Fixed Distance between them and Several Point Loads	T1&R1	2	26
11	Equivalent Uniformly Distributed Load – Focal Length.	T1&R1	2	28

12	**UNIT – IV** **Influence Lines:** Definition of Influence Line for SF – Influence Line for BM –	T1& R2	2	30
13	Load Position for Maximum SF at a Section – Load Position for Maximum BM at a Section Point Loads –	T1& R2	2	32
14	U.D. Load Longer than the Span – U.D. Load Shorter than the Span –	T1& R2	3	35
15	Influence Lines for Forces in Members of Pratt and Warren Trusses.	T1& R2	2	37
16	**UNIT – V** **Flexibility and Stiffness Methods:** **Flexibility Method:** Introduction – Application to Continuous Beams Including Support Settlements.	T2 & R2	5	42
17	**Stiffness Method:** Introduction to Stiffness Method and its Application to Continuous Beams including Support Settlements.	T2 & R2	5	47

Text Books:

1. Dr. C S Reddy "Structural Analysis", Tata McGraw-Hill Companies, Inc. New York.
2. S Ramamrutham and R Narayan "Theory of Structures", Dhanpat Rai Publishing Company (P) Limited, New Delhi.
3. Theory of Structures by B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, 12th Edition.
4. Theory of Structures – Vol. II by S.P.Gupta, G.S. Pandit, R.Gupta, Tata McGraw-Hill Publishers, Ist Edition

Reference Books:

1. Devdas Menon "Structural Analysis", Narosa Publishing House, New Delhi.
2. V N Vazirani, M M Ratwani and S K Duggal "Analysis of Structures", Khanna Publishers, New Delhi.
3. S S Bhavikatti "Structural Analysis – 1 & 2", Vikas Publishing House Pvt. Limited, New Delhi.
4. G S Pandit and S P Gupta "Structural Analysis – A Matrix Approach", Tata McGraw-Hill Companies, Inc. New York.

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