Display of COs in Course Delivery Plans

VIGNAN' S INSTITUTE OF ENGINEERING FOR WOMEN: VISAKHAPATNAM

COURSE DELIVERY PLAN –THEORY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING	L : 4
PROGRAM (UG) : EEE Course Code : R164202B Course Name :FLEXIBLE ALTERNATINTG CURRENT TRANSMISSION SYSTEMS Regulation : R16	T : 0 P : 3 C : 3 Date:21.02.2022

Class	Course Coordinator	Section	Name of the Faculty
IV YEAR -II SEM	Mr. P Anil Kumar	A	Mr. P Anil Kumar
		B	Mrs. T Sushma

COURSE NAME (C1026)	COURSE OUTCOME		
C412.1	Determine power flow control in transmission lines by using FACTS controllers	Evaluate	K5
C412.2	Explain operation and control of voltage source converter	Analyze	K4
C412.3	Develop compensation methods to improve stability and reduce power oscillations in the transmission lines.	Analyze	K4
C412.4	Explain the method of shunt compensation by using static VAR compensators.	Analyze	K4
C412.5	Analyze the methods of compensations by using series compensators.	Analyze	K4
C412.6	Explain the operation of modern power electronic controllers (Unified Power Quality Conditioner and Interline Power Flow Controller).	Analyze	K4

Sl.No.	Course Objective
1	To learn the basics of power flow control in transmission lines byusing FACTS controllers
2	To explain the operation and control of voltage source converter
3	To discuss compensation methods to improve stability and reducePower oscillations in the transmission lines
4	To learn the method of shunt compensation by using static VARcompensators.
5	To learn the methods of compensation by using series compensators
6	To explain the operation of two modern power electronic controllers (Unified Power Quality Conditioner and Interline Power Flow Controller).

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UNIT – I

Introduction to FACTS

Power flow in an AC System ,Loading capability limits, Dynamic stabilityconsiderations, Importance of controllable parameters, Basic types ofFACTS controllers Benefits from FACTS controllers , Requirements andcharacteristics of high power devices ,Voltage and current rating , Lossesand speed of switching , Parameter trade–off devices.

Course Objective: To learn the basics of power flow control in transmission lines byusing FACTS controllers

S.NO	Topic	Page No's	Teaching Aid
1	Power flow in an AC System	[1].3	Chalk & Board
2	Loading capability limits	[1].7	Chalk & Board
3	Dynamic stabilityconsiderations	[1].9	Chalk & Board
	Importance of controllable parameters	[1].12	
4	Basic types ofFACTS controllers	[1].13	Chalk & Board
	Benefits from FACTS controllers	[1].25	Chalk & Board
5	Requirements andcharacteristics of high power devices	[1].41	Chalk & Board
6	Voltage and current rating	[1].41	Chalk & Board
7	Lossesand speed of switching	[1].42	Chalk & Board
8	Parameter trade–off devices		Power Point Presentation
	Total no of Classes	14	

Course Outcome: Determine power flow control in transmission lines by usingFACTS controllers.

UNIT – II

Voltage source and Current source converters

Concept of voltage source converter (VSC), Single phase bridge converter, Square–wave voltage harmonics for a single–phase bridge converter, Three–phase full wave bridge converter, Three–phase current source converter, Comparison of current source converter with voltage source converter

Course Objective: To explain the operation and control of voltage source converter.

S.NO	Topic	Page No's	Teaching Aid
1	Concept of voltage source converter(VSC)	[1].67	Chalk & Board
2	Single phase bridge converter	[1].69	Chalk & Board
3	Square–wave voltage harmonics for a single–phase bridge converter	[1].73	Chalk & Board
4	Three–phase full wave bridge converter	[1].74	Chalk & Board
5	Three–phase current source converter	[1].129	Chalk & Board
6	Comparison of current source converter with voltage source converter	[1].132	Chalk & Board
	Total no of Classes	10	

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UNIT – III

Shunt Compensators–1

Objectives of shunt compensation, Mid–point voltage regulation for lineSegmentation, End of line voltage support to prevent voltage instability,Improvement of transient stability, Power oscillation damping.

Methods of controllable VAR generation

Variable impedance type static VAR generators – Thyristor ControlledReactor (TCR) and Thyristor Switched Reactor (TSR)

Course Objective: To discuss compensation methods to improve stability and reducePower oscillations in the transmission lines.

S.NO	Topic	Page No's	Teaching Aid
1	Objectives of shunt compensation	[1].135	Chalk & Board
2	Mid–point voltage regulation for line segmentation	[1].135	Chalk & Board
3	End of line voltage support to prevent voltage instability	[1].138	Chalk & Board
4	Improvement of transient stability	[1].138	Chalk & Board
5	Power oscillation damping	[1].142	Chalk & Board
6	Variable impedance type static VAR generators	[1].145	Chalk & Board
7	Thyristor Controlled Reactor (TCR) and Thyristor Switched Reactor (TSR magnetic circuit	[1].177	Chalk & Board
	Total no of Classes	10	

Course Outcome: Discuss compensation methods to improve stability and reducepower oscillations in the transmission lines.

UNIT – IV

Shunt Compensators–2

Thyristor Switched Capacitor (TSC)– Thyristor Switched Capacitor –Thyristor Switched Reactor (TSC–TCR).Static VAR compensator (SVC) and Static Compensator(STATCOM):The regulation and slope transfer function and dynamic performance, Transient stability enhancement and power oscillation damping, Operating point control and summary of compensation control.

Course Objective: To learn the method of shunt compensation by using static VARcompensators.

S.NO	Topic	Page No's	Teaching Aid
1	Thyristor Switched Capacitor(TSC)	[1].151	Chalk & Board
3	Thyristor Switched Reactor (TSC-TCR)	[1].177	Chalk & Board
4	Static VAR compensator(SVC)	[1].179	Chalk & Board
5	Static Compensator(STATCOM) Transient stability enhancement and power oscillation damping	[1].197	Chalk & Board
6	Operating point control	[1].193	Chalk & Board
7	summary of compensation control	[1].195	Chalk & Board
	Total no of Classes	**8**	

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Course Outcome: Explain the method of shunt compensation by using static VAR compensators

UNIT – V

Series Compensators

Static series compensators: Concept of series capacitive compensation, Improvement of transient stability, Power oscillation damping, Functional requirements. GTO thyristor controlled Series Capacitor (GSC), Thyristor Switched Series Capacitor (TSSC) and Thyristor Controlled Series Capacitor (TCSC).

Course Objective: To learn the methods of compensation by using series compensators

S.NO	Topic	Page No's	Teaching Aid
1	Static series compensators: Concept of series capacitive compensation	[1].210	Chalk & Board
2	Improvement of transient stability	[1].212	Chalk & Board
3	Power oscillation damping Functional requirements	[1].213	Chalk & Board
4	GTO thyristor controlled SeriesCapacitor (GSC)	[1].216	Chalk & Board
5	Thyristor Switched Series Capacitor (TSSC)	[1].223	Chalk & Board
	Total no of Classes	10	

Course Outcome: Appreciate the methods of compensations by using series compensators.

UNIT – VI

Combined Controllers

Schematic and basic operating principles of unified power flow controller(UPFC) and Interline power flow controller(IPFC) – Application of these controllers on transmission lines.

Course Objective: To explain the operation of two modern power electronic controllers (Unified Power Quality Conditioner and Interline Power Flow Controller).

S.NO	Topic	Page No's	Teaching Aid
1	Schematic and basic operating principles of unified power flow controller(UPFC)	[1].299	Chalk & Board
2	Interline power flow controller(IPFC)	[1].333	Chalk & Board
3	Application of these controllers on transmission lines	[1].346	Power Point Presentation
	Total no of Classes	12	

Course Outcome: Explain the operation of modern power electronic controllers (Unified Power Quality Conditioner and Interline Power Flow Controller).

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Mapping COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C412.1	3	3	3	3	2	2	3		3		3	3	3	
C412.2	3	3	3	2	2	2	3		3		3	3	3	
C412.3	3	3	3	3	2	2	3		3		3	2	3	
C412.4	3	3	3	3	2	2	3		2		2	3	3	
C412.5	3	3	3	3	2	2	3		3		3	2	3	
C412.6	3	3	3	2	2	2	3		3		3	2	3	
Avg	3	3	3	2.67	2	2	3	-	2.83	-	2.833	2.5	3	-

Text Books:

1. "Understanding FACTS" N.G.Hingorani and L.Guygi, IEEEPress.Indian Edition is available:—Standard Publications, 2001.
2. "Flexible ac transmission system (FACTS)" Edited by Yong HueSong and Allan T Johns, Institution of Electrical Engineers, London.
3. Thyristor-based FACTS Controllers for Electrical TransmissionSystems, by R.Mohan Mathur and Rajiv K.Varma, Wiley.

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COURSE DELIVERY PLAN – THEORY

DEPARTMENT OF MECHANICAL ENGINEERING			T: 3+1
B. TECH:MECH Regulation: R20			P: 0
PG Specialization : Not Applicable			C: 3
Sub Code : R20 22032			Date: 7/03/2022
Sub Name : Dynamics of Machinery			Rev No: 03
Class	**Course Coordinator**	**Section**	**Name of the Faculty**
II B.Tech II Sem	Mrs.P.Prasanna Kumari	-	Mrs.P.Prasanna Kumari

UNIT – I

FRICTION: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis: lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- single disc or plate clutch, multiple disc clutch, cone clutch, centrifugal clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. General description and operation of dynamometers: Prony, Rope brake, Epicyclic, Bevis Gibson and belt transmission.

Session No	Topics to be Covered	Reference	Teaching Aids
1	**FRICTION**: Inclined plane, friction of screw and nuts	R.B: 4 Chapter 10 Pg. No:264	PPT in Microsoft Teams
2	Problems	R.B: 4 Chapter 10 Pg. No:269	PPT in Microsoft Teams
3	Pivot uniform pressure and uniform wear	R.B: 4 Chapter 10 Pg. No:287	PPT in Microsoft Teams
4	Collar uniform pressure and uniform wear	R.B: 4 Chapter 10 Pg. No:293	PPT in Microsoft Teams
5	Problems	R.B: 4 Chapter 10 Pg. No:294	PPT in Microsoft Teams
6	Friction circle and friction axis, lubricated surfaces boundary friction, film lubrication	TB:1 Chapter 08 Pg No: 290	PPT in Microsoft Teams
7	**Clutches:** Friction clutches - Single Disc or plate clutch	R.B: 4 Chapter 10 Pg. No:297	PPT in Microsoft Teams
8	Multiple Disc clutch, Cone clutch, Centrifugal clutch	R.B: 4 Chapter 10 Pg. No:301	PPT in Microsoft Teams
9	Problems	R.B: 4 Chapter 10 Pg. No:299	PPT in Microsoft Teams

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10	**Brakes and Dynamometers:** Simple block brakes, Internal expanding brake, band brake of vehicle	R.B: 4 Chapter 19 Pg. No:734,753	PPT in Microsoft Teams
11	Dynamometers - absorption and transmission types	R.B: 4 Chapter 19 Pg. No:763	PPT in Microsoft Teams
12	General description and methods of operation	R.B: 4 Chapter 19 Pg. No:764	PPT in Microsoft Teams
13	Prony, Rope brake.	R.B: 4 Chapter 19 Pg. No:766	PPT in Microsoft Teams
14	Epicyclic, Bevis Gibson and belt transmission	R.B: 4 Chapter 19 Pg. No:766	PPT in Microsoft Teams
15	Problems	R.B: 4 Chapter 19 Pg. No:776	PPT in Microsoft Teams
16	Problems	R.B: 4 Chapter 19 Pg. No:786	PPT in Microsoft Teams
17	Problems	R.B: 4 Chapter 19 Pg. No:786	PPT in Microsoft Teams

UNIT-II

STATIC AND DYNAMIC FORCE ANALYSIS: Dynamic force analysis of four bar mechanism and slider crank mechanism, inertia torque, angular velocity and acceleration of connecting rod, crank effort.

TURNING MOMENT DIAGRAMS: Turning moment diagrams – fluctuation of energy – fly wheels and their design.

Session No	Topics to be Covered	Reference	Teaching Aids
1	Dynamic force analysis of slider crank mechanism	R.B: 4 Chapter 16 Pg. No:451	PPT in Microsoft Teams
2	Inertia torque connecting rod angular velocity and acceleration	R.B: 4 Chapter 16 Pg. No:451	PPT in Microsoft Teams
3	Problems	R.B: 4 Chapter 16 Pg. No:455	PPT in Microsoft Teams
4	problems	R.B: 4 Chapter 16 Pg. No:468	PPT in Microsoft Teams
5	Crank effort and torque diagrams	TB:1 Chapter 13 Pg No 458	PPT in Microsoft Teams
6	Problems	R.B: 4 Chapter 16 Pg. No:459	PPT in Microsoft Teams
7	Fluctuation of energy	R.B: 4 Chapter 16 Pg. No:568	PPT in Microsoft Teams
8	Fly wheels and their design	R.B: 4 Chapter 16 Pg. No:570	PPT in Microsoft Teams

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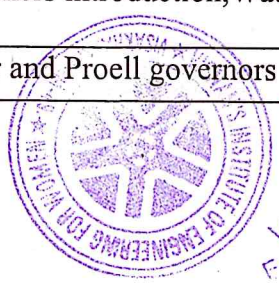
9	Problems	R.B: 4 Chapter 16 Pg. No:573	PPT in Microsoft Teams
10	Problems	R.B: 4 Chapter 16 Pg. No:575	PPT in Microsoft Teams

UNIT-III

PRECESSION: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

GOVERNERS: Watt, porter and proell governors, spring loaded governors– Hartnell and Hartung with auxiliary springs. Sensitiveness, isochronisms and hunting.

Session No	Topics to be Covered	Reference	Teaching Aids
1	Gyroscopes	R.B: 4 Chapter 14 Pg. No: 483	PPT in Microsoft Teams
2	Effect of precession motion on the stability of moving vehicles such as motor car	R.B: 4 Chapter 14 Pg. No:481	PPT in Microsoft Teams
3	Effect of precession motion on the stability of moving vehicles such as motor cycle	R.B: 4 Chapter 14 Pg. No:495	PPT in Microsoft Teams
4	Effect of precession motion on the stabilty of moving vehicles such as aero planes	R.B: 4 Chapter 14 Pg. No:486	PPT in Microsoft Teams
5	Effect of precession motion on the stability of moving vehicles such as ships	R.B: 4 Chapter 14 Pg. No:488	PPT in Microsoft Teams
6	Static analysis of planar mechanisms	TB:1 Chapter 12 Pg No412	PPT in Microsoft Teams
7	Problems on two wheelers	R.B: 4 Chapter 14 Pg. No:502	PPT in Microsoft Teams
8	Problems on two wheelers	R.B: 4 Chapter 14 Pg. No:502	PPT in Microsoft Teams
9	Problems on four wheelers	R.B: 4 Chapter 14 Pg. No:498	PPT in Microsoft Teams
10	Problems on four wheelers	R.B: 4 Chapter 14 Pg. No:498	PPT in Microsoft Teams
11	Problems on aero planes	R.B: 4 Chapter 14 Pg. No:498	PPT in Microsoft Teams
12	Problems on aero planes	R.B: 4 Chapter 14 Pg. No:498	PPT in Microsoft Teams
13	Governers introduction,Watt governors	R.B: 4 Chapter 18 Pg. No:656,657,670	PPT in Microsoft Teams
14	Porter and Proell governors	R.B: 4 Chapter 18	PPT in Microsoft Teams



		Pg. No:710	
15	Spring loaded governors	R.B: 4 Chapter 18 Pg. No:713	PPT in Microsoft Teams
16	Hartnell and hartung with auxiliary springs	R.B: 4 Chapter 18 Pg. No:678,694	PPT in Microsoft Teams
17	Sensitiveness	R.B: 4 Chapter 18 Pg. No:700	PPT in Microsoft Teams
18	isochronisms and hunting.	R.B: 4 Chapter 18 Pg. No:701	PPT in Microsoft Teams
19	Problems on watt governors.	R.B: 4 Chapter 18 Pg. No:703	PPT in Microsoft Teams
20	Problems on Porter governors.	R.B: 4 Chapter 18 Pg. No:704	PPT in Microsoft Teams
21	Problems on Proell and hartnell governors.	R.B: 4 Chapter 18 Pg. No:705	PPT in Microsoft Teams

UNIT-IV

BALANCING: Balancing of rotating masses single and multiple – single and different planes, use analytical and graphical methods. Primary, secondary, and higher balancing of reciprocating masses. analytical and graphical methods, unbalanced forces and couples – examination of "V" multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing, hammer blow, swaying couple, variation of tractive effort.

Session No	Topics to be Covered	Reference	Teaching Aids
1	Balancing of rotating masses	R.B: 4 Chapter 21 Pg. No:833	Projector, BB, Chalk, Duster
2	Single and multiple - single and different planes	R.B: 4 Chapter 21 Pg. No:834,837	BB, Chalk, Duster
3	Primary, secondary balancing of reciprocating masses Analytical and graphical methods	R.B: 4 Chapter 21 Pg. No:837,838	BB, Chalk, Duster
4	Unbalanced forces and couples	R.B: 4 Chapter 22 Pg. No:859	BB, Chalk, Duster
5	Unbalanced forces and couples problems	R.B: 4 Chapter 22 Pg. No:859	BB, Chalk, Duster
6	Examination of "V" multi cylinder in line and radial engines for primary and secondary balancing	R.B: 4 Chapter 22 Pg. No:862,878,899	BB, Chalk, Duster
7	Locomotive balancing - Harmer blow, Swaying couple	R.B: 4 Chapter 22 Pg. No:864	BB, Chalk, Duster
8	Higher balancing of reciprocating masses Analytical and graphical methods	R.B: 4 Chapter 21 Pg. No:837,838	BB, Chalk, Duster

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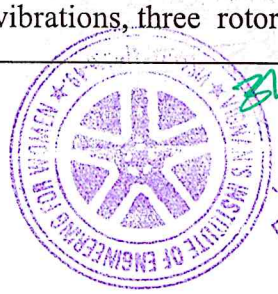
9	Higher balancing of reciprocating masses Analytical and graphical methods	R.B: 4 Chapter 21 Pg. No:837,838	BB, Chalk, Duster
10	Variation of tractive effects	R.B: 4 Chapter 22 Pg. No:864	BB, Chalk, Duster
11	Problems on balancing of rotating masses	R.B: 4 Chapter 22 Pg. No:880	BB, Chalk, Duster
12	Problems on balancing of rotating masses	R.B: 4 Chapter 22 Pg. No:880	BB, Chalk, Duster
13	Problems on balancing of reciprocating masses	R.B: 4 Chapter 22 Pg. No:864	BB, Chalk, Duster
14	problems balancing of reciprocating masses	R.B: 4 Chapter 22 Pg. No:864	BB, Chalk, Duster
15	Problems on Harmer blow, Swaying couple	R.B: 4 Chapter 22 Pg. No:868	BB, Chalk, Duster

UNIT-VI

VIBRATIONS: Free Vibration of spring mass system –Natural frequency-types of damping-damped free vibration, simple problems on forced damped vibration, vibration isolation and transmissibility. Transverse loads, vibrations of beams with concentrated and distributed loads, Dunkerly's methods, Raleigh's method, whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems. Simple

Session No	Topics to be Covered	Reference	Teaching Aids
1	Free vibration of spring mass system	R.B: 4 Chapter 23 Pg. No:910	Projector, BB, Chalk, Duster
2	Oscillation of pendulums, centers of oscillation and suspension	R.B: 4 Chapter 23 Pg No: 918	BB, Chalk, Duster
3	Transverse loads.	R.B: 4 Chapter 23 Pg. No:925	BB, Chalk, Duster
4	vibrations of beams with concentrated and distributed loads	R.B: 4 Chapter 23 Pg. No:925	BB, Chalk, Duster
5	Dunkerly's methods	R.B: 4 Chapter 23 Pg. No:914	BB, Chalk, Duster
6	Rayleigh's method	R.B: 4 Chapter 23 Pg. No:914	BB, Chalk, Duster
7	Whirling of shafts, critical speeds.	R.B: 4 Chapter 24 Pg. No:978	BB, Chalk, Duster
8	torsional vibrations, two rotor systems	R.B: 4 Chapter 24 Pg. No:978	BB, Chalk, Duster
9	torsional vibrations, three rotor systems	R.B: 4 Chapter 24 Pg. No:980	BB, Chalk, Duster



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10	Simple problems on forced damped vibration	R.B: 4 Chapter 23 Pg. No:937	BB, Chalk, Duster
11	Simple problems on forced damped vibration	R.B: 4 Chapter 23 Pg. No:937	BB, Chalk, Duster
12	Vibration isolation & Transmissibility	R.B: 4 Chapter 23 Pg. No:937	BB, Chalk, Duster
13	Transmissibility	R.B: 4 Chapter 23 Pg. No:937	BB, Chalk, Duster
14	Problems on longitudinal vibrations	R.B: 4 Chapter 23 Pg. No:933	BB, Chalk, Duster
15	Problems on longitudinal vibrations	R.B: 4 Chapter 23 Pg. No:933	BB, Chalk, Duster
16	problems on torsional vibrations	R.B: 4 Chapter 23 Pg. No:997	BB, Chalk, Duster
17	problems on torsional vibrations	R.B: 4 Chapter 23 Pg. No:997	BB, Chalk, Duster
18	problems on transverse vibrations	R.B: 4 Chapter 23 Pg. No:983	BB, Chalk, Duster
19	Problems on transverse vibrations	R.B: 4 Chapter 23 Pg. No:983	BB, Chalk, Duster

Session Duration: 50 minutes
Total no of sessions: 82

COURSE OUTCOMES:

CO No	Course Outcome (At the end of the class)	Action Verbs	Level
CO1	Students should able to compute frictional losses, torque transmission of mechanical systems	Compute	K3
CO2	Students should able to examine dynamic force analysis of mechanisms and design of flywheel	Examine	K4
CO3	Students should able to Explain stabilization of sea vehicles, air craft's and automobile vehicles. Students should able to explain different types of governors.	Explain	K4
CO4	Students should able to evaluate balancing of rotating and reciprocating masses by using analytical and graphical methods.	Evaluate	K4
CO5	Students should able to determine the natural frequencies of continuous systems starting from the general equation of displacement.	Determine	K3

GRADUATE ATTRIBUTES:

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S.NO	GRADUATE ATTRIBUTES	MAIN VERBS	LEVEL
1	ENGINEERING KNOWLEDGE	APPLYING	K3
2	PROBLEM ANALYSIS	ANALYZING	K4
3	DESIGN/DEVELOPMENT OF SOLUTIONS	EVALUATING	K5
4	CONDUCT INVESTIGATION OF COMPLEX PROBLEMS	EVALUATING	K5
5	MODERN TOOL USAGE	CREATING	K6,K5,K3
6	ENGINEER AND SOCIETY		
7	ENVIRONMENT AND SUSTAINABILITY		
8	ETHICS		
9	INDIVIDUALS AND TEAM WORK		
10	COMMUNICATION		
11	PROJECT MANAGEMENT AND FINANCE		
12	LIFE LONG LEARNING		

MAPPING OF CO'S AND PO'S:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO 1	3	2	3			2	3		2		3	3	3	3
CO 2	3	3	2	3	2	3			2			2	2	3
CO 3	3	3	3	3		3	2		3		3	3	3	3
CO 4	3	3	2	2	3	3	3		3			3	3	3
CO 5	3	2	3		2	2	2		3			2	2	3

3-Strong **2-Medium** **1-Low**

Text Books:

1. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publ.
2. Mechanism and machine theory by Ashok G. Ambedkar, PHI
3. Publications.

Reference Books:

1. Mechanism and Machine Theory / JS Rao and RV Dukkipati / NewAge.
2. Theory of Machines / Shiegly / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers
4. Theory of Machines / Khurmi / S.Chand

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		Dr.J. Sudhakar	Principal	

Sri Vasavi Institute of Engineering for Women

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COURSE DELIVERY PLAN –THEORY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING		T : 4
PROGRAM (UG/PG)	: ECE	P : 0
Course Code	: C205	C : 3
Course Name	: SIGNALS & SYSTEMS	Date : 11/10/2021
Regulation	: R19	Rev No : 00

Class	Course Coordinator	Section	Name of the Faculty
II YEAR -I SEM	Mrs. T. Sandhya Kumari	A &B	Mr. K. Sunil Kumar
		C	Mr. G. Lakshmana

UNIT 1: INTRODUCTION

Unit Syllabus:

Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude- shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions. Related Problems.

Objective: To explain the basic concepts of signals and systems.

Session No	Topics to be covered	Reference	Teaching Aids
1.	Introduction to Signals	T.B: 2, Foreword Page No: xxvii-xxx	BB
2.	Analogy between vectors and signals	T.B: 2, Ch:1 Page No:1-14	BB
3.	Orthogonal vectors, signals	T.B: 2, Ch:1 Page No:15-20	BB
4.	Signal approximation using orthogonal functions, Mean square error	T.B: 2, Ch:1 Page No:30-35	BB
5.	Closed or complete set of orthogonal functions	RB: 4, Ch:1 Page No:65-82	BB
6.	Orthogonality in complex functions	RB: 4, Ch:1 Page No:41-54	BB
7.	Classification of signals and basic operations on signals	T.B: 1, Ch:3 Page No: 44-48	BB
8.	Exponential and sinusoidal signals	T.B: 1, Ch:3 Page No: 49-53	BB
9.	Concepts of Impulse function, Unit step function, Signum function.	T.B: 1, Ch:3 Page No: 53-54	BB

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10.	Tutorial Problems on calculating energy, power, testing the type of signal. etc.	T.B: 1, Ch:3 Page No: 55-56	BB
Content beyond syllabus covered (if any): Review on vectors			
Course Outcome (CO1): Describe the characteristics of various signals using orthogonal basis and vector space.			

UNIT 2: FOURIER SERIES AND FOURIER TRANSFORM

Unit Syllabus:

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform. RelatedProblems.

Objective: To state and prove the properties of Fourier series representation and Fourier Transform.

Session No	Topics to be covered	Reference	Teaching Aids
11.	Fourier series Representation	T.B: 2, Ch:3 Page No:186-187	BB
12.	Evaluating the Fourier coefficients	R.B: 5, Ch:5 Page No:5.3-5.5	BB
13.	Continuous time periodic signals	T.B: 2, Ch:3 Page No:190-192	BB
14.	Properties of Fourier series, Dirichlet's conditions	T.B: 2, Ch:3 Page No:202-205	BB
15.	Exponential Fourier series	T.B: 2, Ch:3 Page No:195-201	BB
16.	Complex Fourier spectrum	T.B: 1, Ch:3 Page No:66-68, 89-91	BB
17.	Tutorial Problems on trigonometric & Exponential Fourier Series	RB: 4, Ch:4 Page No:207-211	BB
18.	Tutorial Problems on Magnitude &Phase Response	RB: 4, Ch:4 Page No:234-242	BB
19.	Deriving Fourier transform from Fourier series	RB: 4, Ch:4 Page No:259-273	BB
20.	Fourier transform of arbitrary, standard and periodic signal	RB: 4, Ch:5 Page No:298-299	BB
21.	Properties of Fourier transforms	T.B: 1, Ch:4 Page No:105-109 Page No:113-121 Page No:128-129	STAD
22.	Fourier transforms involving impulse function and Signum	T.B: 1, Ch:4 Page No:137-151	BB

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	function		
23.	Hilbert Transform	RB: 4, Ch:1 Page No:300-311	BB
24.	Tutorial Problems on determining Magnitude & phase response	RB: 4, Ch:1 Page No:380-384	BB
25.	Tutorial Problems on properties of Fourier Transform, Signum function	RB: 4, Ch:1 Page No:328-355	BB
Content beyond syllabus covered (if any): NIL			
Course Outcome (CO2): Select Fourier series and Fourier Transform to analyze periodic and aperiodic signals.			

UNIT III: ANALYSIS OF LINEAR SYSTEMS

Unit Syllabus:

Introduction, Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system, Related problems. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

Objective: To realize the response of a linear system to applied input signal

Session No	Topics to be covered	Reference	Teaching Aids
26.	Response of a linear system, Linear time invariant (LTI) system and Linear time variant (LTV) system	R.B: 4, Ch:6 Page No:410-412 T.B: 1, Ch:1 Page No:1-4	BB
27.	Transfer function of a LTI system	R.B: 4, Ch:6 Page No:416-417	BB
28.	Filter characteristics of linear systems	T.B: 1, Ch:6 Page No:245-248	BB
29.	Distortion less transmission through a system	T.B: 1, Ch:6 Page No:248-250	BB
30.	Signal bandwidth and system bandwidth	R.B: 4, Ch:6 Page No:420-421	BB
31.	Ideal LPF, HPF and BPF characteristics	T.B: 1, Ch:6 Page No:250-252	BB
32.	Causality and Poly-Wiener criterion for physical realization	T.B: 1, Ch:6 Page No:252-254	BB
33.	Relationship between bandwidth and rise time.	R.B: 4, Ch:6 Page No:424-427	BB
34.	Tutorial Problems on classification of systems.	R.B: 4, Ch:6 Page No:427-447	BB

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35.	Tutorial Problems on computing the response of systems.	R.B: 4, Ch:6 Page No:427-447	BB
36.	Convolution in time domain and frequency domain	R.B: 4, Ch:7 Page No:457-459	BB
37.	Graphical representation of convolution	T.B: 1, Ch:10 Page No:400-403	BB
38.	Convolution property of Fourier transforms	R.B: 4, Ch:7 Page No:459,463-464	BB
39.	Tutorial Problems on convolution	R.B: 4, Ch:7 Page No:460-462,465-483	BB
Content beyond syllabus covered (if any): NIL			
Course Outcome (CO3): Explain the response characteristics of linear systems using convolution function			

UNIT IV:

CORRELATION:

correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

SAMPLING THEOREM : Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling, Related problems.

Objective: To examine the convolution, correlation & sampling of signals.

Session No	Topics to be covered	Reference	Teaching Aids
40.	Cross correlation and auto correlation functions	R.B: 4, Ch:7 Page No:485-491	BB
41.	Properties of correlation function	T.B: 1, Ch:12 Page No:519-524	BB
42.	Energy density spectrum(ESD), Parseval's theorem, Power density spectrum	R.B: 4, Ch:7 Page No:491-497	BB
43.	Relation between L.T's, and F.T. of a signal	R.B: 4, Ch:7 Page No:497-498	BB
44.	Relation between auto correlation function and energy/power spectral density(PSD) function	R.B: 4, Ch:7 Page No:497-498	BB
45.	Relation between convolution and correlation	T.B: 1, Ch:12 Page No:526-529	BB
46.	Detection of periodic signals in the presence of noise by correlation	T.B: 1, Ch:12 Page No:526-529	BB
47.	Extraction of signal from noise by filtering	T.B: 1, Ch:12 Page No:531-535	BB

48.	Tutorial Problems on correlation	R.B: 4, Ch:7 Page No:465-483, 487	BB
49.	Tutorial Problems on ESD & PSD	R.B: 4, Ch:7 Page No: 499-500	BB
50.	Sampling theorem	T.B: 2, Ch:7 Page No:550	BB
51.	Graphical and analytical proof for Band Limited Signals	RB: 4, Ch:8 Page No:542-545	BB
52.	Impulse sampling,	T.B: 2, Ch:7 Page No:545-549	BB
53.	Natural and Flat top Sampling	T.B: 3, Ch:6 Page No:434-437	PPT
54.	Reconstruction of signal from its samples, Effect of under sampling – Aliasing	T.B: 2, Ch:7 Page No:522-527	BB
Content beyond syllabus covered (if any): Review on Laplace Transforms			
Course Outcome (CO4): Choose the sampling frequency to reconstruct the sampled signal without aliasing effect and discuss the characteristics of LTI system using correlation function			

UNIT V:

Unit Syllabus:

LAPLACE TRANSFORMS: Introduction, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Inverse Laplace transform, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z- transform, properties of Z-transforms. Distinction between Laplace, Fourier and Z transforms.

Objective: To inspect Z-Transforms and properties of Z-transform for the representation of a discrete sequence.

Session No	Topics to be covered	Reference	Teaching Aids
55.	Review of Laplace transforms(L.T.)	T.B: 2, Ch:9 Page No:655-656	BB
56.	Partial fraction expansion	T.B: 2, Ch:9 Page No:670-673	BB
57.	Inverse Laplace transform(I.L.T), Concept of region of convergence (ROC) for L.T.	T.B: 2, Ch:9 Page No:662-691	BB
58.	Constraints on ROC for various classes of signals (Mathematical Analysis of Laplace Transform)	RB: 4, Ch:9 Page No:594-595	BB
59.	Properties of L.T's	T.B: 3, Ch:7 Page No:495-497	BB
60.	Relation between L.T's, and F.T. of a signal	RB: 4, Ch:9 Page No:602-650	BB

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61.	Laplace transform of certain signals using waveform synthesis	RB: 4, Ch:9 Page No:650-668	BB
62.	Tutorial Problems on computing L.T, properties of L.T	RB: 4, Ch:9 Page No:703-715	BB
63.	Tutorial Problems on computing I.L.T, waveform synthesis	RB: 4, Ch:9 Page No:703-718	BB
64.	Fundamental difference between continuous and discrete time signals, Discrete time signal representation using complex exponential and sinusoidal components	T.B: 2, Ch:10 Page No: 21-25	BB
65.	Periodicity of discrete time using complex exponential signal	T.B: 2, Ch:10 Page No:25-29	BB
66.	Concept of Z- Transform of a discrete sequence Distinction between Laplace, Fourier and Z -transforms.	T.B: 2, Ch:10 Page No:741-743	BB
67.	Region of convergence in Z-Transform, Constraints on ROC for various classes of signals	T.B: 3, Ch:8 Page No:582-584	BB
68.	Inverse Z-transform	T.B: 2, Ch:10 Page No:748-757	BB
69.	Properties of Z-transforms	T.B: 2, Ch:10 Page No:757-758	BB
70.	Tutorial Problems on computing Z-Transforms	T.B: 2, Ch:10 Page No:767-774	BB
Content beyond syllabus covered (if any): NIL			
Course Outcome (CO5): Examine the region of convergence with Laplace and Z- Transforms to various classes of signals			

* Session duration: 50 min.

Mapping COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	2	2	-	-	-	--	-	-	-	-	-	2	3
C02	3	3	3	-	-	1	--	--	-	-	-	1	2	3
C03	2	2	2	-	3	-	--	-	-	-	-	2	2	3
C04	3	3	2	2	-	-	--	-	-		-	-	2	3
C05	2	3	2	2	2	2	-	-	-	-	-	2	2	3
Avg	**2.4**	**2.6**	**2.2**	**2**	**2.5**	**1.5**	**-**	**-**	**-**	**-**	**-**	**1.67**	**2**	**3**

3: Strong **2: Medium** **1: Low**

TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.

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2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals & Systems- Narayan Iyer and K Satya Prasad, Cenage Pub.
4. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2ndEdition, 2007

REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Principles of Linear Systems and Signals – BP Lathi, Oxford University Press, 2015
3. Signals and Systems – K Raja Rajeswari, B VisweswaraRao, PHI, 2009
4. Fundamentals of Signals and Systems- Michel J. Robert, MGH International Edition, 2008.
5. Signals and Systems – T K Rawat , Oxford University press, 2011

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COURSE DELIVERY PLAN –THEORY

ACADAMIC YEAR: 2021-22

Department of Computer Science and Engineering			
Course Regulation Specialization Course Code Course Name	: **CSE** : R-20 : - :C202 : **OOPS THROUGH C++**		L : 0 T : 3 P : 0 C : 3 Date :02.02.2022
Class	*Course Coordinator*	*Section*	*Name of the Faculty*
II year I Semester	D.kiranmayi	**CSE-A**	V.SreeLahari
		CSE-B	D.kiranmayi
		CSE-C	D.kiranmayi

COURSE OBJECTIVE:

S.No	*COURSE OBJECTIVES*
1	*Apply fundamental problem solving techniques in python*
2	*Describe the concept of function overloading, operator overloading, virtual functions and polymorphism*
3	*Develop the skill of designing Graphical user Interfaces in Python*

COURSE OUTCOMES:

CO1	Identify importance of object oriented programming and differentiate between procedural oriented and object oriented features.	K2
CO2	Illustrate the objects and classes in python	K3
CO3	Develop programs by applying the concept of inheritance	K3
CO4	Predict the use of binding and virtual functions in c++	K3
CO5	Apply exception handling inorder to handle runtime errors	K3

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UNIT I

Introduction to C++: Difference between C and C++, Evolution of C++, The Object Oriented Technology, Disadvantage of Conventional Programming, Key Concepts of Object Oriented Programming, Advantage of OOP, Object Oriented Language.

Lecture No.	Topic name	Source	Teaching Methodology
UNIT I Lecture 1	Introduction to C++: Difference between C and C++	TB1 - P:03-12 TB1 - P:255-288 TB1 - P:626	Lecture
Lecture 2	Evolution of C++	TB 1- P:256-257	Lecture
Lecture 3	The Object-Oriented Technology	TB 1- P:257-258	Lecture
Lecture 4	Disadvantage of Conventional Programming	TB 1- P:257-258	Lecture
Lecture 5	Key Concepts of Object- OrientedProgramming	TB 1– P:258-259	Lecture
Lecture 6	Advantage ofOOP	TB 1– P:258-259	Lecture
Lecture 7	ObjectOrientedLanguage	TB 2– P: 434-438	Lecture

UNIT II

Classes and Objects &Constructors and Destructor: Classes in C++, Declaring Objects, Access Specifiers and their Scope, Defining Member Function, Overloading Member Function, Nested class, Constructors and Destructors, Introduction, Constructors and Destructor, Characteristics of Constructor and Destructor, Application with Constructor, Constructor with Arguments parameterized Constructor, Destructors, Anonymous Objects..

UNIT II Lecture 8	ClassesandObjects&ConstructorsandDestructor:ClassesinC++	TB 2– P:439-446	PPT
Lecture 9	DeclaringObjects	TB 1– P:320-324	PPT
Lecture 10	AccessSpecifiersandtheirScope	TB 1– P:319-320	Lecture
Lecture 11	DefiningMemberFunction	TB 1– P:310-315	PPT
Lecture 12	OverloadingMemberFunction	TB 1– P:275-278	Lecture
Lecture 13	Nestedclass	TB 1– P:319-320	Lecture
Lecture 14	ConstructorsandDestructors: Introduction	TB 2– P:452-453	TM-Reciprocal Questioning
Lecture 15	ConstructorsandDestructor	TB 1– P:283-286	Lecture

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Lecture 16	CharacteristicsofConstructorandDestructor	TB 2– P:454-459	Lecture
Lecture 17	ApplicationwithConstructor	TB 2– P:463-467	Lecture
Lecture 18	ConstructorwithArgumentsparameterizedConstructor	TB 1– P:307-309	Lecture
Lecture 19	Destructors	TB 1– P:283-286	Lecture
Lecture 20	AnonymousObjects	TB 1– P:295-296	Lecture

UNIT III

Operator Overloading and Type Conversion & Inheritance: The Keyword Operator, Overloading Unary Operator, Operator Return Type, Overloading Assignment Operator (=), Rules for Overloading Operators, Inheritance, Reusability, Types of Inheritance, Virtual Base Classes- Object as a Class Member, Abstract Classes, Advantages of Inheritance, Disadvantages of Inheritance.

UNIT III Lecture 21	OperatorOverloadingandTypeConversion&Inheritance:The Keyword operator	TB 1– P:275-278	PPT
Lecture 22	Overloading Unary Operator	TB 1– P:407-413	PPT
Lecture 23	Operator Return Type	TB 1– P:383-390	Lecture
Lecture 24	Overloading Assignment Operator (=)	TB 2– P:491-499	Lecture
Lecture 25	Rules for Overloading Operators	TB 1– P:383-414	Lecture
Lecture 26	Inheritance	TB 1– P:417	Lecture
Lecture 27	Reusability	TB 1– P:417	Lecture
Lecture 28	Types of Inheritance	TB 1– P:420-425	Lecture
Lecture 29	Types of Inheritance	TB 1– P:420-425	Lecture
Lecture 30	Types of Inheritance	TB 1– P:420-425	Lecture
Lecture 31	Virtual BaseClasses-ObjectasaClassMember	TB 1– P:437-442	Lecture
Lecture 32	AbstractClasses	TB 1– P:455-456	Lecture
Lecture 33	AdvantagesofInheritance and DisadvantagesofInheritance.	TB 1– P:456-57	Lecture

UNIT IV

Pointers & Binding Polymorphisms and Virtual Functions: Pointer, Features of Pointers, Pointer Declaration, Pointer to Class, Pointer Object, The this Pointer, Pointer to Derived Classes and Base Class, Binding Polymorphisms and Virtual Functions, Introduction, Binding in C++, Virtual Functions, Rules for Virtual Function, Virtual Destructor.

UNIT IV	Pointers & Binding Polymorphisms and Virtual	TB 2– P:341-343	PPT

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Lecture 34	Functions: Pointer		
Lecture 35	Features of Pointers	TB 1– P:332-337	PPT
Lecture 36	Pointer Declaration	TB 2– P:346-347	PPT
Lecture 37	Pointer to Class	TB 2– P:562-565	PPT
Lecture 38	Pointer Object	TB 1– P:329-331	PPT
Lecture 39	This Pointer	TB 1– P:332-333	PPT
Lecture 40	Pointer to DerivedClassesandBaseClass	TB 1– P:337-347	PPT
Lecture 41	BindingPolymorphismsandVirtualFunctions: Introduction,BindinginC++	TB 1– P:458-459	PPT
Lecture 42	VirtualFunctions	TB 1– P:445-455	Lecture
Lecture 43	RulesforVirtualFunction	TB 1– P:447-450	Lecture
Lecture 44	VirtualDestructor.	TB 1– P:447-450	Lecture

UNIT V

Generic Programming with Templates & Exception Handling: Definition of class Templates, Normal Function Templates, Over Loading of Template Function, Bubble Sort Using Function Templates, Difference between Templates and Macros, Linked Lists with Templates, Exception Handling, Principles of Exception Handling, The Keywords try throw and catch, Multiple Catch Statements, Specifying Exceptions. Overview of Standard Template Library, STL Programming Model, Containers, Sequence Containers, Associative Containers, Algorithms, Iterators, Vectors, Lists, Maps.

UNIT V Lecture 45	Generic Programming with Templates & Exception Handling: Definition of class Templates	TB 1– P:459-460 TB 1– P:472-473	Lecture
Lecture 46	NormalFunctionTemplates	TB 1– P:460-463	Lecture
Lecture 47	OverLoadingofTemplateFunction	TB 1– P:466-467	Lecture
Lecture 48	BubbleSortUsingFunctionTemplates	TB 1– P:468-469	Lecture
	BubbleSortUsingFunctionTemplates	TB 1– P:468-469	Lecture
Lecture 49	DifferencebetweenTemplatesandMacros		Lecture
Lecture 50	LinkedListswithTemplates	TB 2– P:579-586	Lecture
Lecture 51	Exception Handling and Principles of Exception Handling	TB 1– P:487-488	Lecture
Lecture 52	The Keywords try throwand catch,MultipleCatchStatements andSpecifying Exceptions	TB 1– P:494-506	Lecture
Lecture 53	Overview of Standard Template Library	TB 1– P:629-630	Lecture
Lecture 54	Overview of Standard Template Library	TB 1– P:629-630	Lecture
Lecture 55	STL Programming Model	TB 1– P:631-633	Lecture
Lecture 56	STL Programming Model	TB 1– P:631-633	Lecture

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GRADUATE ATTRIBUTES

S.No	*Graduate Attribute*	*Main Verb*	*Level*
01	Engineering Knowledge	Applying	*K3*
02	Problem Analysis	Analyzing	*K4*
03	Design development of solutions	Evaluating	*K5*
04	Investigation of complex problems	Evaluating	*K5*
05	Modern tool usage	Creating Evaluating Applying	*K6,K5,K3*
06	The Engineer and society		
07	Environment and sustainability		
08	Ethics		
09	Individual and Team work		
10	Communication		
11	Project management and finance		
12	Lifelonglearning		

Mapping CO'S and PO'S:

	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*	*PSO1*	*PSO2*
C01	*3*	-	-	-	-	-	-	-	-	-	*2*	-	-	-
C02	*3*	*3*	*3*	*2*	*3*	-	-	-	-	-	*2*	-	*2*	*2*
C03	*3*	*3*	*3*	*2*	*3*	-	-	-	-	-	*2*	-	*2*	*2*
C04	*3*	*3*	*3*	*2*	*3*	-	-	-	-	-	*2*	-	*2*	*2*
C05	*3*	*3*	*3*	-	*3*	-	-	-	-	-	*2*	-	*2*	*2*
Avg	*3*	*3*	*3*	*2*	*3*	-	-	-	-	-	*2*	-	*2*	*2*

1: Weakly Mapped 2: Average Mapped

3: Strongly Mapped

Text Books:

1) A First Book of C++, Gary Bronson, Cengage Learning.

2) The Complete Reference C++, Herbert Schildt, TMH.

Reference Books:

1) Object Oriented Programming C++, Joyce Farrell, Cengage.

2) C++ Programming: from problem analysis to program design, DS Malik, Cengage Learning

3) Programming in C++, Ashok N Kamthane, Pearson 2nd Edition

Prepared By	Signature	Approved By	Signatures
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		Principal	

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COURSE DELIVERY PLAN –THEORY

DEPARTMENT OF INFORMATION TECHNOLOGY				L : 2 T : 0 P : 2 C : 3 Date : 7/03/2022 Rev No: 03
PROGRAM (UG/PG) : IT Course Code : Course Name : STATISTICS WITH R PROGRAMMING Regulation : R20				
Class	**Course Coordinator**	**Section**	**Name of the Faculty**	
II YEAR -II SEM	Mrs. S.Kalyani	IT	Mrs. S.Kalyani	

Course Objectives: After taking the course, students will be able to

- Use R for statistical programming, computation, graphics, and modeling,
- Write functions and use R in an efficient way,
- Fit some basic types of statistical models
- Use R in their own research,
- Be able to expand their knowledge of R on their own.

Course Outcomes: At the end of this course, students will be able to

CO1: Explain the need for learning a programming language for analyzing the statistical data (U)
CO2: Use online resources for R and import new packages into the R workspace (A)
CO3: Import, review, manipulate and summarize data-sets in R (A)
CO4: Integrate the graphs into statistical analysis (AN)
CO5: Practice various math and statistical functions in R (A)
CO6: Analyze statistical tests using R, create and edit visualizations (AN)

UNIT 1: Introduction

Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

Session No	Topics to be covered	Reference	Teaching Aids
1	Introduction	T.B: 3- Ch: Page No: XIX-XXIII	BB
2	How to run R R Sessions and Functions	T.B: 3- Ch:1 Page No:1-9	Projector& BB
3	Basic Math, Variables	T.B: 2- Ch:4 Page No:35-38	Projector& BB
4	Data Types	T.B: 2- Ch:4 Page No:38-43	Projector& BB
5	Vectors	T.B: 2- Ch:4 Page No:43-48	Projector& BB
6	Data Frames	T.B: 2- Ch:4 Page No:53-61	Projector& BB
7	Data Frames		
8	Lists	T.B: 2- Ch:4	Projector&

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9	Lists	Page No:61-68	BB
10	Matrices	T.B: 2- Ch:4 Page No:68-71	Projector& BB
11	Matrices		
12	Arrays	T.B: 2- Ch:4 Page No:71-72	Projector& BB
13	Classes	T.B: 3- Ch:1 Page No:15-16	Projector& BB
14	S4 Classes	Ref: 3	Projector& BB
15	Reference Classes	Ref: 3	Projector& BB

Content beyond syllabus covered (if any):

- Installation of RStudio
- Miscellaneous functions

UNIT-II: R Programming Structures

Control Statements- Loops, Looping Over Non-vector Sets, If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return, Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quicksort Implementation-Extended Extended Example: A Binary Search Tree.

Session No	Topics to be covered	Reference	Teaching Aids
16	Control Statements-Loops	T.B: 3- Ch:7 Page No:139-42	Projector& BB
17	Looping Over Non-vector Sets	T.B: 3- Ch:7 Page No:142-143	Projector& BB
18	If-Else	T.B: 3- Ch:7 Page No:143-144	Projector& BB
19	Arithmetic and Boolean Operators and values	T.B: 3- Ch:7 Page No:145-146	Projector& BB
20	Default Values for Argument, Return Values, Deciding Whether to explicitly call return	T.B: 3- Ch:7 Page No:146-148	Projector& BB
21	Returning Complex Objects Functions are Objective	T.B: 3- Ch:7 Page No:148-151	Projector& BB
22	No Pointers in R, Recursion	T.B: 3- Ch:7 Page No:159-160	Projector& BB
23	Recursion	T.B: 3- Ch:7 Page No:176	Projector& BB
24	A Quicksort Implementation-Extended	T.B: 3- Ch:7 Page No:176-177	Projector& BB
25	A Quicksort Implementation-Extended	T.B: 3- Ch:7 Page No:176-177	Projector& BB
26	Extended Example: A Binary Search Tree	T.B: 3- Ch:7 Page No:177-180	Projector& BB
27	A Binary Search Tree-code	T.B: 3- Ch:7	Projector&

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		Page No:180-182	BB
Content beyond syllabus covered (if any): -NA-			

UNIT-III: Doing Math and Simulation in R
Math Function, Extended Example Calculating Probability- Cumulative Sums and Products- Minima and Maxima- Calculus, Functions Fir Statistical Distribution, Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Extended Example: Finding Stationary Distribution of Markov Chains, Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files

Session No	Topics to be covered	Reference	Teaching Aids
28	Math Function	T.B: 3- Ch:8 Page No: 189	Projector& BB
29	Extended Example Calculating Probability	T.B: 3- Ch:8 Page No:190	Projector& BB
30	Cumulative Sums and Products Minima and Maxima- Calculus	T.B: 3- Ch:8 Page No:191-192	Projector& BB
31	Functions For Statistical Distribution	T.B: 3- Ch:8 Page No:193	Projector& BB
32	Sorting	T.B: 3- Ch:8 Page No:194-196	Projector& BB
33	Linear Algebra Operation on Vectors and Matrices	T.B: 3- Ch:8 Page No:196 -198	Projector& BB
34	Extended Example: Vector cross Product	T.B: 3- Ch:8 Page No:198	Projector& BB
35	Extended Example: Finding Stationary Distribution of Markov Chains	T.B: 3- Ch:8 Page No:199	Flipped Class room
36	Set Operations	T.B: 3- Ch:8 Page No:202	Projector& BB
37	Input /output- Accessing the Keyboard and Monitor	T.B: 3- Ch:10 Page No:232-235	Projector& BB
38	Reading and writing Files	T.B: 3- Ch:10 Page No:235-237	Projector& BB
39	Introduction to connections	T.B: 3- Ch:10 Page No:237-243	Projector& BB
40	Accessing files on remote machines	T.B: 3- Ch:10 Page No:243-245	Projector& BB
41	Getting file and directory Information	T.B: 3- Ch:10 Page No:245-247	Projector& BB
Content beyond syllabus covered (if any): -NA-			

UNIT-IV: Graphics and Probability Distributions
Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function, Customizing Graphs, Saving Graphs to Files. Probability Distributions & Basic Statistics Probability Distributions, Normal Distribution- Binomial Distribution- Poisson

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Distributions, Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,- ANOVA.

Session No	Topics to be covered	Reference	Teaching Aids
42	Graphics- Creating Graphs	T.B: 3- Ch:12 Page No:261	Projector& BB
43	The Workhorse of R Base Graphics, the plot() Function	T.B: 3- Ch:12 Page No:262	Projector& BB
44	Customizing Graphs-Changing the character sizes and range of access	T.B: 3- Ch:12 Page No:272-274	Projector& BB
45	Adding a polygon,smoothing points	T.B: 3- Ch:12 Page No:275-276	Projector& BB
46	Magnifying a portion of the curve	T.B: 3- Ch:12 Page No:277-280	Projector& BB
47	Saving Graphs to Files	T.B: 3- Ch:12 Page No:280-281	Projector& BB
48	Probability Distributions- Normal Distribution	T.B: 2- Ch:14 Page No:171-173	Projector& BB
49	Normal Distribution(contd.)	T.B: 2- Ch:14 Page No:173-176	Projector& BB
50	Normal Distribution – Problems		
51	Binomial Distribution	T.B: 2- Ch:14 Page No:176-180	Projector& BB
52	Binomial Distribution(contd.)	T.B: 2- Ch:14 Page No:180-182	Projector& BB
53	Binomial Distribution – Problems		
54	Poisson Distributions – Problems	T.B: 2- Ch:14 Page No:182-185	Projector& BB
55	Other Distribution		
56	Basic Statistics	T.B: 2- Ch:15 Page No:187	Projector& BB
57	Correlation and Covariance	T.B: 2- Ch:15 Page No:191-200	Projector& BB
58	Correlation and Covariance(contd.)	T.B: 2- Ch:15 Page No:196-200	Projector& BB
59	T-Tests	T.B: 2- Ch:15 Page No:200-203	Projector& BB
60	T-Tests(contd.)	T.B: 2- Ch:15 Page No:203-206	Projector& BB
61	ANOVA	T.B: 2- Ch:15 Page No:207-209	Seminar
62	ANOVA problems	T.B: 2- Ch:15 Page No:209-210	Projector& BB

Content beyond syllabus covered (if any): Adding lines:The abline() function; Starting a New Graph While Keeping the Old Ones; Extended Example: Two Density Estimates on the Same Graph; Adding Points: The points() Function; Adding a Legend: The legend() Function; Adding Text: The text() Function; Pinpointing Locations: The locator() Function; Restoring a Plot Basic statistical functions, Problems related to distributions and correlations

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UNIT-V: Linear, Generalized and Non-linear Models

Linear Models, Simple Linear Regression, Multiple Regression Generalized Linear Models, Logistic Regression, Poisson Regression, other Generalized Linear Models, Survival Analysis, Nonlinear Models-Splines, Decision Trees, Random Forests.

Session No	Topics to be covered	Reference	Teaching Aids
63	Linear Models	T.B: 2- Ch:16 Page No:211-214	Projector& BB
64	Simple Linear Regression	T.B: 2- Ch:16 Page No:214-216	Think Pair Share Activity
65	Linear Regression – Problems	T.B: 2- Ch:16 Page No:214-216	Projector& BB
66	Multiple Regression	T.B: 2- Ch:16 Page No:216-220	Projector& BB
67	Multiple Regression – Problems	T.B: 2- Ch:16 Page No:220-232	Projector& BB
68	Generalized Linear Models- Logistic Regression	T.B: 2- Ch:17 Page No:235-237	Projector& BB
69	Poisson Regression	T.B: 2- Ch:17 Page No:237-240	Projector& BB
70	Generalized Linear Models	T.B: 2- Ch:17 Page No:240	Projector& BB
71	Survival Analysis	T.B: 2- Ch:17 Page No:240	Projector& BB
72	Survival Analysis		
73	Nonlinear Models-Splines	T.B: 2- Ch:20 Page No:300-304	Projector& BB
74	Splines		
75	Decision Tree	T.B: 2- Ch:20 Page No:310-312	Projector& BB
76	Random Forests	T.B: 2- Ch:20 Page No:312-313	Projector& BB
Content beyond syllabus covered (if any): Problems related to regressions			

* Session duration: 50 mins

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1										
CO2	3	2	1									
CO3	3	2	1									
CO4		3	2	1								
CO5	3	2	1									
CO6		3	2	1								

S: Strong M: Medium L: Low

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TEXT BOOKS:

1) The Art of R Programming, A K Verma, Cengage Learning.
2) R for Everyone, Lander, Pearson
3) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCE BOOKS:

1) R Cookbook, Paul Teetor, Oreilly.
2) R in Action, Rob Kabacoff, Manning.
3) https://www.datamentor.io/r-programming/object-class-introduction

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Mrs.S.Kalyani		HoD	
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COURSE DELIVERY PLAN –THEORY

ACADAMIC YEAR: 2021-22

Department of Basic science & Humanities			
Course Regulation Specialization Course Code Course Name	: **CSE** : R-20 : - : BS1204 **: Applied Physics**		L : 3 T : 0 P : 0 C : 3 Date :02.02.2022
Class	*Course Coordinator*	*Section*	*Name of the Faculty*
I year I Semester	Dr Chandra Sekhar Beera	**CSE-A**	Dr. K. Chaitanya
		CSE-B	Dr.Chandra Sekhar Beera
		CSE-C	Dr. K .Venkata Prasad

COURSE OBJECTIVE:

S.No	*COURSE OBJECTIVES*
1	*Impart Knowledge of Physical Optics phenomena like Interference and Diffraction required to design instruments with higher resolution.*
2	*Employ the basis for the development of quantum mechanics an electric behavior of solids.*
3	*Understand the physics of Semiconductors and their working mechanism for their utility in sensors.*

COURSE OUTCOMES:

CO1	Explain wave behavior of light, including interference and diffraction mathematically and conceptually.	K2
CO2	Explain operational principles and construction of Lasers Understand the properties of optical fiber that affect the performance of a communication system.	K2
CO3	Apply the knowledge of quantum views for understanding the formation of energy bands in solids and their classifications.	K2
CO4	Describe relationship between specific properties and applications of dielectric and magnetic materials.	K4
CO5	Understand the physics of electrical conductivity in semiconductors and superconductors for various applications.	K2

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Unit-I: Wave Optics

Interference: Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings, Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit, double slit - N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating(Qualitative).

Polarization: Introduction-Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

Session No	Topics to be Covered	Reference	Teaching Aids
1	Introduction to Interface	T.B-1,Ch-6, Pg-131	Black Board
2	Principle of Superposition	T.B-1,Ch-6, Pg-131	Black Board
3	Coherent Sources	T.B-1,Ch-6, Pg-131	Black Board
4	Interference inthin films	T.B-1,Ch-6, Pg-141	Black Board
5	Interference inthin films-derivation	T.B-1,Ch-6, Pg-142	Black Board
6	Newton's rings	T.B-1,Ch-6, Pg-151	Black Board
7	Newton's rings-radius of curvature, refractive index	T.B-1,Ch-6, Pg-152	Black Board
8	Construction and basic principle of Interferometers	T.B-2,Ch-1, Pg-1.28	Black Board
9	Interference Problems (solved & unsolved)	T.B-1,Ch-6, Pg-155	Black Board
10	Interference Problems (solved & unsolved)	T.B-2,Ch-1, Pg-1.35	Black Board
11	Introduction to diffraction	T.B-1,Ch-7, Pg-173	Black Board
12	Fraunhofer diffraction at single slit	T.B-1,Ch-7, Pg-176	Black Board
13	Fraunhofer diffraction at double slit	T.B-1,Ch-7, Pg-182	Black Board
14	Numerical on diffraction –single & double	T.B-1,Ch-7, Pg-181	Black Board
15	Cases of double slit	T.B-1,Ch-7, Pg-182	Black Board
16	N-slits &Circular Aperture	T.B-1,Ch-7, Pg-186	Black Board
17	Grating equation	T.B-1,Ch-7, Pg-187	Black Board
18	Grating Equation Problems	T.B-1,Ch-7, Pg-192	Black Board
19	Resolving power of a grating	T.B-1,Ch-7, Pg-183	Black Board
20	Resolving power of a grating- Problems	T.B-1,Ch-7, Pg-195	Black Board
21	Resolving power of Telescope	T.B-2,Ch-2, Pg-2.29	Black Board
22	Resolving power of Microscope	T.B-2,Ch-2, Pg-2.31	Black Board
23	Unsolved problems	T.B-1,Ch-7, Pg-195 T.B-2,Ch-2, Pg-2.28-2.44	Black Board
24	Introduction to polarization	T.B-1,Ch-8, Pg-201	Black Board
25	Types of polarization	T.B-1,Ch-8, Pg-205	Black Board
26	Polarization of reflection	T.B-1,Ch-8, Pg-208	Black Board
27	Polarization by refraction and double refraction	T.B-1,Ch-8, Pg-210	Black Board
28	Nicol's prism	T.B-1,Ch-8, Pg-214	Black Board
29	Halfwave and quarter wave plate	T.B-1,Ch-8, Pg-217	Black Board
30	Solved the Numerical	T.B-1,Ch-8, Pg-223	Black Board

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UNIT-II:Lasers and Fiber optics

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping mechanisms – Ruby laser – He-Ne laser - Applications of lasers.

Fiber optics: Introduction –Principle of optical fiber- Acceptance Angle - Numerical Aperture - Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers - Applications.

Session No	Topics to be Covered	Reference	Teaching Aids
1	Introduction to Lasers and Laser light	T.B-3,Ch-6, Pg-7.3	Black Board
2	Characteristics of lasers, spontaneous and stimulated emission	T.B-3,Ch-6, Pg-7.11	Black Board
3	Einstein coefficients	T.B-3,Ch-6, Pg-7.13	Black Board
4	Population inversion and lasing action	T.B-3,Ch-6, Pg-7.15	Black Board
5	Pumping mechanisms	T.B-3,Ch-6, Pg-7.24	Black Board
6	Working of Ruby laser	T.B-3,Ch-6, Pg-7.24-7.29	Black Board
7	Working of He-Ne laser	T.B-3,Ch-6, Pg-7.24-7.33	Black Board
8	Applications of lasers	T.B-3,Ch-6, Pg7.36	Black Board
9	Solve the problems	T.B-3,Ch-6, Pg-38	Black Board
10	Introduction to optical fibers	T.B-3,Ch-7, Pg-42	Black Board
11	Principle of optical fiber	T.B-3,Ch-7, Pg-45	Black Board
12	Acceptance angle and Numerical aperture	T.B-3,Ch-7, Pg-47	Black Board
13	Classification of optical fibers	T.B-3,Ch-7, Pg-51	Black Board
14	Modes of propagation of electromagnetic wave through optical fibers	T.B-3,Ch-7, Pg-54	Black Board
15	Engineering applications of optical fibers	T.B-3,Ch-7, Pg-60	Black Board
16	Solve the numericals	T.B-3,Ch-7, Pg-65	Black Board
Content beyond syllabus covered (if any) :No			

UNIT-III: Quantum Mechanics, Free Electron Theory and Band theory

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution- Density of states (3D) - Fermi energy.

Band theory of Solids: Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - v vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

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Session No	Topics to be Covered	Reference	Teaching Aids
1	Introduction - Matter waves	T.B-1,Ch-20, Pg-553	Black Board
2	Schröedinger TimeIndependent wave	T.B-1,Ch-20, Pg-581	Black Board
3	Schröedinger Time Dependent wave equations	T.B-1,Ch-20, Pg-579	Black Board
4	Numerical on Quantum Mechanics	T.B-1,Ch-20, Pg-567	Black Board
5	Particle in a box	T.B-1,Ch-20, Pg-584	Black Board
6	Numerical on particle in a box	T.B-1,Ch-20, Pg-598	Black Board
7	Problems on QM (Solved & unsolved)	T.B-1,Ch-20, Pg-597	Black Board
8	Introduction free electrons theory	T.B-2,Ch-7, Pg-7.3	Black Board
9	Defects of Classical free electron theory	T.B-2,Ch-7, Pg-7.11	Black Board
10	QuantumFree electron theory	T.B-2,Ch-7, Pg-7.13	Black Board
11	Concept of Fermi Energy	T.B-2,Ch-7, Pg-7.15	Black Board
12	Problems on FET (Solved)	T.B-2,Ch-7, Pg-7.24	Black Board
13	Problems on FET (Solved & unsolved)	T.B-2,Ch-7, Pg-7.24-	Black Board
14	Introduction free electrons theory	T.B-2,Ch-7, Pg-7.3	Black Board
15	Defects of Classical free electron theory	T.B-2,Ch-7, Pg-7.11	Black Board
16	QuantumFree electron theory	T.B-2,Ch-7, Pg-7.13	Black Board
17	Concept of Fermi Energy	T.B-2,Ch-7, Pg-7.15	Black Board
18	electrical conductivity based on quantum free	T.B-2,Ch-7, Pg-7.24	Black Board
19	Fermi Dirac distribution function –	T.B-2,Ch-7, Pg-7.24-	Black Board
20	expression for Fermi energy - Density of states		Black Board
21	Introduction to Band theory	T.B-1,Ch-29, Pg-835	Black Board
22	Bloch's theorem (qualitative)	T.B-1,Ch-29, Pg-837	Black Board
23	Kronig – Penney model	T.B-1,Ch-29, Pg-836	Black Board
24	Energy bands in crystalline solids	T.B-1,Ch-29, Pg-838	Black Board
25	Classification of crystalline solids	T.B-1,Ch-29, Pg-840	Black Board
26	Effective mass of electron	T.B-1,Ch-29, Pg-850	Black Board
27	concept of hole	T.B-2,Ch-8, Pg-8.15	Black Board
28	E Vs K diagram	T.B-2,Ch-8, Pg-8.17	Black Board
29	Problems on BT (Solved & unsolved)	T.B-1,Ch-29, Pg-846	Black Board

Unit-IV: Dielectric and Magnetic Materials

Magnetic Materials: Introduction - Magnetic dipole moment -MagnetizationMagnetic susceptibility and permeability - Origin of permanent magnetic moment - Classification of magnetic materials: Dia, para, Ferro, antiferro&Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials- Eddy currents- Engineering applications.
Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility and Dielectric constant - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal fieldClausius- Mossotti equation- Piezoelectricity.

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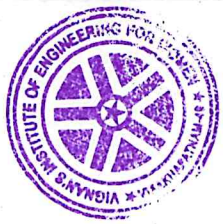
Session No	Topics to be Covered	Reference	Teaching Aids
1	Introduction to Magnetism, magnetic	T.B-3,Ch-7, Pg-7.3	Black Board
2	Magnetization-Magnetic susceptibility	T.B-3,Ch-7, Pg-7.11	Black Board
3	Origin of permanent magnetic moment	T.B-3,Ch-7, Pg-7.13	Black Board
4	Bohr Magneton	T.B-3,Ch-7, Pg-7.15	Black Board
5	Classification of magnetic materials	T.B-3,Ch-7, Pg-7.24	Black Board
6	Domain concept of ferromagnetism	T.B-3,Ch-7, Pg-7.24-	Black Board
7	Hysteresis – soft and hard magnetic		Black Board
8	Applications of Ferromagnetic materials.	T.B-3,Ch-29, Pg-83	Black Board
9	Introduction - Dielectric	T.B-3,Ch-29, Pg-83	Black Board
10	types of polarizations: Electronic	T.B-3,Ch-29, Pg-83	Black Board
11	and Ionic polarization (Quantitative)	T.B-3,Ch-29, Pg-83	Black Board
12	Orientation polarizations	T.B-3,Ch-29, Pg-84	Black Board
13	Lorentz internal field	T.B-3,Ch-29, Pg-85	Black Board
14	Claussius_Mossoti equation	T.B-3,Ch-30, Pg-87	Black Board
15	Frequency dependence of polarization	T.B-3,Ch-30, Pg-88	Black Board
16	Applications of dielectrics	T.B-3,Ch-30, Pg-89	Black Board
Content beyond syllabus covered (if any) :No			

Unit – V: Semiconductors and Superconductors

Semiconductors: Introduction- Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – extrinsic semiconductors – density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation- Hall effect – Hall coefficient –Applications of Hall effect. Superconductors: Introduction – Properties of **Superconductors:** Meissner effect – Type I and Type II superconductors – BCS theory (Qualitative) – Josephson effects (AC and DC) – SQUIDs – High Tc superconductors – Applications of superconductors.

1	Introduction to semiconductors	T.B-1,Ch-30, Pg-853	Black Board
2	Conduction	T.B-1,Ch-29, Pg-853	Black Board
3	Density of carriers in Intrinsic semiconductors	T.B-1,Ch-29, Pg-864	Black Board
4	Electrical conductivity – Fermi level	T.B-1,Ch-29, Pg-865	Black Board
5	Density of carriers in Extrinsic semiconductors	T.B-1,Ch-29, Pg-872	Black Board
6	Dependence of Fermi energy on carrier concentration and temperature	T.B-1,Ch-29, Pg-88	Black Board
7	Drift & Diffusion currents	T.B-1,Ch-29, Pg-887	Black Board
8	Relevance of Einstein's equation	T.B-2,Ch-16, Pg-16.24	Black Board
9	Hall effect in semiconductors and applications	T.B-1,Ch-29, Pg-894	Black Board
10	Problems on SC(Solved & unsolved)	T.B-2,Ch-16, Pg-16.34	Black Board
11	Introduction to superconductors	T.B-1,Ch-30, Pg-903	Black Board
12	Meissner effect	T.B-1,Ch-30, Pg-905	Black Board
13	Type I and Type II superconductors	T.B-1,Ch-30, Pg-907	Black Board
14	BCS theory	T.B-1,Ch-30, Pg-911	Black Board
15	Josphson effects	T.B-1,Ch-30, Pg-915	Black Board
16	SQUIDS, High TC Superconductors	T.B-1,Ch-30, Pg-918	Black Board
17	Applications of superconductors	T.B-1,Ch-30, Pg-925	Black Board
18	Solve the numerical	T.B-1,Ch-30, Pg-932	Black Board



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GRADUATE ATTRIBUTES (PO's)

S.No	*Graduate Attribute*	*Main Verb*	*Level*
01	Engineering Knowledge	Applying	***K3***
02	Problem Analysis	Analyzing	***K4***
03	Design development of solutions	Evaluating	***K5***
04	Investigation of complex problems	Evaluating	***K5***
05	Modern tool usage	Creating Evaluating Applying	***K6,K5,K3***
06	The Engineer and society		
07	Environment and sustainability		
08	Ethics		
09	Individual and Team work		
10	Communication		
11	Project management and finance		
12	Lifelonglearning		

Mapping CO'S and PO'S:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	-	-	-	-	-	-	-	1
CO2	3	2	2	-	-	-	-	-	-	-	-	1
CO3	3	-	2	-	-	-	-	-	-	-	-	1
CO4	3	1	3	-	-	2	2	2	-	-	-	1
CO5	3	-	3	-	-	2	2	-	-	-	-	1

1: Weakly Mapped 2: Average Mapped

3: Strongly Mapped

Text Books:

1."A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar - S.ChandPublications, 2017.

2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).

3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books:

1. "Engineering Physics" by M. R. Srinivasan, New Age international publishers (2009).

2. "Optics" by AjoyGhatak, 6th Edition McGraw Hill Education, 2017.

3. "Solid State Physics" by A. J. Dekker, Mc Millan Publishers (2011).

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VIGNAN'S INSTITUTE OF ENGINEERING FOR WOMEN: VISAKHAPATNAM
COURSE DELIVERY PLAN –THEORY

DEPARTMENT OF MANAGEMENT STUDIES			T	: 5+1
Course	:MBA		P	: 0
Regulation	: R-19		C	:3
PG Specialization	: Finance		Date	:30/03/2022
Course Code	: EF 401		Rev No	:00
Course Name	:Financial Derivatives			
Class	Course Coordinator	Section	Name of the Faculty	
II MBA IV SEM	S.RAMESH	MBA	S.RAMESH	

Unit-I:

Objective: To enlighten the students with the concepts and practical applications of derivatives in the security markets.

Unit - I: Introduction to Financial Derivatives – Meaning and Need – Growth of Financial Derivatives in India – Derivative Markets – Participants- Functions – Types of Derivatives – Forwards – Futures – Options-Swaps – The Regulatory Framework of Derivatives Trading in India.

Objective:

1. It helps to understand the Financial Derivatives system in economic development
2. The students can analyze the decision making process and organization structures and functions of Derivatives markets in India

Session No	Topics to be Covered	Reference	Teaching Aids
1	Introduction to Financial Derivatives	TB-3,Pg:1.1	online
2	Meaning and Need of Financial Derivatives	TB-2,Pg:1.3-1.7	online
3	Growth of Financial Derivatives in India	TB-2,Pg:2.1-2.6	Online
4	Derivatives Markets	TB-3,Pg:3.1-3.4	online
5	Participants in Derivatives markets	TB:3,Pg:3.7,3.8,3.9	online
6	Functions of Derivatives Markets	TB-1,Pg:2.8-2.9	online
7	Types of Derivatives	TB-3,Pg:4.4	Online
8	Forwards in Derivatives markets	TB-3,Pg:4.5	online
9	Futures in Derivatives Markets	TB-2, Pg:2.5	online
10	Functions of Options	TB-3,Pg:5.3-5.12	online
11	Functions of Swaps	TB-2, Pg:3.5-3.8	online

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12	Regulatory Framework	TB-3, Pg-4.3-4.8	online
13	Formalities in trading system	TB-1, Pg-2.3-2.9	online
14	Derivatives trading in India	TB-1, Pg-3.2-.39	Online
Content beyond syllabus covered (if any) : Practical applicability of Derivatives markets in Indian financial Scenario			
Course Outcome (CO1): By this unit we can understand the role of Derivatives markets in business development and understand the operating system of financial markets in our country and Derivatives Trading in India.			

UNIT-II

Features of Futures –Differences Between Forwards and Futures – Financial Futures – Trading – Currency Futures – Interest Rate Futures – Pricing of Future Contracts- Value at Risk (VaR)-Hedging Strategies – Hedging with Stock Index Futures – Types of Members and Margining System in India – Futures Trading on BSE & NSE.

Objective:

1. It helps to understand the Forwards and Futures, Trading, currency Futures- Value at Risk
2. To understand different roles of Hedging with Stock Index Futures- Futures Trading on BSE and NSE

Session No	Topics to be Covered	Reference	Teaching Aids
15	Concept of Futures	TB-3,Pg:6.1	online
16	Differences between Forwards and Futures	TB-1,Pg:5.3	online
17	Growth of Futures and Forwards in India	TB-3,,Pg:8.1-8.2	online
18	Financial Futures	TB-3,Pg:12.13-12.14	online
19	Interest Rate Futures- Pricing of Future Contracts	TB-3,Pg:13.7-13.11	online
20	Pricing of Future Contracts	TB-2,Pg:10.3	online
21	Value at Risk (VAR)	TB-2,Pg:10.4	online
22	Hedging Strategies with stock Index Futures	TB-2,Pg:10.15	online
23	Types of members and Margining system in India-Futures Trading on BSE and NSE	TB-2,Pg:19.5-19.8	Online
Content beyond syllabus covered (if any)			
Course Outcome (CO2): Student can understand the Futures and Forwards and the procedural aspects of trading on BSE and NSE			

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UNIT-III:

: Options Market – Meaning & Need – Options Vs Futures -Types of Options Contracts – Call Options – Put Options- Trading Strategies Involving Options – Basic Option Positions – Margins – Options on Stock Indices – Option Markets in India on NSE and BSE.

Objective:

1. It helps to understand the need of Options and Futures
2. Student can understand about options markets on NSE and BSE

Session No	Topics to be Covered	Reference	Teaching Aids
24	History of Options market in India	TB-2,Pg:14.1	online
25	Definition and meaning of Options Market	TB-2,Pg:12.3-12.5	online
26	Options vs Futures	TB-2,Pg:14.1-14.28	online
27	Types of Options Contracts	TB-3,Pg:24.3-24.8	online
28	Call options	TB-2,Pg:14.20-14.24	online
29	Put Options	TB-2,Pg:11.1-11.3	online
30	Trading strategies involving options	TB-2,Pg:11.3-11.10	online
31	Basic option options	TB-2,Pg:11.10-11.3	online
32	Margins-Options on stock indices	TB-2,Pg:11.13-11.16	online
33	Options markets in India on NSE and BSE	TB-2,Pg:11.00-11.02	Online
Content beyond syllabus covered (if any) :			
Course Outcome (CO3): To create an sense of awareness among students in areas of option markets in India			

UNIT-IV:

Unit - IV: Option Pricing – Intrinsic Value and Time Value- Pricing at Expiration – Factors Affecting Options pricing- Put-Call Parity Pricing Relationship- Pricing Models - Introduction to Binominal Option Pricing Model – Black Scholes Option Pricing Model.

Objective:

1. To understand the option pricing in business houses
2. To enhance the knowledge of various pricing models

Session No	Topics to be Covered	Reference	Teaching Aids
34	Introduction of option pricing	TB-2,Pg:15.3-15.8	online
35	Intrinsic value of option pricing	TB-2,Pg:15.3	online
36	Time value of option pricing	TB-2,Pg:15.7	online
37	Option pricing models	TB-3,Pg:28.1-28.4	online

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38	Pricing at Expiration	TB-2,Pg:16.4-16.16	online
39	Factors affecting options pricing	TB-1,Pg:16.8-16.16	online
40	Put option	TB-3,Pg:1.4-1.16	online
41	Call option	TB-3,Pg:14-16	online
42	Types of pricing Relationship	TB-1,Pg:3.4-3.16	online
42	Binominal Pricing model	TB-1,Pg:10-16	online
43	Black Scholes option pricing model	TB-2 Pg-8-15	**Online**
Content beyond syllabus covered (if any) : •			
Course Outcome (CO4): Student can evaluate risk by various option models			

Unit-V:

Unit – V: Swaps – Meaning – Overview – The Structure of Swaps – Interest Rate Swaps – Currency Swaps – Commodity Swaps – Swap Variant – Swap Dealer Role –Equity Swaps – Economic Functions of Swap Transactions - FRAs and Swaps.

Objective:

1. Student can understand Swaps and their structure
2. It helps to evaluate various types of swaps and swap transactions

Session No	Topics to be Covered	Reference	Teaching Aids
44	Swaps- Definition and meaning	TB-3,Pg:30.1	online
45	Swaps – concept and objectives	TB-3,Pg:30.6-30.8	online
46	Overview of SWAPS	TB-2,Pg:17.12-17.16	online
47	Interest rate swaps	TB-2,Pg:18.12-18.14	online
48	Guidelines of currency swaps	TB-2,Pg:19.1-19.12	online
49	Working of commodity swaps	TB-2, Pg:56-59	online
50	Swap variant	TB-2, Pg:19.2-19.9	online
51	Role of Swap dealer	TB-1, Pg:20-25	online
52	Equity swaps	TB-2, Pg:34-39	online

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53	Economic functions of Swap Transactions	TB-1, Pg:45-49	online
54	Role of FRA's and Swaps	TB-2, Pg:90-95	Online
Content beyond syllabus covered (if any) : •			
Course Outcome (CO5): Student must understand about various types of swaps and swap transactions			

Mapping CO'S and PO'S:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	5		4		3	2	1					
CO2	2	5	1	3	4							
CO3		4	5	3	2	1						
CO4		1	2	5	3	4						
CO5		4	3	2	5	1						
CO6		1	2	3	4	5						

1: Weekly Mapped 2: Mapped 3: Average Mapped

4: Strongly Mapped 5: Very Strongly Mapped

References:

Text Book:
S.C. Gupta. Financial Derivatives : Theory, concepts and problems, Prentice Hall of India
NSE Manual of Indian Futures and Options and www. Sebi.com
T.V.Somanadhan, Derivatives, Tata Mc Graw- Hill Publishing company Ltd
D.C.Patwari, Financial Futures and Options, Jaico Publishing house
Websites of Chartered accountancy and CMA

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