LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF AEROSPACE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : **S.Indrasena Reddy**
Course Name & Code : MOC & 20AE22
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., ASE., VII-Sem. A.Y : 2023-24

PRE-REQUISITE: Strength of materials

COURSE EDUCATIONAL OBJECTIVES (CEOs): To Learn the basic knowledge about composite materials at micro and macro level, lamina and laminates, basic design concepts of sandwich panels, functionally graded materials and the manufacturing process of composite materials.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	understand stress-strain relations of orthotropic materials [Understand L2]
CO 2	analyze properties of composite lamina at micro level and macro level [Analyze-L4]
CO 3	analyze characteristics of layered composites [Analyze-L4]
CO 4	understand the nomenclature of sandwich structures [Understand-L2]
CO 5	apply techniques of fabrication processes to manufacture composites

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2								2	3	2
CO2	3	3	3	2								2	3	2
CO3	3	3	3	2								2	3	2
CO4	3	3	3	2								2	3	2
CO5	2	2	2	2								2	2	2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS:

T1 Calcote, LR., "The Analysis of laminated Composite Structures", Von – Noastrand Reinhold Company, New York 1998.
T2 Jones, R.M., "Mechanics of Composite Materials", 2nd Edition McGraw-Hill, KogakushaLtd.,Tokyo, 1998.
T3 Carlsson, L.A., Kardomateas, G.A., "Structural and Failure Mechanics of Sandwich", Solid Mechanics and its Applications, Vol 121, Springer Heidlberg, New York, 2011.

REFERENCE BOOKS:

R1 Agarwal, B.D., Broutman, L.J., "Analysis and Performance of Fibre Composites", John Wiley and sons. Inc., New York, 1995
R2 Lubin, G., "Handbook on Advanced Plastics and Fibre Glass", Von Nostrand Reinhold Co.,New York, 1989.Publishers,3rd edition 2010.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: STRESS STRAIN RELATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Composite materials introduction	1	03-07-23		TLM1	
2.	History of composites	1	04-07-23		TLM1	
3.	Role of reinforcement and Matrix	1	05-07-23		TLM1	
4.	Classification of composites	1	06-07-23		TLM1	
5.	Advantages and applications	1	07-07-23		TLM1	
6.	Aerospace Applications	1	10-07-23		TLM1	
7.	Other Applications	1	11-07-23		TLM1	
8.	Types of Fibers	1	12-07-23		TLM1	
9.	Properties of Fibers	1	13-07-23		TLM1	
10.	Applications of Fibers	1	14-07-23		TLM1	
11.	Types of matrix and their applications	1	17-07-23		TLM1	
12.	Generalized Hooke's Law	1	18-17-23		TLM1	
13.	Compliance and stiffness matrix	1	19-07-23		TLM1	
14.	Stress strain relations for non-isotropic materials	1	20-07-23		TLM1	
15.	Stress strain relations for orthotropic materials	1	21-07-23		TLM1	
No. of classes required to complete UNIT-I: 15				No. of classes taken:		

UNIT-II: METHODS OF ANALYSIS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to macro mechanics	1	24-07-23		TLM1	
2.	Stress-strain relations	1	25-07-23		TLM1	
3.	Strain-stress relations	1	26-07-23		TLM1	
4.	Stress-strain relation of orthotropic Lamina on-axis	1	27-07-23		TLM1	
5.	Stress-strain relation of orthotropic Lamina Arbitory orientation	1	28-07-23		TLM1	
6.	Determination of material properties	1	01-08-23		TLM1	
7.	Experimental characterization	1	02-08-23		TLM1	
8.	Problems on lamina properties	1	03-08-23		TLM3	
9.	Introduction to micro mechanics	1	04-08-23		TLM1	
10.	Mechanics of materials approach	1	07-08-23		TLM1	
11.	Determine elastic Four constants	1	08-08-23		TLM1	
12.	Problems on Lamina	1	09-08-23		TLM1	
13.	Elasticity approach to materials	1	10-08-23		TLM3	
14.	Properties of lamina	1	11-08-23		TLM1	
15.	Bonding Techniques	1	14-08-23		TLM1	
No. of classes required to complete UNIT-II:15				No. of classes taken:		

UNIT-III: MULTI DIRCTIONAL COMPOSITES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to laminate	1	16-08-23		TLM1	
2.	Macromechanics of Laminate	1	17-08-23		TLM1	
3.	Types of Laminates and Notations	1	18-08-23		TLM1	
4.	Equilibrium equations for laminate	1	21-08-23		TLM1	
5.	Stress strain variation in Laminate	1	22-08-23		TLM1	
6.	Classical Laminate Theory	1	23-08-23		TLM1	
7.	A,B,D matrices	1	24-08-23		TLM1	
8.	Symmetric Laminate	1	25-08-23		TLM1	
9.	Anti-Symmetric Laminate	1	05-09-23		TLM1	
10.	Analysis of Symmetric laminate	1	07-09-23		TLM1	
11.	Cross ply laminates	1	08-09-23		TLM1	
12.	A,B, D matrices Cross ply laminates	1	11-09-23		TLM1	
13.	angle ply laminates	1	12-09-23		TLM1	
14.	A,B, D matrices angle ply laminates	1	13-09-23		TLM3	
15.	Failure criteria of laminates	1	14-09-23		TLM1	
16.	Failure theories (T-Sai. T-sai-Wu etc)	1	15-09-23		TLM1	
17.	strength of laminates	1	19-09-23		TLM1	
No. of classes required to complete UNIT-III:17				No. of classes taken:		

UNIT-IV: SANDWICH CONSTRUCTIONS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to sandwich construction	1	20-09-23		TLM1	
2.	Design concepts of sandwich panels	1	21-09-23		TLM1	
3.	Facing/Skin Materials	1	22-09-23		TLM1	
4.	Core Materials	1	25-09-23		TLM1	
5.	Flexural rigidity of sandwich with same face thickness	1	26-09-23		TLM1	
6.	Flexural rigidity different skin thickness	1	27-09-23		TLM3	
7.	Deflection of sandwich beams	1	29-09-23		TLM1	
8.	Problems on sandwich panels	1	03-10-23		TLM1	
9.	Applications of Sandwich panels	1	04-10-23		TLM1	
10.	Failure modes of sandwich panels	1	05-10-23		TLM1	
11.	Failure modes of sandwich panels	1	06-10-23		TLM1	
12.	Failure modes of sandwich panels	1	09-10-23		TLM1	
No. of classes required to complete UNIT-IV:12				No. of classes taken:		

UNIT-V: FABRICATION PROCESSES & FUNCTIONALLY GRADED MATERIALS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to fabrication process	1	10-10-23		TLM1	
2.	Fabrication of Carbon Fiber	1	11-10-23		TLM1	
3.	Fabrication of Boron Fiber	1	12-10-23		TLM1	

4.	Fabrication of Glass Fiber	1	13-10-23		TLM1	
5.	Open mould fabrication processes	1	16-10-23		TLM1	
6.	Closed mould Fabrication processes	1	17-10-23		TLM1	
7.	Hand Layup, Spray Layup process	1	18-10-23		TLM1	
8.	Vacuum bagging Process	1	19-10-23		TLM1	
9.	Vacuum infusion Process	1	20-10-23		TLM1	
10.	Pressure bagging Process	1	24-10-23		TLM1	
11.	Pultrusion Process	1	25-10-23		TLM1	
12.	Resin Transfer Moulding Process	1	26-10-23		TLM1	
13.	Auto Clave	1	27-10-23		TLM1	
14.	Filament Winding	1	30-10-23		TLM1	
15.	Introduction to FGM	1	31-10-23		TLM1	
16.	Functionally Graded Materials	1	01-11-23		TLM1	
No. of classes required to complete UNIT-V:16				No. of classes taken:		

Advanced Topics/ beyond Syllabus in MOC

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Materials used in Aerospace	1	02-11-23		TLM1	
2.	Advanced Fabrication Techniques	1	03-11-23		TLM1	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	Marks
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures and Flight Dynamics in the Aerospace vehicle design
PSO 2	To prepare the students to work effectively in Aerospace and Allied Engineering organizations

Course Instructor	Module Coordinator	HoD
(S.Indrasena Reddy)	(S.Indrasena Reddy)	(Dr.P.Lovaraju)

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COURSE HANDOUT

PROGRAM : B.Tech, VII Sem, Aerospace Engineering
ACADEMIC YEAR : 2023-2024
COURSE NAME AND CODE : 20AE28-SPACE MECHANICS
L-T-P STRUCUTRE : 3-0-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : Dr.Sreenadh Chevula
COURSE COORDINAOTR : Dr.Sreenadh Chevula

PRE-REQISITE

Course educational objectives : To learn basic aspects of space and solar system, Satellite injection and its orbit perturbations, an interplanetary trajectory issues, ballistic missile trajectories and material used of spacecraft

COURSE OUTCOMES(Co's) At the end of the course students are able to

CO1	Understand the basic aspects of space [Understand-L2]
CO2	Evaluate trajectory details of ballistic missiles [Analyze-L4]
CO3	Apply N-body aspects in space exploration issues [Apply-L3]
CO4	Know the general aspects of satellite injection and orbit perturbations [Understand-L2]
CO5	Evaluate interplanetary trajectories of spacecraft [Analyze-L4]

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	**PSO1**	**PSO2**
CO1	3	3	1	1	-	-	-	-	-	-	-	2	**2**	**3**
CO2	3	3	3	3	-	-	-	-	-	-	-	2	**3**	**3**
CO3	3	3	3	3	-	-	-	-	-	-	-	3	**3**	**3**
CO4	3	3	1	1	-	-	-	-	-	-	-	2	**3**	**3**
CO5	3	3	3	3	-	-	-	-	-	-	-	2	3	3

BOS APPROVED TEXT BOOKS

T1 W.E. Wiesel, "Spaceflight Dynamics", McGraw-Hill, 1997

T2 Comelisse, Schoyer HFR, Wakker KF, "Rocket Propulsion and Space Flight Dynamics", Pitman publications, 1984

T3 Van de Kamp, P., "Elements of Astro-mechanics", Pitman, 1979.

T4 Parker E.R., "Materials for Missiles and Spacecraft", McGraw-Hill Book Co. Inc., 1982. Series, Published by AIAA, 2002

T5 Vladimir A. Chobotov, "Orbital Mechanics", AIAA Education Series, AIAA Education Series, AIAA Education Series, Published by AIAA, 2002

COURSE DELIVERY PLAN (LESSON PLAN)

UNIT - I BASIC CONCEPTS

s.No	Topics to be Covered	No of classes required	Tentative date of completion	Actual Date of completion	Teaching Learning method	Learning Outcomes	Text Book Followed	HoD Sign Weekly
1	References Frames and Coordinate Systems	1	13-07-2023	13-07-2023	TLM2	CO1	T1&T2	
2	The celestial sphere,	2	14,15-07-2023	14,15-07-2023	TLM2	CO1	T1&T2	
3	Theecliptic, Motion of Vernal Equinox:	1	17-07-2023	17-07-2023	TLM2	CO1	T1&T2	
4	Time and calendar Sidereal Time	2	18,20-07-2023	18,20-07-2023	TLM2	CO1	T1&T2	
5	Solar Time, Standard time	1	21-07-2023	21-07-2023	TLM2	CO1	T1&T2	
6	The Earth's atmosphere	2	20,24-07-2023	20,24-07-2023	TLM2	CO1	T1&T2	
7	The space environment	1	25,27-07-2023	25,27-07-2023	TLM2	CO1	T1&T2	
Total No of classes required to complete Unit-1		10	No of Clasess Taken :	11				

UNIT - II BALLISTIC MISSILE TRAJECTORIES

s.No	Topics to be Covered	No of classes required	Tentative date of completion	Actual Date of completion	Teaching Learning method	Learning Outcomes	Text Book Followed	HoD Sign Weekly
1	The Boost Phase: The Ballistic Phase	3	01, 03, 04-08-2023	01, 03, 04-08-2023	TLM2	CO2	T1&T2	
2	Trajectory Geometry, Optimal Flights	3	05,07, 09-08-2023	05,07, 09-08-2023	TLM2	CO2	T1&T2	
3	Time of Flight: The re-entry phase	3	10, 11, 12-08-2023	10, 11, 12-08-2023	TLM2	CO2	T1&T2	
4	The position of the impact point	4	14, 17, 18, 19-08-2023		TLM2	CO2	T1&T2	
	21-08-2023 to 25-8-2023 CRT							
	28-08-2023 to 02-09-2023 MID-1 Examination							
5	Spherical earth, Oblate Earth, Influence Coefficients	4	04,05, 07,08-09-2023		TLM2	CO2	T1&T2	
Total No of classes required to complete Unit-II		17	No of Clasess Taken :					

UNIT - III THE MANY- BODY PROBLEM

s.No	Topics to be Covered	No of classes required	Tentative date of completion	Actual Date of completion	Teaching Learning method	Learning Outcomes	Text Book Followed	HoD Sign
1	General N-body problem:	1	11-09-2023					Weekly
2	The Circular Restricted Three Body Problem	2	12, 14-09-2023		TLM2	CO3	T1&T2	
3	Jocob's integral, Libration Points	3	15,16,19-09-2023		TLM2	CO3	T1&T2	
4	Applications to space flight:	3	21,22,23-09-2023		TLM2	CO3	T1&T2	
5	Relative Motion in the N-body Problem	3	25,26,29-09-2023		TLM2	CO3	T1&T2	
6	Satellite orbit perturbations	3	30-09-2023,3,05-10-2023		TLM2	CO3	T1&T2	
7	Two-Body Problem circular, elliptic	2	6,7-10-2023		TLM2	CO3	T1&T2	
8	parabolic and hyperbolic orbits: Orbital Elements	2	09,10-10-2023		TLM2	CO3	T1&T2	
Total No of classes required to complete Unit-III		19	No of Clasess Taken :		TLM2	CO3	T1&T2	

UNIT - IV SATELLITE LAUNCHING AND ORBIT PERTURBATIONS

s.No	Topics to be Covered	No of classes required	Tentative date of completion	Actual Date of completion	Teaching Learning method	Learning Outcomes	Text Book Followed	HoD Sign
1	Launch vehicle ascent trajectories:	1	12-10-2023					Weekly
2	Satellite Injection- General Aspects:	2	13,14-10-2023		TLM2	CO4	T1&T2	
3	Launch vehicle performances: Orbit deviations:	2	16,17-10-2023		TLM2	CO4	T1&T2	
4	Special and General Perturbations	2	19,20-10-2023		TLM2	CO4	T1&T2	
5	cowell's method, encke's method	2	21,24-10-2023		TLM2	CO4	T1&T2	
6	method of variation of orbital elements	2	26,27-10-2023		TLM2	CO4	T1&T2	
7	General Perturbations Approach	1	28-10-2023		TLM2	CO4	T1&T2	
Total No of classes required to complete Unit-IV		12	No of Clasess Taken :		TLM2	CO4	T1&T2	

30-10-2023 to 04-11-2023 MID-2 Examination

UNIT - V INTERPLANETARY TRAJECTORIES

s.No	Topics to be Covered	No of classes required	Tentative date of completion	Actual Date of completion	Teaching Learning method	Learning Outcomes	Text Book Followed	HoD Sign
1	Two Dimensional Interplanetary trajectories	1	06-11-2023		TLM2	CO5	T1&T2	Weekly
2	Hohmann trajectories, Fast Interplanetary Trajectories	2	7,9-11-2023		TLM2	CO5	T1&T2	
3	Launch opportunities:	2	10, 11-11-2023		TLM2	CO5	T1&T2	
4	Three Dimensional	2	Additional hours from labs and other sessions		TLM2	CO5	T1&T2	
5	Interplanetary Trajectories	1			TLM2	CO5	T1&T2	
6	Launch if interplanetary Spacecraft:	1			TLM2	CO5	T1&T2	
7	Trajectory about the Target Planet.	1			TLM2	CO5	T1&T2	
Total No of classes required to complete Unit-V		10	No of Clasess Taken :		TLM2	CO5	T1&T2	

13-10-2023 to 25-11-2023 Sem end examination

Teaching Learning Method	
TLM2	PPT and Chalk and Talk

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DEPARTMENT OF AEROSPACE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. P. Venkateswara Rao, Sr. Asst.Professor
Course Name & Code : Systems and signal Processing-20EC85 **Regulation**: R20
L-T-P Structure : 3-0-0 **Credits:** 03
Program/Sem/Sec : B. Tech. VII-Sem., Aerospace Engineering **A.Y.:** 2023-24

PRE-REQUISITE: Differentiation and Integration

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides basic knowledge on signals, operations, representation of signals in frequency domain using Fourier series, Fourier transform and Z transform. This course introduces underlying concepts of sampling & reconstruction, types of systems and filter design.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Discuss the classification of signals and systems along with their properties and the Concepts of sampling. **(Understand – L2)**
CO2	Apply the concepts of Fourier series, Fourier Transform and Z Transform on signals. **(Apply – L3)**
CO3	Describe the systems and observe the response of Linear Systems. **(Understand – L2)**
CO4	Design IIR Digital Filters by applying Approximation Procedures and FIR Digital Filters through Window Techniques. **(Apply – L3)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	-	-	-	-	-	-	-	1	-	-	1
CO2	2	2	1	1	-	-	-	-	-	-	-	2	-	-	2
CO3	3	1	1	1	-	-	-	-	-	-	-	1	-	-	3
CO4	3	2	2	1	-	-	-	-	-	-	-	2	-	-	3
1 - Low **2 –**Medium **3 -** High															

TEXTBOOKS:

T1	A V Oppenheim, A S Wilsky and IT Young, "*Signals and Systems*", PHI/Pearson publishers, 2nd Edition.
T2	John G. Proakis, "*Digital Signal Processing, Principles, Algorithms & Applications*", Pearson education, Fourth edition, 2007

REFERENCE BOOKS:

R1	A.Anand Kumar, "*Signals and Systems*", 2nd Edition, PHI, 2012.
R2	B P Lathi, "*Signals, Systems and Communications*", BSP, 2003, 3rd Edition.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN)

UNIT-I: Signal Analysis, Operations of Signals

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to course, Course Outcomes, Introduction to UNIT-I	1	03-07-23			
2.	Concept of signal	1	04-07-23			
3.	Classification of Signals	2	06-07-23 07-07-23			
4.	Representation of elementary signals	1	10-07-23			
5.	Time shifting and Time reversal operatiuons	1	11-07-23			
6.	Time scaling and Amplitude scaling operations	1	13-07-23			
7.	Problems on operations on signals	2	14-07-23 15-07-23			
8.	Even and Odd, Causal and Non causal signals	1	17-07-23			
9.	Bounded and unbounded signals	1	18-07-23			
10.	Periodic and aperiodic signals	1	20-07-23			
11.	Energy and power, Deterministic and random signals	1	21-07-23			
12.	Problems on Properties of signals	2	22-07-23 24-07-23			
No. of classes required to complete UNIT-I: 15				**No. of classes taken:**		

UNIT-II: Fourier series, Fourier Transform, Sampling Theorem

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Concept of Fourier Series	1	25-07-23			
14.	Trigonometric Fourier Series	1	27-07-23			
15.	Exponential Fourier Series	1	28-07-23			
16.	Problems on Trigonometric Fourier Series	1	31-07-23			
17.	Problems on Exponential Fourier Series	1	01-08-23			
18.	Relationship between Trigonometric and Exponential Fourier Series	2	03-08-23 04-08-23			
19.	Existence of Fourier Transform	1	05-08-23			
20.	Properties of Fourier Transform	1	07-08-23			

21.	Problems on Fourier Transform	1	08-08-23			
22.	Sampling Theorem for band limited signals	2	10-08-23 11-08-23			
23.	Reconstruction of original signal	1	14-08-23			
24.	Types of Sampling	1	17-08-23			
25.	Effects of Under Sampling-Aliasing	1	18-08-23			
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

UNIT-III: Signal Transmission through linear systems, Z-Transform

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Definition of system	1	19-08-23			
27.	Linear and Nonlinear systems	1	21-08-23			
28.	Time invariant and Time variant systems	1	22-08-23			
29.	Causal and non-causal systems, stable and unstable systems	1	24-08-23			
30.	Problems on types of systems	2	25-08-23 26-08-23			
31.	Response of Linear systems-convolution Continuous time domain	1	04-09-23			
32.	Response of Linear systems-convolution Discrete time domain	1	05-09-23			
33.	Z-Transform Definition, Region of convergence	1	07-09-23			
34.	Properties of Z-Transform	1	08-09-23			
35.	Inverse Z-Transform through Partial fractions	1	11-09-23			
36.	Problems on Z-Transform	1	12-09-23			
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Discrete Fourier Transform, Fast Fourier Transform

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Introduction to Discrete Time Fourier Transform	1	14-09-23			
38.	Concept of DFT	1	15-09-23			
39.	Properties of DFT	2	16-09-23 19-09-23			
40.	Circular convolution	1	21-09-23			
41.	Problems on DFT	2	22-09-23 23-09-23			
42.	Problems on circular convolution	1	25-09-23			
43.	Need of FFT	1	26-09-23			
44.	Radix-2 Decimation in Time FFT Algorithm	1	29-09-23			

45.	Radix-2 Decimation in Frequency FFT Algorithm	1	30-09-23			
46.	Inverse FFT	1	03-10-23			
47.	Problems on FFT	1	05-10-23			
No. of classes required to complete UNIT-IV: 13				**No. of classes taken:**		

UNIT-V: Filters, IIR Filter Design, FIR Filter Design

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	Concept of Filter	1	06-10-23			
49.	Characteristics of Filters-LPF, HPF	1	07-10-23			
50.	Characteristics of Filters-BPF, BEF	1	09-10-23			
51.	Specifications of IIR Filters	1	10-10-23			
52.	Analog Butterworth IIR filter design using Impulse Invariant Transformation	1	12-10-23			
53.	Analog Butterworth IIR filter design using Bilinear Transformation	1	13-10-23			
54.	Problems on IIR filter design	2	16-10-23 17-10-23			
55.	Design of FIR filters using Fourier series Method	1	19-10-23			
56.	Rectangular window	1	20-10-23			
57.	Hanning window	1	21-10-23			
58.	Hamming window	1	24-10-23			
59.	Problems on FIR Filter design	1	26-10-23			
No. of classes required to complete UNIT-V: 13				**No. of classes taken:**		

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
60.	Applications of signal Processing	2	27-10-23 28-10-23		TLM1	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education
PEO 2	To Function professionally in the rapidly changing world with advances in technology
PEO 3	To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices
PEO 4	To Exercise leadership qualities, at levels appropriate to their experience, which addresses issues in a responsive, ethical, and innovative manner?

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations

PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry
PSO 2	Design and Analyze Analog and Digital Electronic Circuits or systems and implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Date: 03-07-2023

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr.P. Venkateswara Rao**	**Dr. GLN Murthy**	**Dr. Y. Amar Babu**
Signature			

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DEPARTMENT OF AEROSPACE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.MB.Chakravarthy, Sr. Asst.Professor
Course Name & Code : Linear Control Systems-20EE81 **Regulation**: R20
L-T-P Structure : 3-0-0 **Credits:** 03
Program/Sem/Sec : B. Tech. VII-Sem., Aerospace Engineering **A.Y.:** 2023-24

PRE-REQUISITE: None

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to introduce to the students the principles and applications of control systems in everyday life. It deals with the basic concepts ofblock diagram reduction, time domain analysis solutions to time invariant systems the different aspects of stability analysis of systems in frequency domain and time domain.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Develop mathematical model of linear time invariant systems. **(Apply-L3)**
CO2	Realize transfer function representation of system from conventional and state spaceapproach **(Apply-L3)**
CO3	Analyze linear time invariant systems in Time domain **(Apply-L3)**
CO4	Analyze time invariant systems in Frequency domain**(Apply-L3)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	-	-	-	-	-	-	-	-	1	-	-	1
CO2	2	2	1	1	-	-	-	-	-	-	-	2	-	-	2
CO3	3	1	1	1	-	-	-	-	-	-	-	1	-	-	3
CO4	3	2	2	1	-	-	-	-	-	-	-	2	-	-	3
1 - Low **2 –**Medium **3 -** High															

TEXTBOOKS:

T1	B. C. Kuo , "Automatic Control Systems" , John wiley and sons ,9th edition, 2014
T2	I. J. Nagrath and M. Gopal, "Control Systems Engineering", New Age International (P)Limited, 6th edition , 2017

REFERENCE BOOKS:

R1	Katsuhiko Ogata , "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3rdedition,1998.
R2	Norman S. Nise, "Control Systems Engineering" , John Wiley, New Delhi,

PART-B

COURSE DELIVERY PLAN (LESSON PLAN)

UNIT-I: MATHEMATICAL MODELLING OF CONTROLSYSTEM

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to course, Course Outcomes, Introduction to UNIT-I	1	03-07-23			
2.	Concepts of Control Systems- Classification of control systems, Open Loop and closed loop control systems - Different examples of control systems.	1	04-07-23			
3.	Mathematical models – Differential equations, Impulse Response and transfer functions	2	06-07-23 07-07-23			
4.	Translational and Rotational mechanical systems	1	10-07-23			
5.	Block diagram representation of systems -	1	11-07-23			
6.	Block diagram algebra,	1	13-07-23			
7	Signal flow graph - Reduction using Mason's gain formula.	2	14-07-23 15-07-23			
8	Problem solving	1	17-07-23			
9	Problem solving	1	18-07-23			
10	Problem solving	1	20-07-23			
11	Problem solving	1	21-07-23			
12	Problem solving	2	22-07-23 24-07-23			
No. of classes required to complete UNIT-I: 15				**No. of classes taken:**		

UNIT-II: **TIME RESPONSE ANALYSIS-I**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
7.	Standard test signals	1	25-07-23			
8.	Time response of first order systems	1	27-07-23			
9.	Time response of second order systems	1	28-07-23			
10.	Time domain specifications	1	31-07-23			
11.	Problems solving on Second order systems	1	01-08-23			
12.	Problems solving on Second order systems	2	03-08-23 04-08-23			
13.	Problems solving on Second order systems	1	05-08-23			
14.	Problems solving on Second order systems	1	07-08-23			
15.	Problems solving on Second order systems	1	08-08-23			
16.	Steady state errors and error constants	2	10-08-23 11-08-23			
17.	Steady state errors and error constants	1	14-08-23			
18.	Steady state errors and error constants	1	17-08-23			
19.	Steady state errors and error constants	1	18-08-23			
No. of classes required to complete UNIT-II: 15				**No. of classes taken:**		

UNIT-III: TIME RESPONSE ANALYSIS-II

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
20.	The concept of stability	1	19-08-23			
21.	R-H stability criterion,	1	21-08-23			
22.	The root locus concept - construction of root loci	1	22-08-23			
23.	Relative stability analysis	1	24-08-23			
24.	Problems on construction of Root locus	2	25-08-23 26-08-23			
25.	Problems on construction of Root locus& Relative stability	1	04-09-23			
26.	Problems on construction of Root locus& Relative stability	1	05-09-23			
27.	Problems on construction of Root locus& Relative stability	1	07-09-23			

28.	Problems on construction of Root locus& Relative stability	1	08-09-23			
29.	Problems on construction of Root locus& Relative stability	1	11-09-23			
30.	Problems on construction of Root locus& Relative stability	1	12-09-23			
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: **FREQUENCY RESPONSE ANALYSIS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
31.	IntroductionFrequencydomain specifications	1	14-09-23			
32.	Frequency domain specifications	1	15-09-23			
33.	Polar Plot	2	16-09-23 19-09-23			
34.	Bode diagrams	1	21-09-23			
35.	Stability Analysis from Bode Plots	2	22-09-23 23-09-23			
36.	Nyquiat stability criterion	1	25-09-23			
37.	Nyquist Plot	1	26-09-23			
38.	Phase margin and Gain margin	1	29-09-23			
39.	Problems on Bode Plots	1	30-09-23			
40.	Problems on Bode Plots	1	03-10-23			
41.	Problems on Polar Plot	1	05-10-23			
No. of classes required to complete UNIT-IV: 13				**No. of classes taken:**		

UNIT-V: : **: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Concepts of state, state variables and state model,	1	06-10-23			
43.	Problems on state model	1	07-10-23			
44.	Canonical state space models	1	09-10-23			
45.	solving the Time invariant state Equations- State Transition Matrix and it's Properties	1	10-10-23			
46.	solving the Time invariant state Equations- State Transition Matrix and it's Properties	1	12-10-23			
47.	Concepts of Controllability and Observability	1	13-10-23			
48.	Problems on controllability & observability	2	16-10-23 17-10-23			
49.	Problems on controllability & observability	1	19-10-23			
50.	Problems on Canonical state space models	1	20-10-23			
51.	Problems on Canonical state space models	1	21-10-23			
52.	Problemsonstateequation	1	24-10-23			
53.	Problems on state equation	1	26-10-23			
No. of classes required to complete UNIT-V: 13				**No. of classes taken:**		

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
60.	Applications of control systems	2	27-10-23 28-10-23		TLM1	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education
PEO 2	To Function professionally in the rapidly changing world with advances in technology
PEO 3	To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices
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PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry
PSO 2	Design and Analyze Analog and Digital Electronic Circuits or systems and implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Date: 03-07-2023

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr.MB Chakravarthy**	**Dr.G.Nageswar Rao**	**Dr.J.Siva VaraPrasad**
Signature			

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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF AEROSPACE ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: A. Dhanunjay Kumar

Course Name & Code	**:** MANAGEMENT SCIENCE FOR ENGINEERS & 20HS02	**Regulation**: R20
L-T-P Structure	**: 3-0-0**	**Credits:** 03
Program/Sem/Sec	: B.Tech VII Sem (A)	**A.Y.:** 2023-2024

PREREQUISITE: Professional ethics and human values

COURSE EDUCATIONAL OBJECTIVES (CEOs):

1. To make students understand management, its principles, contribution to management, organization, and its basic issues and types.
2. To make students understand the concept of plant location and its factors and plant layout and types, method of production and work study importance.
3. To understand the purpose and function of statistical quality control. And understand thematerial management techniques.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Understand management principles to practical situations based on the organization structures. (L2)
CO2	Design Effective plant Layouts by using work study methods. (L2)
CO3	Apply quality control techniques for improvement of quality and materials management. (L3)
CO4	Develop best practices of HRM in corporate Business to raise employee productivity. (L2)
CO5	Identify critical path and project completion time by using CPM and PERT techniques. (L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	2	2	-	-	3	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	3	-	-	-
CO4	-	-	-	-	-	-	-	3	2	-	-	3	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-
1 - Low					**2 –**Medium						**3 -** High				

TEXTBOOKS:

T1 Dr. A.R.Aryasri, Management Science, TMH, 10th edition, 2012

REFERENCE BOOKS:

R1 Koontz & weihrich – Essentials of management, TMH, 10th edition, 2015

R2 Stoner, Freeman, Gilbert, Management, 6th edition Pearson education, New Delhi, 2004

R3 O.P. Khana, Industrial engineering and Management L.S.Srinath, PERT & CPM

PART-B

COURSE DELIVERY PLAN (LESSON PLAN): Section - A

UNIT-I: INTRODUCTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Outcomes, Introduction to Subject	1	03-07-2023		**TLM1/TLM2**	
2.	Management-Nature and Importance	1	04-07-2023		**TLM1/TLM2**	
3.	Management functions	1	05-07-2023		**TLM1/TLM2**	
4.	Contributions of Taylor	1	06-07-2023		**TLM1/TLM2**	
5.	Fayal's Principles of management	1	08-07-2023		**TLM1/TLM2**	
6.	Contribution of Elton Mayo	1	10-07-2023		**TLM1/TLM2**	
7.	Maslow's & Herzberg's Two Factor Theory	1	11-07-2023		**TLM1/TLM2**	
8.	Douglas McGregor	1	12-07-2023		**TLM1/TLM2**	
9.	Basic Concepts of Organization-Authority	1	13-07-2023		**TLM1/TLM2**	
10.	Responsibility Delegation of Authority	1	15-07-2023		**TLM1/TLM2**	
11.	Departmentation and Decentralization	1	17-07-2023		**TLM1/TLM2**	
12.	Span of Control	1	18-07-2023		**TLM1/TLM2**	
13.	Line, Line and Staff organizations	1	19-07-2023		**TLM1/TLM2**	
14.	Functional, Committee	1	20-07-2023		**TLM1/TLM2**	
15.	Matrix Organizations	1	22-07-2023		**TLM1/TLM2**	
16.	Quiz-I	1	24-07-2023		**TLM1/TLM2**	
No. of classes required to complete UNIT-I: 16				**No. of classes taken:**		

UNIT-II: OPERATIONS MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
17.	Plant location	1	25-07-2023		**TLM1/TLM2**	
18.	Factors influencing location	1	26-07-2023		**TLM1/TLM2**	
19.	Principles	1	27-07-2023		**TLM1/TLM2**	
20.	Types of plant layouts					

21.	Methods of production (job, batchproduction)	1	31-07-2023		**TLM1/TLM2**	
22.	Mass production	1	01-08-2023		**TLM1/TLM2**	
23.	Work study - Basic procedureinvolved in method study and Work measurement	1	02-08-2023		**TLM1/TLM2**	
24.	Work study - Basic procedure involved in method study andWork measurement	1	03-08-2023		**TLM1/TLM2**	
25.	Quiz-II	1	05-08-2023		**TLM1/TLM2**	
No. of classes required to complete UNIT-II: 07				**No. of classes taken:**		

UNIT-III: STATISTICAL QUALITY CONTROL, MATERIALS MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Statistical quality control Introduction	1	07-08-2023		**TLM1/TLM2**	
27.	Concept of Quality & Quality Control	1	08-08-2023		**TLM1/TLM2**	
28.	Functions, Meaning of SQC	1	09-08-2023		**TLM1/TLM2**	
29.	Variables and attributes	1	10-08-2023		**TLM1/TLM2**	
30.	X chart	1	12-08-2023		**TLM1/TLM2**	
31.	R Chart	1	14-08-2023		**TLM1/TLM2**	
32.	C Chart	1	16-08-2023		**TLM1/TLM2**	
33.	P Chart	1	17-08-2023		**TLM1/TLM2**	
34.	Simple Problems	1	19-08-2023		**TLM1/TLM2**	
35.	Acceptance sampling	1	21-08-2023		**TLM1/TLM2**	
36.	Sampling plans	1	22-08-2023		**TLM1/TLM2**	
37.	Deming's contribution to quality	1	23-08-2023		**TLM1/TLM2**	
38.	Materials management	1	24-08-2023		**TLM1/TLM2**	
39.	Meaning and objectives	1	26-08-2023		**TLM1/TLM2**	
40.	Inventory control	1	04-09-2023		**TLM1/TLM2**	
41.	Need for inventory control	1	05-09-2023		**TLM1/TLM2**	
42.	Purchase procedure	1	07-09-2023		**TLM1/TLM2**	
43.	Store records					
44.	EOQ, ABC analysis	1	09-09-2023		**TLM1/TLM2**	
45.	Stock levels	1	11-09-2023		**TLM1/TLM2**	
46.	Quiz-3	1	12-09-2023		**TLM1/TLM2**	
No. of classes required to complete UNIT-III: 15				**No. of classes taken:**		

UNIT-IV: HUMAN RESOURCE MANAGEMENT (HRM)

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Concepts of HRM	1	13-09-2023		TLM1/TLM2	
48.	Basic functions of HR manager	1	14-09-2023		TLM1/TLM2	
49.	Manpower planning	1	16-09-2023		TLM1/TLM2	
50.	Recruitment	1	19-09-2023		TLM1/TLM2	
51.	Selection	1	20-09-2023		TLM1/TLM2	
52.	Training and development	1	21-09-2023		TLM1/TLM2	
53.	Placement	1	23-09-2023		TLM1/TLM2	
54.	Wage and salary administration	1	25-09-2023		TLM1/TLM2	
55.	Wage and salary administration	1	26-09-2023		TLM1/TLM2	
56.	Promotion	1	27-09-2023		TLM1/TLM2	
57.	Transfers Separation	1	30-09-2023		TLM1/TLM2	
58.	Performance appraisal					
59.	Job evaluation and merit rating	1	03-10-2023		TLM1/TLM2	
60.	Quiz-4	1	04-10-2023		TLM1/TLM2	
No. of classes required to complete UNIT-IV: 14				**No. of classes taken:**		

UNIT-V: PROJECT MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
61.	Introduction	1	05-10-2023		TLM1/TLM2	
62.	Early techniques in project management	1	07-10-2023		TLM1/TLM2	
63.	Network analysis	1	09-10-2023		TLM1/TLM2	
64.	Programme Evaluation and Review Technique (PERT)	1	10-10-2023		TLM1/TLM2	
65.	Problems	1	11-10-2023		TLM1/TLM2	
66.	Critical path method (CPM)	1	12-10-2023		TLM1/TLM2	
67.	Identifying critical path	1	14-10-2023		TLM1/TLM2	
68.	Problems	1	16-10-2023		TLM1/TLM2	
69.	Problems	1	17-10-2023		TLM1/TLM2	
70.	Probability of completing project within given time	1	18-10-2023		TLM1/TLM2	
71.	Project cost analysis	1	19-10-2023		TLM1/TLM2	
72.	Problems	1	25-10-2023		TLM1/TLM2	
73.	project crashing	1	26-10-2023		TLM1/TLM2	
74.	Simple problems	1	28-10-2023		TLM1/TLM2	

No. of classes required to complete UNIT-V: 14	No. of classes taken:

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To Attain a solid foundation in Electronics & Communication Engineering fundamentals with an attitude to pursue continuing education.
PEO 2	To Function professionally in the rapidly changing world with advances in technology
PEO 3	To Contribute to the needs of the society in solving technical problems using Electronics & Communication Engineering principles, tools and practices.
PEO 4	To Exercise leadership qualities, at levels appropriate to their experience, which addresses issues in a responsive, ethical, and innovative manner.

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools.
PSO 3	Apply the Signal processing techniques to synthesize and realize the issues related to real time applications.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	A.Dhanunjay Kumar	Mr. A.Nageswara Rao	Dr.M.B.S.Sreekara Reddy	Dr.S.Pichi Reddy
Signature				