COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : INTRODUCTION, TRANSISTOR CURRENT SOURCE & DIFFERENTIAL AMPLIFIERS (DA)

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 the Subject	1	1.12.16			
2.	Discussion about Syllabus and course outcomes	1	2.12.16			
3.	Integrated circuit (IC) definition, & IC technologies	1	5.12.16			
4.	Types of ICs, Differences between Analog IC and Digital IC	1	5.12.16			
5.	Introduction to OP-AMP and its block diagram	1	7.12.16			
6.	Differential Amplifier (DA) overview and its Configurations	1	8.12.16			
7.	Differential Amplifier DC Analysis	1	9.12.16			
8.	AC Analysis of Dual input DA	2	12.12.16 12.12.16			
9.	AC Analysis of single input balanced output & unbalanced output DA	1	14.12.16			
10.	TUTORIAL-1	1	15.12.16			
11.	FET Differential amplifier	1	16.12.16			
12.	Level Translator	1	19.12.16			
13.	Circuits for improving CMRR	1	19.12.16			
14.	Basic current mirror / current source	1	21.12.16			
15.	Widlar current source	1	22.12.16			
16.	TUTORIAL-2	1	23.12.16			
17.	FET current mirror & Cascode current mirror	1	26.12.16			
18.	TUTORIAL-3	1	26.12.16			
19.	Assignment/Quiz-1	1	28.12.16			
No. of classes required to complete UNIT-I		20	No. of classes taken:			

UNIT-II : OPERATIONAL AMPLIFIERS (OP-AMPS) & APPLICATIONS OF OP-AMPS

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.	OP- Amp Block Diagram, Package Types, IC741 and its Features, Power supply requirements	1	29.12.16			
21.	Ideal & Practical Op-Amp , CMRR , DC Characteristics of Op-Amp	1	30.12.16			
22.	AC Characteristics of Op-Amp	1	2.1.17			
23.	Inverting , Non inverting amplifier	1	2.1.17			

	& voltage follower					
24.	Op-Amp adder, Subtractor & Adder-Subtractor	1	4.1.17			
25.	V to I & I to V converters, Instrumentation Amplifier	1	5.1.17			
26.	Integrator & Differentiator	1	6.1.17			
27.	TUTORIAL-4	1	16.1.17			
28.	AC amplifier, Analog Multiplier, Four Quadrant Multiplier	1	16.1.17			
29.	Squarer Circuit, Square root Circuit & Analog Divider	1	18.1.17			
30.	Op-Amp circuits using Diodes	1	19.1.17			
31.	Sample & Hold Circuit, IC 1496, Log and Anti Log Amplifiers	1	19.1.17			
32.	TUTORIAL-5	1	20.1.17			
33.	Assignment/Quiz-2	1	20.1.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : OP-AMP ACTIVE FILTERS, OP-AMP WAVEFORM GENERATORS & OP-AMP OSCILLATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	Introduction to Active Filters and their frequency responses	1	27.1.17			
35.	1st order Low pass and High pass filter using OP-Amp	1	30.1.17			
36.	2nd order Low pass filter using OP-Amp	1	30.1.17			
37.	2nd order High pass filter using OP-Amp	1	1.2.17			
38.	TUORIAL-6	1	2.2.17			
39.	Band pass (wide band pass filter)	1	3.2.17			
40.	Band pass (Narrow band pass filter)	1	6.2.17			
41.	Band reject filters & All pass filter	1	6.2.17			
42.	TUTORIAL-7	1	8.2.17			
43.	Comparator circuit	1	9.2.17			
44.	Regenerative comparator (Schmitt trigger)	1	10.2.17			
45.	Square wave & Triangular wave Generators	1	13.2.17			
46.	IC Function generator	1	13.2.17			
47.	Astable Multivibrator	1	15.2.17			
48.	Monostable Multivibrator	1	16.2.17			
49.	TUTORIAL-8	1	17.2.17			
50.	RC phase shift oscillator using Op-Amp	1	20.2.17			

51.	Wein Bridge oscillator using Op-Amp	1	20.2.17			
52.	Assignment/Quiz-3	1	22.2.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : 555 TIMER, PHASE LOCKED LOOPM& IC VOLTAGE REGULATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
53.	Pin and Functional diagram of 555 timer	1	23.2.17			
54.	Astable Operation and its applications	1	27.2.17			
55.	Monostable Operation and its applications	1	27.2.17			
56.	Schmitt trigger using IC 555	1	1.3.17			
57.	TUTORIAL-10	1	2.3.17			
58.	IC 565 PLL block schematic, Principle and description of PLL	1	3.3.17			
59.	Applications of PLL	1	6.3.17			
60.	TUTORIAL-11	1	6.3.17			
61.	Fixed voltage regulators	1	8.3.17			
62.	IC 723 voltage regulators	1	9.3.17			
63.	IC 723 voltage regulators	1	10.3.17			
64.	TUTORIAL-12	1	13.3.17			
65.	Assignment/Quiz-4	1	13.3.17			
No. of classes required to complete UNIT-IV		13	No. of classes taken:			

UNIT-V : DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
66.	Introduction to converters	1	15.3.17			
67.	Weighted Resistor DAC	1	16.3.17			
68.	R-2R Ladder DAC & Inverted R-2R DAC	1	17.3.17			
69.	TUTORIAL-13	1	17.3.17			
70.	Flash(Comparator) type ADC	1	20.3.17			
71.	Counter type ADC	1	20.3.17			
72.	Tracking converter, Successive Approximation ADC	1	22.3.17			
73.	TUTORIAL-14	1	22.3.17			
74.	Charge balancing ADC	1	23.3.17			
75.	Dual slope ADC	1	24.3.17			
76.	Specifications of DAC and ADC.	1	27.3.16			
77.	TUTORIAL-15	1	27.3.16			
78.	Assignment/Quiz-5	1	29.3.16			
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
79.	About VLSI	1	29.3.16			
80.	Applications of VLSI	1	30.3.16			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Mr.G.Venkata Rao	Mr.G.Venkata Rao	Mr.Y.Amar Babu	Dr.M.Suman	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Analog Integrated Circuits – S128

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : T.kalpana

COURSE COORDINATOR : Mr. G.Venkata Rao.

COURSE OBJECTIVE: This course provides the knowledge on basic Integrated Circuit (IC), OP-AMP internal structure and various applications of it like open-loop, closed loop linear and non-linear. And designing of Active Filters. It provides the Importance of 555 Timer and its applications. And it explains the Phase Locked Loop and its applications.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze various Transistor Current Sources and Differential amplifiers															
2	Explore the Linear and Non Linear Applications of Op-Amp															
3	Design different types of Active filters and waveform generators															
4	Use the Timer circuits and Phase Locked Loop for various applications															
5	Implement ADC and DAC Circuits in different applications															

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

BOS APPROVED TEXT BOOKS:

1 M.H.Rashid,"Microelectronic Circuits:Analysis and Design",PWS publishing Company,2nd Edition

2 Ramakanth A.Gayakwad,Op-Ampps and Linear Integrated Circuits,PHI Publishers,4th Edition.

BOS APPROVED REFERENCE BOOKS:

1 D.Roy Choudhury,Linear Integrated circuits,New Age International(P)Ltd.

2 R.F.Coughlin and Fredrick Driscoll,Operational Amplifiers and Linear Integrated circuits, PHI Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : INTRODUCTION, TRANSISTOR CURRENT SOURCE & DIFFERENTIAL AMPLIFIERS (DA)

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
81.	Introduction to the Subject , Discussion about Syllabus and course outcomes	1	01.12.16			
82.	Integrated circuit definition, Meaning of integration technologies	1	02.12.16			
83.	Types of ICs, Differences between Analog IC and Digital IC	1	03.12.16			
84.	Introduction to Op-Amp, Differential Amplifier overview	1	06.12.16			
85.	Different Configurations in Differential Amplifiers, DC Analysis	1	07.12.16			
86.	**Tutorial -1**	1	08.12.16			
87.	AC Analysis of Dual input balanced output DA	1	09.12.16			
88.	AC Analysis of Dual input unbalanced output DA	1	10.12.16			
89.	AC Analysis of single input balanced output DA	1	14.12.16			
90.	AC Analysis of single input unbalanced output DA	1	15.12.16			
91.	FET Differential amplifiers	1	16.12.16			
92.	DC Coupling	1	17.12.16			
93.	DC Coupling ,Cascaded Diff. Amp.,Level Translator	1	20.12.16			
94.	Widlar Current Source Analysis	1	21.12.16			
95.	Cascade Current Source Analysis	1	22.12.16			
96.	Wilson current source Analysis	1	23.12.16			
97.	**Tutorial -2**	1	24.12.16			
98.	**Tutorial-3**	1	27.12.16			
99.	Assignment/Quiz-1	1	28.12.16			
No. of classes required to complete UNIT-I		19	No. of classes taken:			

UNIT-II : OPERATIONAL AMPLIFIERS (OP-AMPS) & APPLICATIONS OF OP-AMPS

S.No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign

		Required	Completion	Completion	Methods	Weekly
100.	OP- Amp Block Diagram, Package Types, IC741 and its Features, Power supply requirements	1	29.12.16			
101.	Ideal & Practical Op-Amp , CMRR , DC Characteristics of Op-Amp, AC Characteristics of Op-Amp	1	30.12.16			
102.	Inverting , Non inverting amplifier & voltage follower	1	31.12.16			
103.	Op-Amp adder, Subtractor & Adder-Subtractor	1	03.01.17			
104.	V to I & I to V converters, Instrumentation Amplifier	1	04.01.17			
105.	Integrator & Differentiator	1	05.01.17			
106.	**Tutorial-4**	1	06.01.17			
107.	AC amplifier, Analog Multiplier, Four Quadrant Multiplier	1	07.01.17			
108.	Squarer Circuit, Square root Circuit & Analog Divider	1	17.01.17			
109.	Op-Amp circuits using Diodes	1	18.01.17			
110.	Sample & Hold Circuit, IC 1496, Log and Anti Log Amplifiers	1	19.01.17			
111.	**Tutorial-5**	1	20.01.17			
112.	Assignment/Quiz-2	1	21.01.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : OP-AMP ACTIVE FILTERS, OP-AMP WAVEFORM GENERATORS & OP-AMP OSCILLATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
113.	Introduction to Active Filters and their frequency responses	1	27.01.17			
114.	1st order Low pass and High pass filter using OP-Amp	1	28.01.17			
115.	2nd order Low pass filter using OP-Amp	1	31.01.17			
116.	2nd order High pass filter using OP-Amp	1	01.02.17			
117.	**Tutorial-6**	1	02.02.17			
118.	Band pass (wide band pass filter)	1	03.02.17			
119.	Band pass (Narrow band pass filter)	1	04.02.17			
120.	Band reject filters & All pass filter	1	07.02.17			
121.	**Tutorial-7**	1	08.02.17			
122.	Comparator circuit	1	09.02.17			
123.	Regenerative comparator (Schmitt trigger)	1	10.02.17			

124.	Square wave & Triangular wave Generators	1	11.02.17			
125.	IC Function generator	1	14.02.17			
126.	Astable Multivibrator	1	15.02.17			
127.	Monostable Multivibrator	1	16.02.17			
128.	**Tutorial-8**	1	17.02.17			
129.	RC phase shift oscillator using Op-Amp	1	18.02.17			
130.	Wein Bridge oscillator using Op-Amp	1	21.02.17			
131.	Assignment/Quiz-3	1	22.02.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : 555 TIMER, PHASE LOCKED LOOPM& IC VOLTAGE REGULATORS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
132.	Pin and Functional diagram of 555 timer	1	23.02.17			
133.	Astable Operation and its applications	1	24.02.17			
134.	Monostable Operation and its applications	1	25.02.17			
135.	Schmitt trigger using IC 555	1	28.02.17			
136.	**Tutorial-9**	1	01.03.17			
137.	IC 565 PLL block schematic	1	02.03.17			
138.	Principle and description of PLL	1	04.03.17			
139.	Applications of PLL	1	07.03.17			
140.	Fixed voltage regulators	1	08.03.17			
141.	IC 723 voltage regulators	1	09.03.17			
142.	IC 723 voltage regulators	1	10.03.17			
143.	**Tutorial-10**	1	11.03.17			
144.	Assignment/Quiz-4	1	14.03.17			
No. of classes required to complete UNIT-IV		13	No. of classes taken:			

UNIT-V : DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
145.	Introduction to converters, Weighted Resistor DAC	1	15.03.17			
146.	R-2R Ladder DAC & Inverted R-2R DAC	1	16.03.17			

147.	**Tutorial-11**	1	17.03.17			
148.	Flash(Comparator) type ADC, Counter type ADC	1	18.03.17			
149.	Tracking converter, Successive Approximation ADC	1	21.03.17			
150.	**Tutorial-12**	1	22.03.17			
151.	Charge balancing ADC	1	23.03.17			
152.	Dual slope ADC	1	24.03.17			
153.	Specifications of DAC and ADC.	1	25.03.17			
154.	Assignment/Quiz-5	1	28.03.17			
No. of classes required to complete UNIT-V		10	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
155.	About VLSI	1	29.03.16			
156.	Applications of VLSI	1	30.03.16			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5

Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

T.kalpana	Mr.G.Venkata Rao	Mr.Y.Amar Babu	Dr.M.Suman	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Analog Communications - S 125

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : M.V.L Bhavani

COURSE COORDINATOR : G.L.N.Murthy

COURSE OBJECTIVE : This course provides the fundamental knowledge about the various analog modulation techniques. Further, performance of these modulation schemes is evaluated based on Figure of merit. Various types of radio transmitters and receivers also well explained. The course will give a complete idea about different Pulse analog modulation techniques.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Summarize the basic concepts of Amplitude Modulation.	3	2										2	3		
2	Classify and elaborate angle modulation techniques.	3	2										2	3		
3	Derive various noise parameters with relevance to different modulation schemes.	3	2										2	3		
4	Analyze and differentiate various types of Transmitters and Receivers.	3	2										2	3		
5	Distinguish between various pulse modulation techniques.	3	2										2	3		

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

BOS APPROVED TEXT BOOKS:

1 Simon Haykin,' Communication Systems ,,John wiley & Sons,,2/e,1983.
2 JGeorg Kennedy, Electronic Communication systems ' Tata McGrawHill.3rd Edition.
3 Taub and Schilling ,' Principles of communication Systems',2nd Edition, Tata McHraw Hill Publishers

BOS APPROVED REFERENCE BOOKS:

1 V.Chandra Sekhar, 'Analog Communications', Oxford University Press.
2 G.K.Mithal,'Radio Engineering', Khanna Publishers , New Delhi

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I : Amplitude Modulation

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.	General introduction	1	1-12-16			
2.	Elements of a communication system	1	3-12-16			
3.	Need for modulation	1	5-12-16			
4.	Classification of modulation schemes	1	6-12-16			
5.	Amplitude Modulation , Time & Frequency domain representation	1	7-12-16			
6.	Single tone modulation , modulation index	1	8-12-16			
7.	Power relations & efficiency in Amplitude modulation	1	10-12-16			
8.	Generation on AM waves , square law modulator	1	12-12-16			
9.	Switching modulator	1	13-12-16			
10.	Tutorial – I	1	14-12-16			
11.	Demodulation of AM waves & limitations of AM	1	15-12-16			
12.	Introduction to DSBSC – AM, Generation	1	17-12-16			
13.	Ring modulator & demodulation of DSBSC AM	1	1912-16			
14.	Demodulation of DSBSC –AM contd..,	1	20-12-16			
15.	Limitations of Coherent Detection, Quadrature carrier multiplexing	1	21-12-16			
16.	Introduction to SSB & Time domain Representation	1	22-12-16			
17.	Tutorial –II	1	24-12-16			
18.	Generation of SSB – Filter & Phase shift methods	1	26-12-16			
19.	Demodulation of SSB , limitations	1	27-12-16			
20.	Introduction to VSBSC , Time domain representation of VSBSC	1	28-12-16			
21.	Envelope detection of VSBSC plus Carrier	1	29-12-16			
22.	Tutorial –III	1	30-12-16			
No. of classes required to complete UNIT-I		22	No. of classes taken:			

UNIT-II : Angle Modulation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
23.	Introduction to Angle modulation , PM & FM	1	2-1-17			
24.	Single tone frequency modulation, Narrow band FM, Wide band FM	1	3-1-17			
25.	Tutorial-IV	1	4-1-17			
26.	Multi Tone FM waves, Transmission bandwidth of FM Wave	1	5-1-17			
27.	Generation of FM Waves – indirect method	1	7-1-17			

28.	Tutorial –V	1	16-1-17			
29.	Generation of FM waves – direct method	1	17-1-17			
30.	Demodulation of FM waves – slope detector	1	18-1-17			
31.	Balanced slope & ratio detector	1	19-1-17			
32.	Phase locked loop for FM demodulation	1	21-1-17			
33.	Tutorial -VI	1	21-1-17			
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : Noise in Analog Communication 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
34.	Review of noise concepts	1	24-1-17			
35.	Radio receiver model	1	25-1-17			
36.	SNR calculations in AM	1	28-1-17			
37.	SNR calculations in DSBSC	1	30-1-17			
38.	SNR calculations in SSBSC techniques	1	31-1-17			
39.	Noise in FM systems	1	2-2-17			
40.	Tutorial –VII	1	4-2-17			
41.	SNR calculations in FM	1	6-2-17			
42.	Threshold effect in FM	1	7-2-17			
43.	Pre emphasis & De emphasis circuit	1	8-2-17			
44.	Tutorial –VIII	1	9-2-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : Radio Transmitters and Receivers

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
45.	Introduction to Radio Transmitters	1	11-2-17			
46.	Classification of Radio Transmitters	1	13-2-17			
47.	Frequency requirements of Radio transmitters	1	14-2-17			
48.	AM Transmitter and the impact of feedback on its performance	1	15-2-17			
49.	FM Transmitters and different types	1	16-2-17			
50.	Frequency stability in FM transmitters	1	18-2-17			
51.	Radio receivers introduction & classification	1	20-2-17			
52.	Tutorial –IX	1	21-2-17			
53.	TRF receiver and its limitations ,Super heterodyne receiver	1	22-2-17			
54.	The concept of image frequency and other characteristics of receivers	1	23-2-17			
55.	Characteristics of RF section , Significance of AGC	1	27-2-17			

56.	FM receivers introduction , pre emphasis & De emphasis concepts	1	28-2-17			
57.	Tutorial –X	1	1-3-17			
No. of classes required to complete UNIT-IV		13	No. of classes taken:			

UNIT-V : Pulse Analog Modulation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
58.	Need for Pulse modulation , types	1	2-3-17			
59.	Pulse amplitude modulation-definition, generation : Ideal, Natural, flat tap sampling.	1	6-3-17			
60.	Generation contd….	1	7-3-17			
61.	Demodulation of PAM	1	8-3-17			
62.	Pulse width modulation-Generation	1	9-3-17			
63.	Generation contd.. , demodulation	1	14-3-17			
64.	Demodulation contd..	1	15-3-17			
65.	Tutorial –XI	1	16-3-17			
66.	Pulse position modulation -Generation	1	18-3-17			
67.	Demodulation of PPM	1	20-3-17			
68.	Frequency & Time division multiplexing	1	21-3-17			
69.	Tutorial –XII	1	23-3-17			
No. of classes required to complete UNIT-V		12	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
70.	Developments in Communication (Digital)	1	27-3-17			
71.	Mobile Communication	1	29-3-17			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W

Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

M V L Bhavani	G L N Murthy	G L N Murthy	Dr. J Babu	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)
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NAAC Accredited with "A" grade, Accredited by NBA
New Delhi & Certified by ISO 9001:2008
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
http://www.lbrce.ac.in, ecedept4@gmail.com Phone: 08659-222933, Fax: 08659-222931

LESSON PLAN

COURSE : B.Tech.,(IV-Sem.,)- Section-A
A.Y : 2016-17
BRANCH : Electronics and Communication Engineering
SUBJECT :Control Systems (Code: S 174)
FACULTY : Mr. P VENKATESWARA RAO

Process of Teaching, Learning, Delivery and Assessment Methods:

S.No	Teaching Learning Process (TLP)	Delivery Methods (DM)	Assessment Methods (AM)
1	Solving Real world problem	Chalk & Talk	Assignments
2	Explaining application before theory	ICT tools	Quiz
3	Solving problems	Group discussions	Tutorials
4	Designing of experiments	Industrial visit	Surprise Tests
5	Problems on environmental, economics, health & safety	Field work	Mid Exams
6	Problems on professional & ethics	Case studies	Model Exam
7	Seminar	Mini Projects	QAs
8	Problems using software	Numerical treatment	
9	Self study	Design / Exercises	

UNIT-I : INTRODUCTION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
1.	Brief introduction about the course & its importance	1	01-12-16				
2.	Introduction to control systems	1	02-12-16				
3.	Classification of Control systems	1	03-12-16				
4.	Open loop and Closed loop control systems	1	05-12-16				
5.	Examples of control systems	1	06-12-16				
6.	Effect of feedback and its Characteristics	1	08-12-16				
7.	Translational mechanical Systems	1	09-12-16				
8.	Rotational Mechanical Systems	1	10-12-16				
9.	Electrical analogous force-voltage& force-current, torque-voltage& torque-current.	1	13-12-16				
10.	**Tutorial-1**	1	15-12-16				
11.	Block Diagrams, reduction rules	1	16-12-16				
12.	Problems on Block diagram Reduction	1	17-12-16				

13.	**Tutorial-2**	1	19-12-16				
14.	Signal Flow Graph(SFG): Terminology	1	20-12-16				
15.	Properties of Signal Flow Algebra	1	22-12-16				
16.	SFG Reduction using Masons Gain Formula.	1	23-12-16				
17.	**Tutorial-3**	1	24-12-16				
18.	Armature controoled DC Servo Motor	1	26-12-16				
19.	Field controoled DC Servo Motor	1	27-12-16				
No. of classes required to complete UNIT-I			No. of classes taken				

UNIT-II : TIME RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
20.	Standard test signals	1	29-12-16				
21.	Time response of first order systems C/S Equation of Feedback control systems	1	30-12-16				
22.	Transient response of second order undammed system and order under damped system	1	31-12-16				
23.	**Tutorial-4**	1	02-01-17				
24.	Time response of 2nd order system	1	03-01-17				
25.	Time domain specifications rise time, delay time	1	05-01-17				
26.	**Tutorial-5**	1	06-01-17				
27.	Time domain specifications.	1	07-01-17				
28.	Steady state response	1	16-01-17				
29.	Steady state errors and error constants	1	17-01-17				
30.	**Tutorial-6**	1	19-01-17				
31.	Effects of PD, PI systems	1	20-01-17				
32.		1	21-01-17				
No. of classes required to complete UNIT-II		17	No. of classes taken				

UNIT-III : FREQUENCY RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
33.	The concept of stability	1	27-01-17				
34.	Routh's stability criterion	1	28-01-17				
35.	qualitative stability & conditional stability	1	30-01-17				
36.	limitations of Routh's stability	1	31-01-17				
37.	**Tutorial-7**	1	02-02-17				
38.	Root Locus Technique**:** The root locus concept	1	03-02-17				
39.	construction of root loci	1	04-02-17				

40.	**Tutorial-8**	1	06-02-17				
41.	Effects of adding poles and zeros to G(s)H(s) on the root loci.	1	07-02-17				
42.	Effects of adding zeros to G(s)H(s) on the root loci.	1	09-02-17				
43.	**Tutorial-9**	1	10-02-17				
No. of classes required to complete UNIT-III		15	No. of classes taken				

UNIT-IV: STABILITY ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
44.	Introduction, Frequency domain specifications	1	11-02-17				
45.	Frequency domain specifications	1	13-02-17				
46.	Bode diagrams-Determination of Frequency domain specifications	1	14-02-17				
47.	Transfer function from the Bode Diagram-Phase margin and Gain margin	1	16-02-17				
48.	**Tutorial-10**	1	17-02-17				
49.	Stability Analysis from Bode Plots	1	18-02-17				
50.	Polar Plots	1	20-02-17				
51.	**Tutorial-11**	1	21-02-17				
52.	Nyquist Plots Stability Analysis	1	23-02-17				
53.	Nyquist Plots Stability Analysis	1	24-02-17				
54.	**Tutorial-12**	1	27-02-17				
55.	Compensation techniques – Lag	1	28-02-17				
56.	Lead, Lead-Lag	1	02-03-17				
57.	PID Controllers	1	03-03-17				
58.	**Tutorial-13**	1	04-03-17				
No. of classes to complete UNIT-IV			No. of classes taken				

UNIT-V : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
59.	Concepts of state, state variables and state model	1	06-03-17				
60.	Derivation of state models from block diagrams	1	07-03-17				
61.	Diagonalization	1	09-03-17				
62.	Solving the Time invariant state Equations	1	10-03-17				
63.	State Transition Matrix	1	11-03-17				
64.	State Transition Matrix Properties	1	14-03-17				
65.	**Tutorial-14**	1	16-03-17				
66.	Concept of Controllability	1	17-03-17				
67.	Concept of Observability	1	18-03-17				

68.	**Tutorial-15**	1	20-03-17				
69.	Solution of Homogenious state equation	1	21-03-17				
70.	Solution of Non-Homogenious state equation	1	23-03-17				
71.		1	24-03-17				
72.		1	25-03-17				
73.		1	27-03-17				
74.		1	30-03-17				
No. of classes required to complete UNIT-V			No. of classes taken				

P Venkateswara Rao			Prof.B.RameshReddy
Subject Teacher	**Course Coordinator**	**Module Coordinator**	**HOD**

Assessment Summary:

Assessment Task	Weightage (Marks)	**Course Outcomes**				
		CO1	CO2	CO3	CO4	CO5
Attendance/Assignments/Quiz's	05					
Mid Exams	20					
End Exam	75					
Total	100					

Mapping of Course Outcomes (COs) with Programme Outcomes (POs):

POs / COs	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**
CO1											
CO2											
CO3											
CO4											
CO5											

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Analog Communications - S 125

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : G.L.N.Murthy

COURSE COORDINATOR : G.L.N.Murthy

COURSE OBJECTIVE : This course provides the fundamental knowledge about the various analog modulation techniques. Further, performance of these modulation schemes is evaluated based on Figure of merit. Various types of radio transmitters and receivers also well explained. The course will give a complete idea about different Pulse analog modulation techniques

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Understand the basic concepts of Amplitude Modulation.	3	2	-	-	-	-	-	-	-	-	-	2	3	-	-
2	Classify and elaborate angle modulation techniques.	3	2	-	-	-	-	-	-	-	-	-	2	3	-	-
3	Evaluate the noise performance of different modulation schemes.	3	2	-	-	-	-	-	-	-	-	-	2	3	-	-
4	Contrast various types of Transmitters and Receivers.	3	2	-	-	-	-	-	-	-	-	-	2	3	-	-
5	Analyze various pulse analog modulation techniques.	3	2	-	-	-	-	-	-	-	-	-	2	3	-	-

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

BOS APPROVED TEXT BOOKS:

1. Simon Haykin,' Communication Systems ,,John wiley & Sons,,2/e,1983.
2. JGeorg Kennedy, Electronic Communication systems ' Tata McGrawHill.3rd Edition.
3. Taub and Schilling ,' Principles of communication Systems',2nd Edition, Tata McHraw Hill Publishers

BOS APPROVED REFERENCE BOOKS:

1. V.Chandra Sekhar, 'Analog Communications', Oxford University Press.
2. G.K.Mithal,'Radio Engineering', Khanna Publishers , New Delhi

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Amplitude Modulation

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.	General introduction	1	01-12-16			
2.	Elements of a communication system	1	02-12-16			
3.	Need for modulation	1	03-12-16			
4.	Classification of modulation schemes	1	05-12-16			
5.	Amplitude Modulation , Time & Frequency domain representation	1	06-12-16			
6.	Single tone modulation , modulation index	1	08-12-16			
7.	Power relations & efficiency in Amplitude modulation	1	09-12-16			
8.	Generation on AM waves , square law modulator	1	10-12-16			
9.	Switching modulator	1	13-12-16			
10.	Tutorial – I	1	15-12-16			
11.	Demodulation of AM waves & limitations of AM	1	16-12-16			
12.	Introduction to DSBSC – AM, Generation	1	17-12-16			
13.	Ring modulator & demodulation of DSBSC AM	1	19-12-16			
14.	Demodulation of DSBSC –AM contd..,	1	20-12-16			
15.	Limitations of Coherent Detection, Quadrature carrier multiplexing	1	22-12-16			
16.	Introduction to SSB & Time domain Representation	1	23-12-16			
17.	Tutorial –II	1	24-12-16			
18.	Generation of SSB – Filter & Phase shift methods	1	26-12-16			
19.	Demodulation of SSB , limitations	1	27-12-16			
20.	Introduction to VSBSC , Time domain representation of VSBSC	1	29-12-16			
21.	Envelope detection of VSBSC plus Carrier	1	30-12-16			
No. of classes required to complete UNIT-I		21	No. of classes taken:			

UNIT-II : Angle Modulation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Introduction to Angle modulation , PM & FM	1	31.12.16			
23.	Single tone frequency modulation, Narrow band FM, Wide band FM	1	02-01-17			
24.	Tutorial –III	1	03-01-17			
25.	Multi Tone FM waves, Transmission bandwidth of FM Wave	1	05-01-17			
26.	Generation of FM Waves – indirect method	1	06-01-17			
27.	Tutorial-IV	1	07-01-17			

28.	Generation of FM waves – direct method	1	16-01-17			
29.	Demodulation of FM waves – slope detector	1	19-01-17			
30.	Balanced slope & ratio detector	1	20-01-17			
31.	Phase locked loop for FM demodulation	1	21-01-17			
32.	Tutorial –V	1	27-01-17			
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : Noise in Analog Communication 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
33.	Review of noise concepts	1	28-01-17			
34.	Radio receiver model	1	30-01-17			
35.	SNR calculations in AM	1	31-01-17			
36.	SNR calculations in DSBSC	1	02-02-17			
37.	SNR calculations in SSBSC techniques	1	03-02-17			
38.	Noise in FM systems	1	04-02-17			
39.	Tutorial -VI	1	06-02-17			
40.	SNR calculations in FM	1	07-02-17			
41.	Threshold effect in FM , Pre emphasis & De emphasis circuit	2	09-02-17 10-02-17			
42.	Tutorial –VII	1	13-02-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : Radio Transmitters and Receivers

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43.	Introduction to Radio Transmitters	1	14-02-17			
44.	Classification of Radio Transmitters	1	16-02-17			
45.	Frequency requirements of Radio transmitters	1	17-02-17			
46.	AM Transmitter and the impact of feedback on its performance	1	18-02-17			
47.	Tutorial –VIII	1	20-02-17			
48.	FM Transmitters and different types	1	21-02-17			
49.	Frequency stability in FM transmitters	1	23-02-17			
50.	Radio receivers introduction & classification	1	27-02-17			
51.	Tutorial –IX	1	28-02-17			
52.	TRF receiver and its limitations ,Super heterodyne receiver	1	02-03-17			
53.	The concept of image frequency and other characteristics of receivers	1	03-03-17			
54.	Characteristics of RF section , Significance of AGC	1	04-03-17			
55.	FM receivers introduction , pre	1	06-03-17			

	emphasis & De emphasis concepts					
56.	Tutorial –X	1	07-03-17			
No. of classes required to complete UNIT-IV		14	No. of classes taken:			

UNIT-V : Pulse Analog Modulation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
57.	Need for Pulse modulation , types	1	09-03-17			
58.	Pulse amplitude modulation-definition, generation : Ideal, Natural, flat tap sampling.	1	10-03-17			
59.	Generation contd.….	1	13-03-17			
60.	Demodulation of PAM	1	14-03-17			
61.	Pulse width modulation-Generation , demodulation	2	16-03-17 17-03-17			
62.	Demodulation contd..	1	18-03-17			
63.	Tutorial –XI	1	20-03-17			
64.	Pulse position modulation -Generation	1	21-03-17			
65.	Demodulation of PPM	1	23-03-17			
66.	Frequency & Time division multiplexing	1	24-03-17			
67.	Tutorial –XII	1	25-03-17			
No. of classes required to complete UNIT-V		12	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
68.	Developments in Communication (Digital)	1	27-03-17			
69.	Mobile Communication	1	30-03-17			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Mr.G.L.N.Murthy	Mr.G.L.N.Murthy	Mr.G.L.N.Murthy	Dr.J.babu	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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LESSON PLAN

ACADEMIC YEAR : 2016-17
COURSE : B.Tech., (IV-Sem.,)- Section B
BRANCH : Electronics and Communication Engineering
SUBJECT : Analog communications (Code: S125)
FACULTY : Smt.K.Lakshmi

Process of Teaching, Learning, Delivery and Assessment Methods:

S.No	Teaching Learning Process (TLP)	Delivery Methods (DM)	Assessment Methods (AM)
1	Solving Real world problem	Chalk & Talk	Assignments
2	Explaining application before theory	ICT tools	Quiz
3	Solving problems	Group discussions	Tutorials
4	Designing of experiments	Industrial visit	Surprise Tests
5	Problems on environmental, economics, health & safety	Field work	Mid Exams
6	Problems on professional & ethics	Case studies	Model Exam
7	Seminar	Mini Projects	QAs
8	Problems using software	Numerical treatment	
9	Self study	Design / Exercises	

UNIT-I : AMPLITUDE MODULATION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
1.	General introduction	1	01.12.16		2	1	1,2,4,5
2.	Elements of a communication system	1	02.12.16		2	1	1,2,4,5
3.	Need for modulation	1	03.12.16		2	1	1,2,4,5
4.	Classification of modulation schemes	1	06.12.16		2	1	1,2,4,5
5.	Amplitude Modulation , Time & Frequency domain representation	1	07.12.16		2	1	1,2,4,5
6.	Single tone modulation , modulation index	1	08.12.16		2	1	1,2,4,5
7.	Power relations & efficiency in Amplitude modulation	1	09.12.16		2	1	1,2,4,5

8.	Generation on AM waves , square law modulator	1	10.12.16		2	1	1,2,4,5
9.	Switching modulator	1	14.12.16		2	1	1,2,4,5
10.	Tutorial – I	1	15.12.16		2	1,3	3
11.	Demodulation of AM waves & limitations of AM	1	16.12.16		2	1	1,2,4,5
12.	Introduction to DSBSC – AM, Generation	1	17.12.16		2	1	1,2,4,5
13.	Ring modulator & demodulation of DSBSC AM	1	20.12.16		2	1	1,2,4,5
14.	Demodulation of DSBSC –AM contd.., Quadrature carrier multiplexing	1	21.12.16		2	1	1,2,4,5
15.	Introduction to SSB & Time domain Representation	1	22.12.16		2	1	1,2,4,5
16.	Tutorial –II	1	23.12.16		2	1,3	3
17.	Generation of SSB – Filter & Phase shift methods	1	24.12.16		2	1	1,2,4,5
18.	Demodulation of SSB , limitations	1	27.12.16		2	1	1,2,4,5
19.	Introduction to VSBSC , Time domain representation of VSBSC	1	28.12.16		2	1	1,2,4,5
20.	Frequency division multiplexing	1	29.12.16		2	1	1,2,4,5
21.	Tutorial –III	1	30.12.16		2	1,3	3
No. of classes required to complete UNIT-I		21	No. of classes taken				

UNIT-II : ANGLE MODULATION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
22.	Introduction to Angle modulation , PM & FM	1	31.12.16		2	1	1,2,4,5
23.	Single tone frequency modulation	1	03.01.17		2	1	1,2,4,5
24.	Narrow band FM, Wide band FM	1	04.01.17		2	1,2	1,2,4,5
25.	Tutorial –IV	1	05.01.17		2	1	1,2,4,5
26.	Multi Tone FM waves, Transmission bandwidth of FM Wave	1	06.01.17		2	1	1,2,4,5
27.	Generation of FM Waves – indirect method	1	07.01.17		2	1	1,2,4,5
28.	Generation of FM waves – direct	1	17.01.17		2	1	1,2,4,5

	method						
29.	Demodulation of FM waves – slope detector	1	18.01.17		2	1	1,2,4,5
30.	Balanced slope & ratio detector	1	19.01.17		2	1	1,2,4,5
31.	Phase locked loop for FM demodulation	1	20.01.17		2	1	1,2,4,5
32.	Tutorial –V	1	21.01.17		2	1,3	3
No. of classes required to complete UNIT-II		11	No. of classes taken				

UNIT-III : Noise in Analog Communication systems

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
33.	Review of noise concepts	1	27.01.17		2	1	1,2,4,5
34.	Radio receiver model	1	28.01.17		2	1	1,2,4,5
35.	SNR calculations in AM	1	31.01.17		2	1	1,2,4,5
36.	SNR calculations in DSBSC	1	01.02.17		2	1	1,2,4,5
37.	SNR calculations in SSBSC techniques	1	02.02.17		2	1	1,2,4,5
38.	Noise in FM systems	1	03.02.17		2	1	1,2,4,5
39.	Tutorial -VI	1	04.02.17		2	1,3	3
40.	SNR calculations in FM	1	07.02.17		2	1	1,2,4,5
41.	Threshold effect in FM	1	08.02.17		2	1	1,2,4,5
42.	Pre emphasis & De emphasis circuit	1	09.02.17		2	1	1,2,4,5
43.	Tutorial –VII	1	10.02.17		2	1,3	3
No. of classes required to complete UNIT-III		11	No. of classes taken				

UNIT-IV : RADIO TRANSMITTERS AND RECEIVERS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
44.	Classification of Radio Transmitters	1	11.02.17		2	1	1,2,4,5
45.	Frequency requirements of Radio transmitters	1	14.02.17		2	1	1,2,4,5
46.	AM Transmitter and the impact of feedback on its performance	1	15.02.17		2	1	1,2,4,5
47.	FM Transmitters and different types	1	16.02.17		2	1	1,2,4,5
48.	Frequency stability in FM transmitters	1	17.02.17		2	1	1,2,4,5
49.	Radio receivers introduction & classification	1	18.02.17		2	1	1,2,4,5
50.	Tutorial –VIII	1	21.02.17		2	1,3	3

51.	TRF receiver and its limitations	1	22.02.17		2	1	1,2,4,5
52.	Super heterodyne receiver	1	23.02.17		2	2	1,2,4,5
53.	The concept of image frequency and other characteristics of receivers	1	24.02.17		2	1	1,2,4,5
54.	Characteristics of RF section , Significance of AGC	1	25.02.17		2	1	1,2,4,5
55.	FM receivers introduction , pre emphasis concept	1	28.02.17		2	1	1,2,4,5
56.	De emphasis concept	1	01.03.17		2	1	1,2,4,5
57.	Tutorial –IX	1	02.03.17		2	1,3	3
No. of classes required to complete UNIT-IV		14	No. of classes taken				

UNIT-V : PULSE ANALOG MODULATION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
58.	Need Pulse modulation , types	1	04.03.17		2	1	1,2,4,5
59.	Pulse amplitude modulation- definition, generation : Ideal, Natural, flat tap sampling.	1	07.03.17		2	1	1,2,4,5
60.	Generation contd….	1	08.03.17		2	1	1,2,4,5
61.	Demodulation of PAM	1	09.03.17		2	1	1,2,4,5
62.	Pulse width modulation-Generation	1	10.03.17		2	1	1,2,4,5
63.	Generation contd.. , demodulation	1	11.03.17		2	2	1,2,4,5
64.	Demodulation contd..	1	14.03.17		2	1	1,2,4,5
65.	Tutorial –X	1	15.03.17		2	1,3	3
66.	Pulse position modulation -Generation	1	16.03.17		2	1	1,2,4,5
67.	Demodulation of PPM	1	17.03.17		2	1	1,2,4,5
68.	Time division multiplexing	1	18.03.17		2	1	1,2,4,5
69.	Frequency division multiplexing	1	21.03.17		2	1	1,2,4,5
70.	Tutorial -XI	1	22.03.17		2	1,3	3
71.	Review	1	23.03.17		2	1	
No. of classes required to complete UNIT-V		14	No. of classes taken				

TOPICS BEYOND THE SYLLABUS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
1.	Recent Trends in Communication	**2**			**2**	**2**	

2.	Application areas of communications	**3**			**2**	**2**	
	No. of classes required for contents beyond syllabus	**5**	No. of classes taken				

Assessment Summary:

Assessment Task	Weightage (Marks)	**Course Outcomes**				
		CO1	CO2	CO3	CO4	CO5
Attendance/Assignments/Quiz's	05					
Mid Exams	20					
End Exam	75					
Total	100					

Mapping of Course Outcomes (COs) with Programme Outcomes (POs):

POs / COs	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**
CO1											
CO2											
CO3											
CO4											
CO5											

K Lakshmi	G L N Murthy	G L N Murthy	Prof B Ramesh Reddy
Subject teacher	Course coordinator	Module coordinator	HOD

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Digital Signal Processing - S 192

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Prof.B.Ramesh Reddy, Professor and HOD

COURSE COORDINATOR : Dr.E.V.Krishna Rao, Professor

COURSE OBJECTIVE : This course provides the knowledge on discrete time signals and systems in both time and frequency domains. The course will give an idea about various transformations like DTFT, DFT, FFT and DIT/DIF radix-2 algorithms. The course also gives the complete information regarding the design of both FIR and IIR filters.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze the various types of signals and systems in time and frequency domain	3	2		3									2		3
2	Apply the Z-Transform on Discrete Time Signals and Realization of Discrete Systems	3	3	2										2		3
3	Gain the knowledge on DFT and importance of FFT	3	3											2	1	3
4	Design an IIR Digital Filters through Approximation Procedures	2	2	3	2									2		3
5	Design a FIR Digital Filters through Window Techniques	2	2	3	2									2	1	3

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

BOS APPROVED TEXT BOOKS:

1. A.V.Openheim, R.W.Schafer, Digital Signal Processing, PHI learning Pvt. Ltd, 1975, 11th Reprint
2. J.G.Proakis, Digital Signal Processing, Principles, Algorithms and Applications, Pearson Education, 4th edition, 2007.

BOS APPROVED REFERENCE BOOKS:

1. A.Nagoor Kani, Digital Signal Processing, RBA Publications, Chennai
2. P.Ramesh Babu, Digital Signal Processing, Scitech Publications, Chennai

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Discrete Time Signals, Discrete Time Systems and DTFT

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 Subject	1	1.12.16			
2.	Course Outcomes	1	2.12.16			
3.	Introduction to UNIT-I	1	5.12.16			
4.	Concept of Signal and Classification	1	6.12.16			
5.	Elementary Discrete Time Signals	2	7.12.16 8.12.16			
6.	Representation of Discrete Time Signals	1	9.12.16			
7.	Operations on Signals	2	12.12.16 14.12.16			
8.	Properties of Signals	2	15.12.16 16.12.16			
9.	System Representation through LCCDE	2	19.12.16 20.12.16			
10.	Properties of Discrete Time Systems	2	21.12.16 22.12.16			
11.	TUTORIAL-1	1	23.12.16			
12.	DTFT of a Sequence	1	26.12.16			
13.	DTFT of a System	1	27.12.16			
14.	Properties of DTFT	1	28.12.16			
15.	TUTORIAL-2	1	29.12.16			
16.	Assignment/Quiz-1	1	30.12.16			
No. of classes required to complete UNIT-I		21	No. of classes taken:			

UNIT-II : Z-Transforms and Realization of Discrete 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
17.	Introduction to UNIT-II	1	2.1.17			
18.	Z-Transform of a sequence	1	3.1.17			
19.	Z-Transform of various classes of signals	1	4.1.17			
20.	ROC and its properties	1	5.1.17			
21.	Properties of Z-Transforms	2	6.1.17 9.1.17			
22.	TUTORIAL-3	1	10.1.17			
23.	Inverse Z-Transform	2	11.1.17 16.1.17			
24.	TUTORIAL-4	1	17.1.17			
25.	Realization of discrete systems	1	18.1.17			
26.	TUTORIAL-5	1	19.1.17			
27.	Assignment/Quiz-2	1	20.1.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : Discrete Fourier Transform and 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
28.	Introduction to UNIT-III	1	27.1.17			
29.	Computation of DFT and IDFT	1	27.1.17			
30.	Relation b/n DTFT & DFT Properties of Twiddle Factor	1	27.1.17			
31.	Properties of DFT	1	27.1.17			
32.	TUTORIAL-6	1	30.1.17			
33.	Linear Convolution	1	31.1.17			
34.	Circular Convolution	1	1.2.17			
35.	Linear Convolution through Circular Convolution	1	2.2.17			
36.	Response of discrete LSI system through circular convolution	1	3.2.17			
37.	Circular Convolution through DFT & IDFT	1	6.2.17			
38.	Linear Convolution through DFT & IDFT	1	7.2.17			
39.	TUTORIAL-7	1	8.2.17			
40.	FFT	1	9.2.17			
41.	Radix – 2 DIT-FFT Algorithms	1	10.2.17			
42.	Radix – 2 DIF-FFT Algorithms	1	13.2.17			
43.	Comparison b/n DIT and DIF	1	14.2.17			
44.	Inverse FFT	1	15.2.17			
45.	TUTORIAL-8	1	16.2.17			
46.	Assignment/Quiz-3	1	17.2.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : IIR 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
47.	Introduction to UNIT-IV	1	20.2.17			
48.	Characteristics and Classification of Filters	1	21.2.17			
49.	IIR Filter Design - Steps	1	22.2.17			
50.	BUTTERWORTH Filter Appr.	1	23.2.17			
51.	CHEBYSHEV Filter Approximation	1	27.2.17			
52.	Impulse Invariant Transformation	1	28.2.17			
53.	Bilinear Transformation	1	1.3.17			
54.	Frequency Transformation	1	2.3.17			
55.	TUTORIAL-9	1	3.3.17			
56.	TUTORIAL-10	1	6.3.17			
57.	TUTORIAL-11	1	7.3.17			
58.	Assignment/Quiz-4	1	8.3.17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : 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
59.	Introduction to UNIT-V	1	9.3.17			
60.	FIR Filter Design - Steps	1	10.3.17			
61.	Frequency Response	1	13.3.17			
62.	Windows	2	14.3.17 15.3.17			
63.	Linear Phase Characteristics	1	16.3.17			
64.	TUTORIAL-12	1	17.3.17			
65.	TUTORIAL-13	1	20.3.17			
66.	TUTORIAL-14	1	21.3.17			
67.	Digital Signal Processing System Advantages of DSP	1	22.3.17			
68.	Limitations and Applications of DSP	1	23.3.17			
69.	Assignment/Quiz-5	1	24.3.17			
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
70.	Advanced DSP	1	27.3.17			
71.	Image Processing	1	29.3.17			
72.	Speech Processing	1	30.3.17			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Prof.B.Ramesh Reddy	Dr.E,V.Krishna Rao	Mr.T.Anil Raju	Dr.E,V.Krishna Rao	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Digital Signal Processing - S 192

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Prof.B.Ramesh Reddy, Professor and HOD

COURSE COORDINATOR : Dr.E.V.Krishna Rao, Professor

COURSE OBJECTIVE : This course provides the knowledge on discrete time signals and systems in both time and frequency domains. The course will give an idea about various transformations like DTFT, DFT, FFT and DIT/DIF radix-2 algorithms. The course also gives the complete information regarding the design of both FIR and IIR filters.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze the various types of signals and systems in time and frequency domain	3	2		3									2		3
2	Apply the Z-Transform on Discrete Time Signals and Realization of Discrete Systems	3	3	2										2		3
3	Gain the knowledge on DFT and importance of FFT	3	3											2	1	3
4	Design an IIR Digital Filters through Approximation Procedures	2	2	3	2									2		3
5	Design a FIR Digital Filters through Window Techniques	2	2	3	2									2	1	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
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BOS APPROVED REFERENCE BOOKS:

1. A.Nagoor Kani, Digital Signal Processing, RBA Publications, Chennai
2. P.Ramesh Babu, Digital Signal Processing, Scitech Publications, Chennai

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Discrete Time Signals, Discrete Time Systems and DTFT

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 Subject	1	1.12.16			
2.	Course Outcomes	1	2.12.16			
3.	Introduction to UNIT-I	1	5.12.16			
4.	Concept of Signal and Classification	1	6.12.16			
5.	Elementary Discrete Time Signals	2	7.12.16 8.12.16			
6.	Representation of Discrete Time Signals	1	9.12.16			
7.	Operations on Signals	2	12.12.16 14.12.16			
8.	Properties of Signals	2	15.12.16 16.12.16			
9.	System Representation through LCCDE	2	19.12.16 20.12.16			
10.	Properties of Discrete Time Systems	2	21.12.16 22.12.16			
11.	TUTORIAL-1	1	23.12.16			
12.	DTFT of a Sequence	1	26.12.16			
13.	DTFT of a System	1	27.12.16			
14.	Properties of DTFT	1	28.12.16			
15.	TUTORIAL-2	1	29.12.16			
16.	Assignment/Quiz-1	1	30.12.16			
No. of classes required to complete UNIT-I		21	No. of classes taken:			

UNIT-II : Z-Transforms and Realization of Discrete 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
17.	Introduction to UNIT-II	1	2.1.17			
18.	Z-Transform of a sequence	1	3.1.17			
19.	Z-Transform of various classes of signals	1	4.1.17			
20.	ROC and its properties	1	5.1.17			
21.	Properties of Z-Transforms	2	6.1.17 9.1.17			
22.	TUTORIAL-3	1	10.1.17			
23.	Inverse Z-Transform	2	11.1.17 16.1.17			
24.	TUTORIAL-4	1	17.1.17			
25.	Realization of discrete systems	1	18.1.17			
26.	TUTORIAL-5	1	19.1.17			
27.	Assignment/Quiz-2	1	20.1.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : Discrete Fourier Transform and 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
28.	Introduction to UNIT-III	1	27.1.17			
29.	Computation of DFT and IDFT	1	27.1.17			
30.	Relation b/n DTFT & DFT Properties of Twiddle Factor	1	27.1.17			
31.	Properties of DFT	1	27.1.17			
32.	TUTORIAL-6	1	30.1.17			
33.	Linear Convolution	1	31.1.17			
34.	Circular Convolution	1	1.2.17			
35.	Linear Convolution through Circular Convolution	1	2.2.17			
36.	Response of discrete LSI system through circular convolution	1	3.2.17			
37.	Circular Convolution through DFT & IDFT	1	6.2.17			
38.	Linear Convolution through DFT & IDFT	1	7.2.17			
39.	TUTORIAL-7	1	8.2.17			
40.	FFT	1	9.2.17			
41.	Radix – 2 DIT-FFT Algorithms	1	10.2.17			
42.	Radix – 2 DIF-FFT Algorithms	1	13.2.17			
43.	Comparison b/n DIT and DIF	1	14.2.17			
44.	Inverse FFT	1	15.2.17			
45.	TUTORIAL-8	1	16.2.17			
46.	Assignment/Quiz-3	1	17.2.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : IIR 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
47.	Introduction to UNIT-IV	1	20.2.17			
48.	Characteristics and Classification of Filters	1	21.2.17			
49.	IIR Filter Design - Steps	1	22.2.17			
50.	BUTTERWORTH Filter Appr.	1	23.2.17			
51.	CHEBYSHEV Filter Approximation	1	27.2.17			
52.	Impulse Invariant Transformation	1	28.2.17			
53.	Bilinear Transformation	1	1.3.17			
54.	Frequency Transformation	1	2.3.17			
55.	TUTORIAL-9	1	3.3.17			
56.	TUTORIAL-10	1	6.3.17			
57.	TUTORIAL-11	1	7.3.17			
58.	Assignment/Quiz-4	1	8.3.17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : 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
59.	Introduction to UNIT-V	1	9.3.17			
60.	FIR Filter Design - Steps	1	10.3.17			
61.	Frequency Response	1	13.3.17			
62.	Windows	2	14.3.17 15.3.17			
63.	Linear Phase Characteristics	1	16.3.17			
64.	TUTORIAL-12	1	17.3.17			
65.	TUTORIAL-13	1	20.3.17			
66.	TUTORIAL-14	1	21.3.17			
67.	Digital Signal Processing System Advantages of DSP	1	22.3.17			
68.	Limitations and Applications of DSP	1	23.3.17			
69.	Assignment/Quiz-5	1	24.3.17			
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
70.	Advanced DSP	1	27.3.16			
71.	Image Processing	1	29.3.16			
72.	Speech Processing	1	30.3.16			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Dr.E,V.Krishna Rao	Dr.E,V.Krishna Rao	Mr.T.Anil Raju	Dr.E,V.Krishna Rao	Prof.B.Ramesh Reddy
Course Coordinator	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Digital Signal Processing - S 192

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Prof.B.Ramesh Reddy, Professor and HOD

COURSE COORDINATOR : Dr.E.V.Krishna Rao, Professor

COURSE OBJECTIVE : This course provides the knowledge on discrete time signals and systems in both time and frequency domains. The course will give an idea about various transformations like DTFT, DFT, FFT and DIT/DIF radix-2 algorithms. The course also gives the complete information regarding the design of both FIR and IIR filters.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze the various types of signals and systems in time and frequency domain	3	2		3									2		3
2	Apply the Z-Transform on Discrete Time Signals and Realization of Discrete Systems	3	3	2										2		3
3	Gain the knowledge on DFT and importance of FFT	3	3											2	1	3
4	Design an IIR Digital Filters through Approximation Procedures	2	2	3	2									2		3
5	Design a FIR Digital Filters through Window Techniques	2	2	3	2									2	1	3

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

BOS APPROVED TEXT BOOKS:

1. A.V.Openheim, R.W.Schafer, Digital Signal Processing, PHI learning Pvt. Ltd, 1975, 11th Reprint
2. J.G.Proakis, Digital Signal Processing, Principles, Algorithms and Applications, Pearson Education, 4th edition, 2007.

BOS APPROVED REFERENCE BOOKS:

1. A.Nagoor Kani, Digital Signal Processing, RBA Publications, Chennai
2. P.Ramesh Babu, Digital Signal Processing, Scitech Publications, Chennai

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Discrete Time Signals, Discrete Time Systems and DTFT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
157.	Introduction to Subject	1	1.12.16			
158.	Course Outcomes	1	2.12.16			
159.	Introduction to UNIT-I	1	5.12.16			
160.	Concept of Signal and Classification	1	6.12.16			
161.	Elementary Discrete Time Signals	2	7.12.16 8.12.16			
162.	Representation of Discrete Time Signals	1	9.12.16			
163.	Operations on Signals	2	12.12.16 14.12.16			
164.	Properties of Signals	2	15.12.16 16.12.16			
165.	System Representation through LCCDE	2	19.12.16 20.12.16			
166.	Properties of Discrete Time Systems	2	21.12.16 22.12.16			
167.	TUTORIAL-1	1	23.12.16			
168.	DTFT of a Sequence	1	26.12.16			
169.	DTFT of a System	1	27.12.16			
170.	Properties of DTFT	1	28.12.16			
171.	TUTORIAL-2	1	29.12.16			
172.	Assignment/Quiz-1	1	30.12.16			
No. of classes required to complete UNIT-I		21	No. of classes taken:			

UNIT-II : Z-Transforms and Realization of Discrete 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
173.	Introduction to UNIT-II	1	2.1.17			
174.	Z-Transform of a sequence	1	3.1.17			
175.	Z-Transform of various classes of signals	1	4.1.17			
176.	ROC and its properties	1	5.1.17			
177.	Properties of Z-Transforms	2	6.1.17 9.1.17			
178.	TUTORIAL-3	1	10.1.17			
179.	Inverse Z-Transform	2	11.1.17 16.1.17			
180.	TUTORIAL-4	1	17.1.17			
181.	Realization of discrete systems	1	18.1.17			
182.	TUTORIAL-5	1	19.1.17			
183.	Assignment/Quiz-2	1	20.1.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : Discrete Fourier Transform and 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
184.	Introduction to UNIT-III	1	27.1.17			
185.	Computation of DFT and IDFT	1	27.1.17			
186.	Relation b/n DTFT & DFT Properties of Twiddle Factor	1	27.1.17			
187.	Properties of DFT	1	27.1.17			
188.	TUTORIAL-6	1	30.1.17			
189.	Linear Convolution	1	31.1.17			
190.	Circular Convolution	1	1.2.17			
191.	Linear Convolution through Circular Convolution	1	2.2.17			
192.	Response of discrete LSI system through circular convolution	1	3.2.17			
193.	Circular Convolution through DFT & IDFT	1	6.2.17			
194.	Linear Convolution through DFT & IDFT	1	7.2.17			
195.	TUTORIAL-7	1	8.2.17			
196.	FFT	1	9.2.17			
197.	Radix – 2 DIT-FFT Algorithms	1	10.2.17			
198.	Radix – 2 DIF-FFT Algorithms	1	13.2.17			
199.	Comparison b/n DIT and DIF	1	14.2.17			
200.	Inverse FFT	1	15.2.17			
201.	TUTORIAL-8	1	16.2.17			
202.	Assignment/Quiz-3	1	17.2.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : IIR 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
203.	Introduction to UNIT-IV	1	20.2.17			
204.	Characteristics and Classification of Filters	1	21.2.17			
205.	IIR Filter Design - Steps	1	22.2.17			
206.	BUTTERWORTH Filter Appr.	1	23.2.17			
207.	CHEBYSHEV Filter Approximation	1	27.2.17			
208.	Impulse Invariant Transformation	1	28.2.17			
209.	Bilinear Transformation	1	1.3.17			
210.	Frequency Transformation	1	2.3.17			
211.	TUTORIAL-9	1	3.3.17			
212.	TUTORIAL-10	1	6.3.17			
213.	TUTORIAL-11	1	7.3.17			
214.	Assignment/Quiz-4	1	8.3.17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : 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
215.	Introduction to UNIT-V	1	9.3.17			
216.	FIR Filter Design - Steps	1	10.3.17			
217.	Frequency Response	1	13.3.17			
218.	Windows	2	14.3.17 15.3.17			
219.	Linear Phase Characteristics	1	16.3.17			
220.	TUTORIAL-12	1	17.3.17			
221.	TUTORIAL-13	1	20.3.17			
222.	TUTORIAL-14	1	21.3.17			
223.	Digital Signal Processing System Advantages of DSP	1	22.3.17			
224.	Limitations and Applications of DSP	1	23.3.17			
225.	Assignment/Quiz-5	1	24.3.17			
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
226.	Advanced DSP	1	27.3.17			
227.	Image Processing	1	29.3.17			
228.	Speech Processing	1	30.3.17			

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I : Discrete Time Signals, Discrete Time Systems and DTFT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
73.	Introduction to Subject	1	1.12.16			
74.	Course Outcomes	1	2.12.16			
75.	Introduction to UNIT-I	1	5.12.16			
76.	Concept of Signal and Classification	1	6.12.16			
77.	Elementary Discrete Time Signals	2	7.12.16 8.12.16			
78.	Representation of Discrete Time Signals	1	9.12.16			
79.	Operations on Signals	2	12.12.16 14.12.16			
80.	Properties of Signals	2	15.12.16 16.12.16			
81.	System Representation through LCCDE	2	19.12.16 20.12.16			
82.	Properties of Discrete Time Systems	2	21.12.16 22.12.16			
83.	TUTORIAL-1	1	23.12.16			
84.	DTFT of a Sequence	1	26.12.16			

85.	DTFT of a System	1	27.12.16			
86.	Properties of DTFT	1	28.12.16			
87.	TUTORIAL-2	1	29.12.16			
88.	Assignment/Quiz-1	1	30.12.16			
No. of classes required to complete UNIT-I		21	No. of classes taken:			

UNIT-II : Z-Transforms and Realization of Discrete 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
89.	Introduction to UNIT-II	1	2.1.17			
90.	Z-Transform of a sequence	1	3.1.17			
91.	Z-Transform of various classes of signals	1	4.1.17			
92.	ROC and its properties	1	5.1.17			
93.	Properties of Z-Transforms	2	6.1.17 9.1.17			
94.	TUTORIAL-3	1	10.1.17			
95.	Inverse Z-Transform	2	11.1.17 16.1.17			
96.	TUTORIAL-4	1	17.1.17			
97.	Realization of discrete systems	1	18.1.17			
98.	TUTORIAL-5	1	19.1.17			
99.	Assignment/Quiz-2	1	20.1.17			
No. of classes required to complete UNIT-II		13	No. of classes taken:			

UNIT-III : Discrete Fourier Transform and 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
100.	Introduction to UNIT-III	1	27.1.17			
101.	Computation of DFT and IDFT	1	27.1.17			
102.	Relation b/n DTFT & DFT Properties of Twiddle Factor	1	27.1.17			
103.	Properties of DFT	1	27.1.17			
104.	TUTORIAL-6	1	30.1.17			
105.	Linear Convolution	1	31.1.17			
106.	Circular Convolution	1	1.2.17			
107.	Linear Convolution through Circular Convolution	1	2.2.17			
108.	Response of discrete LSI system through circular convolution	1	3.2.17			
109.	Circular Convolution through DFT & IDFT	1	6.2.17			
110.	Linear Convolution through DFT & IDFT	1	7.2.17			
111.	TUTORIAL-7	1	8.2.17			
112.	FFT	1	9.2.17			

113.	Radix – 2 DIT-FFT Algorithms	1	10.2.17			
114.	Radix – 2 DIF-FFT Algorithms	1	13.2.17			
115.	Comparison b/n DIT and DIF	1	14.2.17			
116.	Inverse FFT	1	15.2.17			
117.	TUTORIAL-8	1	16.2.17			
118.	Assignment/Quiz-3	1	17.2.17			
No. of classes required to complete UNIT-III		19	No. of classes taken:			

UNIT-IV : IIR 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
119.	Introduction to UNIT-IV	1	20.2.17			
120.	Characteristics and Classification of Filters	1	21.2.17			
121.	IIR Filter Design - Steps	1	22.2.17			
122.	BUTTERWORTH Filter Appr.	1	23.2.17			
123.	CHEBYSHEV Filter Approximation	1	27.2.17			
124.	Impulse Invariant Transformation	1	28.2.17			
125.	Bilinear Transformation	1	1.3.17			
126.	Frequency Transformation	1	2.3.17			
127.	TUTORIAL-9	1	3.3.17			
128.	TUTORIAL-10	1	6.3.17			
129.	TUTORIAL-11	1	7.3.17			
130.	Assignment/Quiz-4	1	8.3.17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : 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
131.	Introduction to UNIT-V	1	9.3.17			
132.	FIR Filter Design - Steps	1	10.3.17			
133.	Frequency Response	1	13.3.17			
134.	Windows	2	14.3.17 15.3.17			
135.	Linear Phase Characteristics	1	16.3.17			
136.	TUTORIAL-12	1	17.3.17			
137.	TUTORIAL-13	1	20.3.17			
138.	TUTORIAL-14	1	21.3.17			
139.	Digital Signal Processing System Advantages of DSP	1	22.3.17			
140.	Limitations and Applications of DSP	1	23.3.17			
141.	Assignment/Quiz-5	1	24.3.17			
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
142.	Advanced DSP	1	27.3.16			
143.	Image Processing	1	29.3.16			
144.	Speech Processing	1	30.3.16			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
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II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Prof.B.Ramesh Reddy	Dr.E,V.Krishna Rao	Mr.T.Anil Raju	Dr.E,V.Krishna Rao	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE-A

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Environmental Studies - S 243

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : Nil

COURSE INSTRUCTOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE COORDINATOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE OBJECTIVE: This course is designed to bring about awareness on a variety of environmental concerns. It attempts to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable life styles and a new ethic towards conservation.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Evaluate local, regional and global environmental issues related to resources and management.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
2	Understand the implications of the ecosystems and identify the threats to global biodiversity	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
3	Address and prevent the problems related to pollution of air, water and soil.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
4	Investigate and solve social issues of the environment.	2	3	2	1	-	1	-	-	-	-	-	-	-	-	-
5	Create awareness on the concept of sustainable population growth	2	3	2	1	-	-	-	-	-	--	-	-	-	-	-

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

BOS APPROVED TEXT BOOKS:

1. Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, 4th Edition.
2. William Hayt, "Engineering Electromagnetics", TMH Publishers,7th Edition.

BOS APPROVED REFERENCE BOOKS:

1. Jordan and Balmain, Electromagnetic fields and Radiating systems, Pearson education.
2. G.S.N Raju, "EM Field Theory and Transmission Lines", Pearson Education

Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: NATURAL RESOURCES

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 Objective, introduction, their applications	1	1/12/16		**TLM1**	
2.	Introduction to syllabus, Def of Environmental studies, Scope & Importance of environmental studies. Need for public awareness.	1	5/12/16		**TLM1**	
3.	Renewable and non-renewable resources Forest resources	1	6/12/16		**TLM1 TLM2**	
4.	Water resources	1	8/12/16		**TLM1 TLM2**	
5.	Mineral resources	1	12/12/16		**TLM1 TLM2**	
6.	Mineral resources and intro to Food resources	1	13/12/16		**TLM1 TLM2**	
7.	Food resources	1	15/12/16		**TLM1 TLM2**	
8.	Energy resources	1	19/12/16		**TLM1 TLM2**	
9.	**Tutorial -1**	1	20/12/16		**TLM3**	
10.	**Assignment in UNIT I**	1	22/12/16		**TLM6**	
No. of classes required to complete UNIT-I		10	No. of classes taken:			

UNIT-II: ECOSYSTEMS AND BIODIVERSITY AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Structure and functions of ecosystems	1	26/12/16		**TLM1 TLM2**	
12.	Ecological succession, Food chains and Food web	2	27/12/16		**TLM1 TLM2**	
13.	**Assignment in UNIT II**	1	29/12/16		**TLM6**	
14.	Ecological pyramids	1	2/1/17		**TLM1 TLM2**	
15.	Bio-Geo chemical cycles	1	3/1/17		**TLM1 TLM2**	
16.	**Tutorial-2**	1	5/1/17		**TLM3**	
17.	Biodiversity definition and levels of measuring biodiversity	1	16/1/17		**TLM1 TLM2**	

18.	Bio-geographical classification of India	1	17/1/17		**TLM1 TLM2**	
19.	India as mega diversity nation, Values, Hot-spots	1	19/1/17		**TLM1 TLM2**	
20.	Threats and conservation of biodiversity	1	19/1/17		**TLM1 TLM2**	
21.	**Tutorial-3**	1	19/1/17		**TLM3**	
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : ENVIRONMENTAL POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Air pollution	1	27-1-17		**TLM1 TLM2**	
23.	Air pollution	1	28-1-17		**TLM1 TLM2**	
24.	Water pollution	1	31-1-17		**TLM1 TLM2**	
25.	Water pollution	1	01-2-17		**TLM1 TLM2**	
26.	Soil pollution	1	02-2-17		**TLM1 TLM2**	
27.	Noise pollution	1	03-2-17		**TLM1 TLM2**	
28.	Radioactive pollution	1	04-2-17		**TLM1 TLM2**	
29.	Solid waste management	1	07-2-17		**TLM4**	
30.	Disaster management	1	08-2-17		**TLM1 TLM2**	
31.	**Tutorial-4**	1	09-2-17		**TLM3**	
32.	**Assignment in UNIT III**	1	20/2/17		**TLM6**	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : SOCIAL ISSUES AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	From unsustainable to sustainable development	21/2/17	10-2-17		**TLM1**	
34.	Environmental and human health	1	11-2-17		**TLM1**	
35.	Resettlement and rehabilitation	1	14-2-17		**TLM1**	
36.	**Tutorial-5**	1	15-2-17		**TLM3**	
37.	Climate change: Global warming & Acid rains	1	16-2-17		**TLM1 TLM2**	
38.	Ozone depletion & Nuclear accidents	1	17-2-17		**TLM1 TLM2**	

	and holocaust					
39.	Consumerism and waste products	1	18-2-17		**TLM1**	
40.	**Tutorial -6**	1	21-2-17		**TLM3**	
No. of classes required to complete UNIT-IV		08	No. of classes taken:			

UNIT-V : HUMAN POPULATION AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Population growth and variations among nations, population explosion	1	13/3/17		**TLM1 TLM2**	
42.	Family welfare programs	1	14/3/17		**TLM1 TLM2**	
43.	**Tutorial-7**	1	16/3/17		**TLM3**	
44.	Human rights and value education, HIV/AIDS	1	20/3/17		**TLM1 TLM2**	
45.	**Assignment in UNIT IV & V**	1	21/3/17		**TLM6**	
46.	Women and child welfare programs	1	23/3/17		**TLM3**	
47.	Role of IT in Environmental management and human health	2	27/3/17		**TLM1**	
48.	**Tutorial-8**	2	28/3/17		**TLM3**	
49.	**Revision**	1	30/3/17		**TLM1**	
50.	**II MID EXAMINATION**	1	3/4/2017		**TLM6**	
No. of classes required to complete UNIT-V		09	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
51.	Case studies on Pollution	1	20-2-17		**TLM9**	
52.	Case studies on Social issues and Human population	1	30-3-17		**TLM9**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE-B

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Environmental Studies - S 243

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : Nil

COURSE INSTRUCTOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE COORDINATOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE OBJECTIVE: This course is designed to bring about awareness on a variety of environmental concerns. It attempts to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable life styles and a new ethic towards conservation.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Evaluate local, regional and global environmental issues related to resources and management.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
2	Understand the implications of the ecosystems and identify the threats to global biodiversity	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
3	Address and prevent the problems related to pollution of air, water and soil.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
4	Investigate and solve social issues of the environment.	2	3	2	1	-	1	-	-	-	-	-	-	-	-	-
5	Create awareness on the concept of sustainable population growth	2	3	2	1	-	-	-	-	-	--	-	-	-	-	-

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

BOS APPROVED TEXT BOOKS:

1 Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, 4th Edition.

2 William Hayt, "Engineering Electromagnetics", TMH Publishers,7th Edition.

BOS APPROVED REFERENCE BOOKS:

1 Jordan and Balmain, Electromagnetic fields and Radiating systems, Pearson education.

2 G.S.N Raju, "EM Field Theory and Transmission Lines", Pearson Education

Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: NATURAL RESOURCES

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 Objective, introduction, their applications	1	2/12/16		**TLM1**	
2.	Introduction to syllabus, Def of Environmental studies, Scope & Importance of environmental studies. Need for public awareness.	1	3/12/16		**TLM1**	
3.	Renewable and non-renewable resources Forest resources	1	5/12/16		**TLM1 TLM2**	
4.	Water resources	1	9/12/16		**TLM1 TLM2**	
5.	Mineral resources	1	10/12/16		**TLM1 TLM2**	
6.	Mineral resources and intro to Food resources	1	12/12/16		**TLM1 TLM2**	
7.	Food resources	1	16/12/16		**TLM1 TLM2**	
8.	Energy resources	1	17/12/16		**TLM1 TLM2**	
9.	**Tutorial -1**	1	19/12/16		**TLM3**	
10.	**Assignment in UNIT I**	1	23/12/16		**TLM6**	
No. of classes required to complete UNIT-I		10	No. of classes taken:			

UNIT-II: ECOSYSTEMS AND BIODIVERSITY AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Structure and functions of ecosystems	1	24/12/16		**TLM1 TLM2**	
12.	Ecological succession, Food chains and Food web	2	26/12/16		**TLM1 TLM2**	
13.	**Assignment in UNIT II**	1	30/12/16		**TLM6**	
14.	Ecological pyramids	1	31/12/16		**TLM1 TLM2**	
15.	Bio-Geo chemical cycles	1	2/1/17		**TLM1 TLM2**	
16.	**Tutorial-2**	1	6/1/17		**TLM3**	
17.	Biodiversity definition and levels of	1	7/1/17		**TLM1 TLM2**	

	measuring biodiversity						
18.	Bio-geographical classification of India	1	16/1/17		**TLM1 TLM2**		
19.	India as mega diversity nation, Values, Hot-spots	1	20/1/17		**TLM1 TLM2**		
20.	Threats and conservation of biodiversity	1	20/1/17		**TLM1 TLM2**		
21.	**Tutorial-3**	1	21/1/17		**TLM3**		
No. of classes required to complete UNIT-II		11	No. of classes taken:				21/1/17

UNIT-III : ENVIRONMENTAL POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Air pollution	1	27/1/17		**TLM1 TLM2**	
23.	Air pollution	1	28/1/17		**TLM1 TLM2**	
24.	Water pollution	1	30/1/17		**TLM1 TLM2**	
25.	Water pollution	1	3/2/17		**TLM1 TLM2**	
26.	Soil pollution	1	4/2/17		**TLM1 TLM2**	
27.	Noise pollution	1	6/2/17		**TLM1 TLM2**	
28.	Radioactive pollution	1	10/2/17		**TLM1 TLM2**	
29.	Solid waste management	1	11/2/17		**TLM4**	
30.	Disaster management	1	13/2/17		**TLM1 TLM2**	
31.	**Tutorial-4**	1	17/2/17		**TLM3**	
32.	**Assignment in UNIT III**	1	18/2/17		**TLM6**	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : SOCIAL ISSUES AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	From unsustainable to sustainable development	1	20/2/17		**TLM1**	
34.	Environmental and human health	1	24/2/17		**TLM1**	
35.	Resettlement and rehabilitation	1	25/2/17		**TLM1**	
36.	**Tutorial-5**	1	27/2/17		**TLM3**	

37.	Climate change: Global warming & Acid rains	1	3/3/17		**TLM1 TLM2**	
38.	Ozone depletion & Nuclear accidents and holocaust	1	4/3/17		**TLM1 TLM2**	
39.	Consumerism and waste products	1	6/3/17		**TLM1**	
40.	**Tutorial -6**	1	10/3/17		**TLM3**	
No. of classes required to complete UNIT-IV		08	No. of classes taken:			

UNIT-V : HUMAN POPULATION AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Population growth and variations among nations, population explosion	1	11/3/17		**TLM1 TLM2**	
42.	Family welfare programs	1	13/3/17		**TLM1 TLM2**	
43.	**Tutorial-7**	1	17/3/17		**TLM3**	
44.	Human rights and value education, HIV/AIDS	1	18/3/17		**TLM1 TLM2**	
45.	**Assignment in UNIT IV & V**	1	20/3/17		**TLM6**	
46.	Women and child welfare programs	1	24/3/17		**TLM3**	
47.	Role of IT in Environmental management and human health	2	25/3/17		**TLM1**	
48.	**Tutorial-8**	2	27/3/17		**TLM3**	
49.	**Revision**	1	27/3/17		**TLM1**	
50.	**II MID EXAMINATION**	1	31/3/17		**TLM6**	
No. of classes required to complete UNIT-V		09	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
51.	Case studies on Pollution	1	20-2-17		**TLM9**	
52.	Case studies on Social issues and Human population	1	30-3-17		**TLM9**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
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II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE-C

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Environmental Studies - S 243

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : Nil

COURSE INSTRUCTOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE COORDINATOR : Dr. Shaheda Niloufer, Sr. Asst. Professor

COURSE OBJECTIVE: This course is designed to bring about awareness on a variety of environmental concerns. It attempts to create a pro-environmental attitude and a behavioral pattern in society that is based on creating sustainable life styles and a new ethic towards conservation.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Evaluate local, regional and global environmental issues related to resources and management.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
2	Understand the implications of the ecosystems and identify the threats to global biodiversity	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
3	Address and prevent the problems related to pollution of air, water and soil.	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
4	Investigate and solve social issues of the environment.	2	3	2	1	-	1	-	-	-	-	-	-	-	-	-
5	Create awareness on the concept of sustainable population growth	2	3	2	1	-	-	-	-	-	--	-	-	-	-	-

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

BOS APPROVED TEXT BOOKS:

1. Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, 4th Edition.
2. William Hayt, "Engineering Electromagnetics", TMH Publishers,7th Edition.

BOS APPROVED REFERENCE BOOKS:

1. Jordan and Balmain, Electromagnetic fields and Radiating systems, Pearson education.
2. G.S.N Raju, "EM Field Theory and Transmission Lines", Pearson Education

Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: NATURAL RESOURCES

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 Objective, introduction, their applications	1	3/12/16		**TLM1**	
2.	Introduction to syllabus, Def of Environmental studies, Scope & Importance of environmental studies. Need for public awareness.	1	5/12/16		**TLM1**	
3.	Renewable and non-renewable resources Forest resources	1	7/12/16		**TLM1 TLM2**	
4.	Water resources	1	10/12/16		**TLM1 TLM2**	
5.	Mineral resources	1	12/12/16		**TLM1 TLM2**	
6.	Mineral resources and intro to Food resources	1	14/12/16		**TLM1 TLM2**	
7.	Food resources	1	17/12/16		**TLM1 TLM2**	
8.	Energy resources	1	19/12/16		**TLM1 TLM2**	
9.	**Tutorial -1**	1	21/12/16		**TLM3**	
10.	**Assignment in UNIT I**	1	24/12/16		**TLM6**	
No. of classes required to complete UNIT-I		10	No. of classes taken:			

UNIT-II: ECOSYSTEMS AND BIODIVERSITY AND CONSERVATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Structure and functions of ecosystems	1	26/12/16		**TLM1 TLM2**	
12.	Ecological succession, Food chains and Food web	2	28/12/16		**TLM1 TLM2**	
13.	**Assignment in UNIT II**	1	31/12/16		**TLM6**	
14.	Ecological pyramids	1	2/1/17		**TLM1 TLM2**	
15.	Bio-Geo chemical cycles	1	4/1/17		**TLM1 TLM2**	
16.	**Tutorial-2**	1	7/1/17		**TLM3**	
17.	Biodiversity definition and levels of	1	16/1/17		**TLM1 TLM2**	

	measuring biodiversity					
18.	Bio-geographical classification of India	1	18/1/17		**TLM1 TLM2**	
19.	India as mega diversity nation, Values, Hot-spots	1	18/1/17		**TLM1 TLM2**	
20.	Threats and conservation of biodiversity	1	21/1/17		**TLM1 TLM2**	
21.	**Tutorial-3**	1	21/1/17		**TLM3**	
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : ENVIRONMENTAL POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
22.	Air pollution	1	28/1/17		**TLM1 TLM2**	
23.	Air pollution	1	30/1/17		**TLM1 TLM2**	
24.	Water pollution	1	1/2/17		**TLM1 TLM2**	
25.	Water pollution	1	4/2/17		**TLM1 TLM2**	
26.	Soil pollution	1	6/2/17		**TLM1 TLM2**	
27.	Noise pollution	1	8/2/17		**TLM1 TLM2**	
28.	Radioactive pollution	1	11/2/17		**TLM1 TLM2**	
29.	Solid waste management	1	13/2/17		**TLM4**	
30.	Disaster management	1	15/2/17		**TLM1 TLM2**	
31.	**Tutorial-4**	1	18/2/17		**TLM3**	
32.	**Assignment in UNIT III**	1	20/2/17		**TLM6**	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : SOCIAL ISSUES AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
33.	From unsustainable to sustainable development	1	22/2/17		**TLM1**	
34.	Environmental and human health	1	25/2/17		**TLM1**	
35.	Resettlement and rehabilitation	1	27/2/17		**TLM1**	
36.	**Tutorial-5**	1	1/3/17		**TLM3**	

37.	Climate change: Global warming & Acid rains	1	4/3/17		**TLM1 TLM2**	
38.	Ozone depletion & Nuclear accidents and holocaust	1	6/3/17		**TLM1 TLM2**	
39.	Consumerism and waste products	1	8/3/17		**TLM1**	
40.	**Tutorial -6**	1	11/3/17		**TLM3**	
No. of classes required to complete UNIT-IV		08	No. of classes taken:			

UNIT-V : HUMAN POPULATION AND ENVIRONMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	Population growth and variations among nations, population explosion	1	13/3/17		**TLM1 TLM2**	
42.	Family welfare programs	1	15/3/17		**TLM1 TLM2**	
43.	**Tutorial-7**	1	18/3/17		**TLM3**	
44.	Human rights and value education, HIV/AIDS	1	20/3/17		**TLM1 TLM2**	
45.	**Assignment in UNIT IV & V**	1	22/3/17		**TLM6**	
46.	Women and child welfare programs	1	25/3/17		**TLM3**	
47.	Role of IT in Environmental management and human health	2	27/3/17		**TLM1**	
48.	**Tutorial-8**	2	27/3/17		**TLM3**	
49.	**Revision**	1	29/3/17		**TLM1**	
50.	**II MID EXAMINATION**	1	3/4/2017		**TLM6**	
No. of classes required to complete UNIT-V		09	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
51.	Case studies on Pollution	1	20-2-17		**TLM9**	
52.	Case studies on Social issues and Human population	1	30-3-17		**TLM9**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

V. Bhagya Lakshmi	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Dr. Shaheda Niloufer	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
http://www.lbrce.ac.in, ecedept4@gmail.com Phone: 08659-222933, Fax: 08659-222931

LESSON PLAN

COURSE : B.Tech.,(IV-Sem.,)- Section-B
A.Y : 2016-17
BRANCH : Electronics and Communication Engineering
SUBJECT : Control Systems (Code: S 174)
FACULTY : Mr. CH Siva Rama Krishna

Process of Teaching, Learning, Delivery and Assessment Methods:

S.No	Teaching Learning Process (TLP)	Delivery Methods (DM)	Assessment Methods (AM)
1	Solving Real world problem	Chalk & Talk	Assignments
2	Explaining application before theory	ICT tools	Quiz
3	Solving problems	Group discussions	Tutorials
4	Designing of experiments	Industrial visit	Surprise Tests
5	Problems on environmental, economics, health & safety	Field work	Mid Exams
6	Problems on professional & ethics	Case studies	Model Exam
7	Seminar	Mini Projects	QAs
8	Problems using software	Numerical treatment	
9	Self study	Design / Exercises	

UNIT-I : INTRODUCTION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
229.	Brief introduction about the course & its importance	1	02-12-16				
230.	Introduction to control systems	1	03-12-16				
231.	Classification of Control systems	1	05-12-16				
232.	Open loop and Closed loop control systems	1	06-12-16				
233.	Examples of control systems	1	07-12-16				
234.	Effect of feedback and its Characteristics	1	09-12-16				
235.	Translational mechanical Systems	1	10-12-16				
236.	Rotational Mechanical Systems	1	13-12-16				
237.	Electrical analogous force-voltage& force-current, torque-voltage& torque-current.	1	14-12-16				
238.	**Tutorial-1**	1	16-12-16				
239.	Block Diagrams, reduction rules	1	17-12-16				
240.	Problems on Block diagram Reduction	1	19-12-16				
241.	**Tutorial-2**	1	20-12-16				

242.	Signal Flow Graph(SFG): Terminology	1	21-12-16				
243.	Properties of Signal Flow Algebra	1	23-12-16				
244.	SFG Reduction using Masons Gain Formula.	1	24-12-16				
245.	**Tutorial-3**	1	26-12-16				
246.	Armature controoled DC Servo Motor	1	27-12-16				
247.	Field controoled DC Servo Motor	1	28-12-16				
No. of classes required to complete UNIT-I			No. of classes taken				

UNIT-II : TIME RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
248.	Standard test signals	1	30-12-16				
249.	Time response of first order systems C/S Equation of Feedback control systems	1	31-12-16				
250.	Transient response of second order undammed system and order under damped system	1	02-01-17				
251.	**Tutorial-4**	1	03-01-17				
252.	Time response of 2nd order system	1	04-01-17				
253.	Time domain specifications rise time, delay time	1	06-01-17				
254.	**Tutorial-5**	1	07-01-17				
255.	Time domain specifications.	1	16-01-17				
256.	Steady state response	1	17-01-17				
257.	Steady state errors and error constants	1	18-01-17				
258.	**Tutorial-6**	1	20-01-17				
259.	Effects of PD, PI systems	1	21-01-17				
No. of classes required to complete UNIT-II		17	No. of classes taken				

UNIT-III : FREQUENCY RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
260.	The concept of stability	1	27-01-17				
261.	Routh's stability criterion	1	28-01-17				
262.	qualitative stability & conditional stability	1	30-01-17				
263.	limitations of Routh's stability	1	31-01-17				
264.	**Tutorial-7**	1	01-02-17				
265.	Root Locus Technique**:** The root locus concept	1	03-02-17				
266.	construction of root loci	1	04-02-17				
267.	**Tutorial-8**	1	06-02-17				
268.	Effects of adding poles and zeros to G(s)H(s) on the root loci.	1	07-02-17				

269.	Effects of adding zeros to G(s)H(s) on the root loci.	1	08-02-17				
270.	**Tutorial-9**	1	10-02-17				
No. of classes required to complete UNIT-III		15	No. of classes taken				

UNIT-IV: STABILITY ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
271.	Introduction, Frequency domain specifications	1	11-02-17				
272.	Frequency domain specifications	1	13-02-17				
273.	Bode diagrams-Determination of Frequency domain specifications	1	14-02-17				
274.	Transfer function from the Bode Diagram-Phase margin and Gain margin	1	15-02-17				
275.	**Tutorial-10**	1	17-02-17				
276.	Stability Analysis from Bode Plots	1	18-02-17				
277.	Polar Plots	1	20-02-17				
278.	**Tutorial-11**	1	21-02-17				
279.	Nyquist Plots Stability Analysis	1	22-02-17				
280.	Nyquist Plots Stability Analysis	1	24-02-17				
281.	**Tutorial-12**	1	27-02-17				
282.	Compensation techniques – Lag	1	28-02-17				
283.	Lead, Lead-Lag	1	01-03-17				
284.	PID Controllers	1	03-03-17				
285.	**Tutorial-13**	1	04-03-17				
No. of classes to complete UNIT-IV			No. of classes taken				

UNIT-V : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
286.	Concepts of state, state variables and state model	1	06-03-17				
287.	Derivation of state models from block diagrams	1	07-03-17				
288.	Diagonalization	1	08-03-17				
289.	Solving the Time invariant state Equations	1	10-03-17				
290.	State Transition Matrix	1	11-03-17				
291.	State Transition Matrix Properties	1	14-03-17				
292.	**Tutorial-14**	1	15-03-17				
293.	Concept of Controllability	1	17-03-17				
294.	Concept of Observability	1	18-03-17				
295.	**Tutorial-15**	1	20-03-17				
296.	Solution of Homogenious state equation	1	21-03-17				
297.	Solution of Non-Homogenious state	1	22-03-17				

	equation						
298.		1	24-03-17				
299.		1	25-03-17				
300.		1	27-03-17				
301.		1	29-03-17				
No. of classes required to complete UNIT-V			No. of classes taken				

CH Siva Rama Krishna			Prof.B.RameshReddy
Subject Teacher	**Course Coordinator**	**Module Coordinator**	**HOD**

Assessment Summary:

Assessment Task	Weightage (Marks)	**Course Outcomes**				
		CO1	CO2	CO3	CO4	CO5
Attendance/Assignments/Quiz's	05					
Mid Exams	20					
End Exam	75					
Total	100					

Mapping of Course Outcomes (COs) with Programme Outcomes (POs):

POs / COs	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**
CO1											
CO2											
CO3											
CO4											
CO5											

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LESSON PLAN

COURSE : B.Tech.,(IV-Sem.,)- Section-C
A.Y : 2016-17
BRANCH : Electronics and Communication Engineering
SUBJECT : Control Systems (Code: S 174)
FACULTY : Mr. CH Siva Rama Krishna

Process of Teaching, Learning, Delivery and Assessment Methods:

S.No	Teaching Learning Process (TLP)	Delivery Methods (DM)	Assessment Methods (AM)
1	Solving Real world problem	Chalk & Talk	Assignments
2	Explaining application before theory	ICT tools	Quiz
3	Solving problems	Group discussions	Tutorials
4	Designing of experiments	Industrial visit	Surprise Tests
5	Problems on environmental, economics, health & safety	Field work	Mid Exams
6	Problems on professional & ethics	Case studies	Model Exam
7	Seminar	Mini Projects	QAs
8	Problems using software	Numerical treatment	
9	Self study	Design / Exercises	

UNIT-I : INTRODUCTION

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
1.	Brief introduction about the course & its importance	1	01-12-16				
2.	Introduction to control systems	1	03-12-16				
3.	Classification of Control systems	1	05-12-16				
4.	Open loop and Closed loop control systems	1	06-12-16				
5.	Examples of control systems	1	07-12-16				
6.	Effect of feedback and its Characteristics	1	08-12-16				
7.	Translational mechanical Systems	1	10-12-16				
8.	Rotational Mechanical Systems	1	13-12-16				
9.	Electrical analogous force-voltage& force-current, torque-voltage& torque-current.	1	14-12-16				
10.	**Tutorial-1**	1	15-12-16				
11.	Block Diagrams, reduction rules	1	17-12-16				
12.	Problems on Block diagram Reduction	1	19-12-16				
13.	**Tutorial-2**	1	20-12-16				
14.	Signal Flow Graph(SFG): Terminology	1	21-12-16				
15.	Properties of Signal Flow Algebra	1	22-12-16				

16.	SFG Reduction using Masons Gain Formula.	1	24-12-16				
17.	**Tutorial-3**	1	26-12-16				
18.	Armature controoled DC Servo Motor	1	27-12-16				
19.	Field controoled DC Servo Motor	1	28-12-16				
No. of classes required to complete UNIT-I			No. of classes taken				

UNIT-II : TIME RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
20.	Standard test signals	1	29-12-16				
21.	Time response of first order systems C/S Equation of Feedback control systems	1	31-12-16				
22.	Transient response of second order undammed system and order under damped system	1	02-01-17				
23.	**Tutorial-4**	1	03-01-17				
24.	Time response of 2nd order system	1	04-01-17				
25.	Time domain specifications rise time, delay time	1	05-01-17				
26.	**Tutorial-5**	1	07-01-17				
27.	Time domain specifications.	1	16-01-17				
28.	Steady state response	1	17-01-17				
29.	Steady state errors and error constants	1	18-01-17				
30.	**Tutorial-6**	1	19-01-17				
31.	Effects of PD, PI systems	1	21-01-17				
No. of classes required to complete UNIT-II		17	No. of classes taken				

UNIT-III : FREQUENCY RESPONSE ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
32.	The concept of stability	1	28-01-17				
33.	Routh's stability criterion	1	30-01-17				
34.	qualitative stability & conditional stability	1	31-01-17				
35.	limitations of Routh's stability	1	01-02-17				
36.	**Tutorial-7**	1	02-02-17				
37.	Root Locus Technique**:** The root locus concept	1	04-02-17				
38.	construction of root loci	1	06-02-17				
39.	**Tutorial-8**	1	07-02-17				
40.	Effects of adding poles and zeros to G(s)H(s) on the root loci.	1	08-02-17				
41.	Effects of adding zeros to G(s)H(s) on the root loci.	1	09-02-17				

42.	**Tutorial-9**	1	11-02-17				
No. of classes required to complete UNIT-III		15	No. of classes taken				

UNIT-IV: STABILITY ANALYSIS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
43.	Introduction, Frequency domain specifications	1	13-02-17				
44.	Frequency domain specifications	1	14-02-17				
45.	Bode diagrams-Determination of Frequency domain specifications	1	15-02-17				
46.	Transfer function from the Bode Diagram-Phase margin and Gain margin	1	16-02-17				
47.	**Tutorial-10**	1	18-02-17				
48.	Stability Analysis from Bode Plots	1	20-02-17				
49.	Polar Plots	1	21-02-17				
50.	**Tutorial-11**	1	22-02-17				
51.	Nyquist Plots Stability Analysis	1	23-02-17				
52.	Nyquist Plots Stability Analysis	1	27-02-17				
53.	**Tutorial-12**	1	28-02-17				
54.	Compensation techniques – Lag	1	01-03-17				
55.	Lead, Lead-Lag	1	02-03-17				
56.	PID Controllers	1	04-03-17				
57.	**Tutorial-13**	1	06-03-17				
No. of classes to complete UNIT-IV			No. of classes taken				

UNIT-V : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

S.No.	Topics to be covered	No. of Classes	Tentative Date	Actual Date	TLP	DM	AM
58.	Concepts of state, state variables and state model	1	07-03-17				
59.	Derivation of state models from block diagrams	1	08-03-17				
60.	Diagonalization	1	09-03-17				
61.	Solving the Time invariant state Equations	1	11-03-17				
62.	State Transition Matrix	1	14-03-17				
63.	State Transition Matrix Properties	1	15-03-17				
64.	**Tutorial-14**	1	16-03-17				
65.	Concept of Controllability	1	18-03-17				
66.	Concept of Observability	1	20-03-17				
67.	**Tutorial-15**	1	21-03-17				
68.	Solution of Homogenious state equation	1	22-03-17				
69.	Solution of Non-Homogenious state equation	1	23-03-17				
70.		1	25-03-17				

71.		1	27-03-17				
72.		1	29-03-17				
73.		1	30-03-17				
No. of classes required to complete UNIT-V			No. of classes taken				

CH Siva Rama Krishna			Prof.B.RameshReddy
Subject Teacher	**Course Coordinator**	**Module Coordinator**	**HOD**

Assessment Summary:

Assessment Task	Weightage (Marks)	**Course Outcomes**				
		CO1	CO2	CO3	CO4	CO5
Attendance/Assignments/Quiz's	05					
Mid Exams	20					
End Exam	75					
Total	100					

Mapping of Course Outcomes (COs) with Programme Outcomes (POs):

POs / COs	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**
CO1											
CO2											
CO3											
CO4											
CO5											

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Computer Organization - S 169

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : Dr E.V.Prasad

COURSE COORDINATOR :

COURSE OBJECTIVE This course provides the knowledge on Register transfer language and shows how it is used to express micro-operations in symbolic form. The course will give an idea about organization and design of a basic computer and introduces the concept of microprogramming and how to write micro-codes for computer instructions. The course also gives a brief idea about central processing unit and the concept of pipelining and the way it can speed-up processing. This course also gives the knowledge on algorithms for computer arithmetic operations and the concept of memory organization and the techniques that computers use to communicate with input and output devices.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Able to understand register transfer, micro operations such as arithmetic logic ad shift.	3	1	2										3	1	2
2	Able to analyze the basic concepts and elements of a computer system.	3		2	1									3		2
3	Able to learn how to design a CPU.	2	3	1										2	3	1
4	Able to perform arithmetic operations.	3	2	1										3	2	1
5	Able to study memory and I/O management	1			2	3								1		
		3	**2**	**2**	**2**	**3**								**3**	**3**	**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).

BOS APPROVED TEXT BOOKS:

1 M.Morris Mano, "Computer Systems Architecture", Pearson Education publishers, 3rd Edition.

BOS APPROVED REFERENCE BOOKS:

1 Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", Tata McGraw Hill publishers.

2 William Stallings, "Computer Organization and Architecture", Sixth Edition, Pearson/PHI publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : RTL & BASIC COMPUTER ORGANIZATION

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.	Register Transfer language	1	01-12-16		**TLM1**	
2.	Register transfer	1	02-12-16		**TLM1**	
3.	Bus and memory transfer	1	05-12-16		**TLM1**	
4.	Arithmetic Micro operations	1	06-12-16		**TLM1**	
5.	Logic micro operations	1	07-12-16		**TLM1**	
6.	Shift micro operations	1	08-12-16		**TLM1**	
7.	Arithmetic logic shift unit	1	09-12-16		**TLM1**	
8.	Tutorial	1	12-12-16		**TLM3**	
9.	Instruction codes	1	13-12-16		**TLM1**	
10.	Computer Registers,	1	14-12-16		**TLM1**	
11.	Computer instructions	1	15-12-16		**TLM1**	
12.	Instruction cycle	1	16-12-16		**TLM1**	
13.	Memory – Reference Instructions, Register reference Instructions	1	19-12-16		**TLM1**	
14.	Input – Output and Interrupt	1	20-12-16		**TLM1**	
15.	Tutorial	1	21-12-16		**TLM3**	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : MICROPROGRAMMED CONTROL & CPU

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Control memory	1	22-12-16		**TLM1**	
17.	Address sequencing	1	23-12-16		**TLM1**	
18.	Micro program example	1	26-12-16		**TLM2**	
19.	Micro program example	1	27-12-16		**TLM1**	
20.	Design of control unit Hard wired control	1	28-12-16		**TLM2**	
21.	Micro programmed control	1	29-12-16		**TLM1**	
22.	Tutorial	1	30-12-16		**TLM3**	
23.	STACK organization.	1	02-01-17		**TLM1**	

24.	Program control	1	03-01-17		**TLM1**	
25.	Instruction formats	1	04-01-17		**TLM1**	
26.	Addressing modes	1	05-01-17		**TLM1**	
27.	DATA Transfer and manipulation	1	06-01-17		**TLM1**	
28.	Reduced Instruction set computer	1	17-01-17		**TLM1**	
29.	Overlapped register windows	1	18-01-17		**TLM2**	
30.	Tutorial	1	19-01-17		**TLM3**	
31.	Revision for mid exam		20-01-17		**TLM1**	
No. of classes required to complete UNIT-II		16	No. of classes taken:			

UNIT-III : PIPELINING, VECTOR PROCESSING AND ARITHMETIC

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Parallel processing	1	30-01-17		**TLM1**	
33.	Pipelining	1	31-01-17		**TLM1**	
34.	Arithmetic Pipeline	1	01-02-17		**TLM2**	
35.	Instruction Pipeline	1	02-02-17		**TLM1**	
36.	RISC pipeline	1	03-02-17		**TLM1**	
37.	Vector Processing	1	06-02-17		**TLM2**	
38.	Tutorial	1	07-02-17		**TLM3**	
39.	Data Representation. Fixed Point Representation	1	08-02-17		**TLM1**	
40.	Floating PointRepresentation	1	09-02-17		**TLM1**	
41.	Addition and subtraction	1	10-02-17		**TLM1**	
42.	Multiplication Algorithms	1	13-02-17		**TLM1**	
43.	Problems	1	14-02-17		**TLM1**	
44.	Tutorial	1	15-02-17		**TLM3**	
45.	Division Algorithms	1	16-02-17		**TLM1**	
46.	Problems	1	17-02-17		**TLM1**	
47.	Floating – point Arithmetic operations	1	20-02-17		**TLM1**	
48.	Decimal Arithmetic unit,	1	21-02-17		**TLM2**	
49.	Decimal Arithmetic operations	1	22-02-17		**TLM3**	
50.	Tutorial	1	23-02-17		**TLM1**	
No. of classes required to complete UNIT-III		20	No. of classes taken:			

UNIT-IV : MEMORY ORGANIZATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	Memory Hierarchy	1	24-02-17		**TLM1**	
52.	Main memory	1	01-02-17		**TLM1**	

53.	Auxiliary memory	1	02-03-17		**TLM1**	
54.	Tutorial	1	03-03-17		**TLM3**	
55.	Associative memory	1	06-03-17		**TLM1**	
56.	Cache memory	1	07-03-17		**TLM1**	
57.	Mapping Techniques	1	08-03-17		**TLM1**	
58.	Virtual memory	1	09-03-17		**TLM2**	
59.	Virtual memory	1	10-03-17		**TLM2**	
60.	Tutorial	1	14-03-17		**TLM3**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V INPUT-OUTPUT ORGANIZATION :

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.	Peripheral Devices	1	15-03-17		**TLM1**	
62.	Input-Output Interface	1	16-03-17		**TLM1**	
63.	Asynchronous datatransfer	1	17-03-17		**TLM2**	
64.	Modes of Transfer	1	20-03-17		**TLM2**	
65.	Tutorial	1	21-03-17		**TLM3**	
66.	Direct memory Access	1	22-03-17		**TLM2**	
67.	Input–Output Processor (IOP)	1	23-03-17		**TLM2**	
68.	Serial communication	1	24-03-17		**TLM2**	
69.	Tutorial	1	28-03-17		**TLM3**	
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
70.	Multiprocessors		29-03-17		**TLM2**	
71.	Multicomputers		30-03-17		**TLM2**	
72.	DSP Processors		31-03-17		**TLM2**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W

I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Dr.E.V.Prasad

Course Instructor **Course Coordinator** **Module Coordinator** **Research Coordinator** **BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Computer Organization - S 169

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : V.V.Rama Krishna

COURSE COORDINATOR : V.V.Rama Krishna

COURSE OBJECTIVE This course provides the knowledge on Register transfer language and shows how it is used to express micro-operations in symbolic form. The course will give an idea about organization and design of a basic computer and introduces the concept of microprogramming and how to write micro-codes for computer instructions. The course also gives a brief idea about central processing unit and the concept of pipelining and the way it can speed-up processing. This course also gives the knowledge on algorithms for computer arithmetic operations and the concept of memory organization and the techniques that computers use to communicate with input and output devices.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Able to understand register transfer, micro operations such as arithmetic logic ad shift.	3	1	2										3	1	2
2	Able to analyze the basic concepts and elements of a computer system.	3		2	1									3		2
3	Able to learn how to design a CPU.	2	3	1										2	3	1
4	Able to perform arithmetic operations.	3	2	1										3	2	1
5	Able to study memory and I/O management	1			2	3								1		
		3	**2**	**2**	**2**	**3**								**3**	**3**	**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).

BOS APPROVED TEXT BOOKS:

1 M.Morris Mano, "Computer Systems Architecture", Pearson Education publishers, 3rd Edition.

BOS APPROVED REFERENCE BOOKS:

1 Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", Tata McGraw Hill publishers.

2 William Stallings, "Computer Organization and Architecture", Sixth Edition, Pearson/PHI publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Register Transfer language and microoperations & Basic ComputerOrganization And 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
1.	Register Transfer language	1	02-12-16		**TLM1**	
2.	Register transfer	1	03-12-16		**TLM1**	
3.	Bus and memory transfer	1	05-12-16		**TLM1**	
4.	Arithmetic Micro operations	1	06-12-16		**TLM1**	
5.	Logic micro operations	1	07-12-16		**TLM1**	
6.	Shift micro operations	1	09-12-16		**TLM1**	
7.	Arithmetic logic shift unit	1	10-12-16		**TLM1**	
8.	Tutorial	1	12-12-16		**TLM3**	
9.	Instruction codes	1	13-12-16		**TLM1**	
10.	Computer Registers,	1	14-12-16		**TLM1**	
11.	Computer instructions	1	16-12-16		**TLM1**	
12.	Instruction cycle	1	17-12-16		**TLM1**	
13.	Memory – Reference Instructions, Register reference Instructions	1	19-12-16		**TLM1**	
14.	Input – Output and Interrupt	1	20-12-16		**TLM1**	
15.	Tutorial	1	21-12-16		**TLM3**	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : Micro Programmed Control & Central Processing Unit

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Control memory	1	23-12-16		**TLM1**	
17.	Address sequencing	1	24-12-16		**TLM1**	
18.	Micro program example	1	26-12-16		**TLM2**	
19.	Micro program example	1	27-12-16		**TLM1**	
20.	Design of control unit Hard wired control	1	28-12-16		**TLM2**	
21.	Micro programmed control	1	30-12-16		**TLM1**	
22.	Tutorial	1	31-12-16		**TLM3**	

23.	STACK organization.	1	02-01-17		**TLM1**	
24.	Program control	1	03-01-17		**TLM1**	
25.	Instruction formats	1	04-01-17		**TLM1**	
26.	Addressing modes	1	06-01-17		**TLM1**	
27.	DATA Transfer and manipulation	1	07-01-17		**TLM1**	
28.	Reduced Instruction set computer	1	16-01-17		**TLM1**	
29.	Overlapped register windows	1	17-01-17		**TLM2**	
30.	Tutorial	1	18-01-17		**TLM3**	
31.	Revision for mid exam		20-01-17		**TLM1**	
No. of classes required to complete UNIT-II		16	No. of classes taken:			

UNIT-III : Pipelining, Vector Processing and Computer Arithmetic

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Parallel processing	1	27-01-17		**TLM1**	
33.	Pipelining	1	28-01-17		**TLM1**	
34.	Arithmetic Pipeline	1	30-01-17		**TLM2**	
35.	Instruction Pipeline	1	31-01-17		**TLM1**	
36.	RISC pipeline	1	27-01-17		**TLM1**	
37.	Vector Processing	1	01-02-17		**TLM2**	
38.	Tutorial	1	03-02-17		**TLM3**	
39.	Data Representation. Fixed Point Representation	1	04-02-17		**TLM1**	
40.	Floating PointRepresentation	1	06-02-17		**TLM1**	
41.	Addition and subtraction	1	07-02-17		**TLM1**	
42.	Multiplication Algorithms	1	08-02-17		**TLM1**	
43.	Problems	1	10-02-17		**TLM1**	
44.	Tutorial	1	11-02-17		**TLM3**	
45.	Division Algorithms	1	13-02-17		**TLM1**	
46.	Problems	1	14-02-17		**TLM1**	
47.	Floating – point Arithmetic operations	1	15-02-17		**TLM1**	
48.	Decimal Arithmetic unit,	1	17-02-17		**TLM2**	
49.	Decimal Arithmetic operations	1	18-02-17		**TLM3**	
50.	Tutorial	1	20-02-17		**TLM1**	
No. of classes required to complete UNIT-III		20	No. of classes taken:			

UNIT-IV : Memory Organization

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	Memory Hierarchy	1	21-02-17		**TLM1**	

52.	Main memory	1	22-02-17		**TLM1**	
53.	Auxiliary memory	1	25-02-17		**TLM1**	
54.	Tutorial	1	27-02-17		**TLM3**	
55.	Associative memory	1	28-02-17		**TLM1**	
56.	Cache memory	1	01-03-17		**TLM1**	
57.	Mapping Techniques	1	03-03-17		**TLM1**	
58.	Virtual memory	1	04-03-17		**TLM2**	
59.	Virtual memory	1	06-03-17		**TLM2**	
60.	Tutorial	1	07-03-17		**TLM3**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V INPUT-OUTPUT ORGANIZATION :

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.	Peripheral Devices	1	08-03-17		**TLM1**	
62.	Input-Output Interface	1	10-03-17		**TLM1**	
63.	Asynchronous datatransfer	1	11-03-17		**TLM2**	
64.	Modes of Transfer	1	14-03-17		**TLM2**	
65.	Modes of Transfer	1	15-03-17		**TLM2**	
66.	Tutorial	1	17-03-17		**TLM3**	
67.	Direct memory Access	1	18-03-17		**TLM2**	
68.	Direct memory Access	1	20-03-17		**TLM2**	
69.	Input–Output Processor (IOP)	1	21-03-17		**TLM2**	
70.	Serial communication	1	22-03-17		**TLM2**	
71.	Serial communication	1	24-03-17		**TLM2**	
72.	Tutorial	1	25-03-17		**TLM3**	
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
73.	Multiprocessors		27-03-17		**TLM2**	
74.	Multicomputers		29-03-17		**TLM2**	
75.	DSP Processors		31-03-17		**TLM2**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

V.V.Rama Krishna	V.V.Rama Krishna	Y.Amar Babu		Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Computer Organization - S 169

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : K.V.Ashok

COURSE COORDINATOR : **V.V.RamaKrishna**

COURSE OBJECTIVE This course provides the knowledge on Register transfer language and shows how it is used to express micro-operations in symbolic form. The course will give an idea about organization and design of a basic computer and introduces the concept of microprogramming and how to write micro-codes for computer instructions. The course also gives a brief idea about central processing unit and the concept of pipelining and the way it can speed-up processing. This course also gives the knowledge on algorithms for computer arithmetic operations and the concept of memory organization and the techniques that computers use to communicate with input and output devices.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Able to understand register transfer, micro operations such as arithmetic logic ad shift.	3	1	2										3	1	2
2	Able to analyze the basic concepts and elements of a computer system.	3		2	1									3		2
3	Able to learn how to design a CPU.	2	3	1										2	3	1
4	Able to perform arithmetic operations.	3	2	1										3	2	1
5	Able to study memory and I/O management	1			2	3								1		
		3	**2**	**2**	**2**	**3**								**3**	**3**	**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).

BOS APPROVED TEXT BOOKS:

1 M.Morris Mano, "Computer Systems Architecture", Pearson Education publishers, 3rd Edition.

BOS APPROVED REFERENCE BOOKS:

1 Carl Hamacher, Zvonks Vranesic, SafeaZaky, "Computer Organization", Tata McGraw Hill publishers.

2 William Stallings, "Computer Organization and Architecture", Sixth Edition, Pearson/PHI publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : RTL & BASIC COMPUTER ORGANIZATION

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.	Register Transfer language	1	01-12-16		**TLM1**	
2.	Register transfer	1	02-12-16		**TLM1**	
3.	Bus and memory transfer	1	05-12-16		**TLM1**	
4.	Arithmetic Micro operations	1	06-12-16		**TLM1**	
5.	Logic micro operations	1	07-12-16		**TLM1**	
6.	Shift micro operations	1	08-12-16		**TLM1**	
7.	Arithmetic logic shift unit	1	09-12-16		**TLM1**	
8.	Tutorial	1	12-12-16		**TLM3**	
9.	Instruction codes	1	13-12-16		**TLM1**	
10.	Computer Registers,	1	14-12-16		**TLM1**	
11.	Computer instructions	1	15-12-16		**TLM1**	
12.	Instruction cycle	1	16-12-16		**TLM1**	
13.	Memory – Reference Instructions, Register reference Instructions	1	19-12-16		**TLM1**	
14.	Input – Output and Interrupt	1	20-12-16		**TLM1**	
15.	Tutorial	1	21-12-16		**TLM3**	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : MICROPROGRAMMED CONTROL & CPU

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Control memory	1	22-12-16		**TLM1**	
17.	Address sequencing	1	23-12-16		**TLM1**	
18.	Micro program example	1	26-12-16		**TLM2**	
19.	Micro program example	1	27-12-16		**TLM1**	
20.	Design of control unit Hard wired control	1	28-12-16		**TLM2**	
21.	Micro programmed control	1	29-12-16		**TLM1**	
22.	Tutorial	1	30-12-16		**TLM3**	
23.	STACK organization.	1	02-01-17		**TLM1**	

24.	Program control	1	03-01-17		**TLM1**	
25.	Instruction formats	1	04-01-17		**TLM1**	
26.	Addressing modes	1	05-01-17		**TLM1**	
27.	DATA Transfer and manipulation	1	06-01-17		**TLM1**	
28.	Reduced Instruction set computer	1	17-01-17		**TLM1**	
29.	Overlapped register windows	1	18-01-17		**TLM2**	
30.	Tutorial	1	19-01-17		**TLM3**	
31.	Revision for mid exam		20-01-17		**TLM1**	
No. of classes required to complete UNIT-II		16	No. of classes taken:			

UNIT-III : PIPELINING, VECTOR PROCESSING AND ARITHMETIC

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Parallel processing	1	30-01-17		**TLM1**	
33.	Pipelining	1	31-01-17		**TLM1**	
34.	Arithmetic Pipeline	1	01-02-17		**TLM2**	
35.	Instruction Pipeline	1	02-02-17		**TLM1**	
36.	RISC pipeline	1	03-02-17		**TLM1**	
37.	Vector Processing	1	06-02-17		**TLM2**	
38.	Tutorial	1	07-02-17		**TLM3**	
39.	Data Representation. Fixed Point Representation	1	08-02-17		**TLM1**	
40.	Floating PointRepresentation	1	09-02-17		**TLM1**	
41.	Addition and subtraction	1	10-02-17		**TLM1**	
42.	Multiplication Algorithms	1	13-02-17		**TLM1**	
43.	Problems	1	14-02-17		**TLM1**	
44.	Tutorial	1	15-02-17		**TLM3**	
45.	Division Algorithms	1	16-02-17		**TLM1**	
46.	Problems	1	17-02-17		**TLM1**	
47.	Floating – point Arithmetic operations	1	20-02-17		**TLM1**	
48.	Decimal Arithmetic unit,	1	21-02-17		**TLM2**	
49.	Decimal Arithmetic operations	1	22-02-17		**TLM3**	
50.	Tutorial	1	23-02-17		**TLM1**	
No. of classes required to complete UNIT-III		20	No. of classes taken:			

UNIT-IV : MEMORY ORGANIZATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
51.	Memory Hierarchy	1	24-02-17		**TLM1**	
52.	Main memory	1	01-02-17		**TLM1**	

53.	Auxiliary memory	1	02-03-17		**TLM1**	
54.	Tutorial	1	03-03-17		**TLM3**	
55.	Associative memory	1	06-03-17		**TLM1**	
56.	Cache memory	1	07-03-17		**TLM1**	
57.	Mapping Techniques	1	08-03-17		**TLM1**	
58.	Virtual memory	1	09-03-17		**TLM2**	
59.	Virtual memory	1	10-03-17		**TLM2**	
60.	Tutorial	1	14-03-17		**TLM3**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V INPUT-OUTPUT ORGANIZATION :

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.	Peripheral Devices	1	15-03-17		**TLM1**	
62.	Input-Output Interface	1	16-03-17		**TLM1**	
63.	Asynchronous datatransfer	1	17-03-17		**TLM2**	
64.	Modes of Transfer	1	20-03-17		**TLM2**	
65.	Tutorial	1	21-03-17		**TLM3**	
66.	Direct memory Access	1	22-03-17		**TLM2**	
67.	Input–Output Processor (IOP)	1	23-03-17		**TLM2**	
68.	Serial communication	1	24-03-17		**TLM2**	
69.	Tutorial	1	28-03-17		**TLM3**	
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
70.	Multiprocessors		29-03-17		**TLM2**	
71.	Multicomputers		30-03-17		**TLM2**	
72.	DSP Processors		31-03-17		**TLM2**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W

I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

Dr.E.V.Prasad

Course Instructor **Course Coordinator** **Module Coordinator** **Research Coordinator** **BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Electromagnetic Fields and Waves - S 223

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : B. Siva Hari Prasad, Sr. Asst. Professor

COURSE COORDINATOR : V.Ravi Sekhar Reddy, Sr. Asst. Professor

COURSE OBJECTIVE: This course provides the knowledge on electric and magnetic fields in both static and dynamic domains. The course will give an idea about application of Maxwell's equations. The course also gives the complete information regarding the Electromagnetic wave propagation in different mediums.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze the basic concepts of Electric fields in static and time varying conditions	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
2	Analyze the basic concepts of Magnetic fields in static and time varying conditions	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
3	Apply Maxwell's equations to solve the equations of EM fields	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
4	Understand characteristics of EM wave propagation in different mediums	2	3	2	1	-	1	-	-	-	-	-	-	-	-	-
5	Gain the knowledge on the different Poynting vectors to obtain the power flow	2	3	2	1	-	-	-	-	-	--	-	-	-	-	-

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

BOS APPROVED TEXT BOOKS:

1. Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, 4th Edition.
2. William Hayt, "Engineering Electromagnetics", TMH Publishers,7th Edition.

BOS APPROVED REFERENCE BOOKS:

1. Jordan and Balmain, Electromagnetic fields and Radiating systems, Pearson education.
2. G.S.N Raju, "EM Field Theory and Transmission Lines", Pearson Education Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Electrostatics

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 Subject	1	1.12.16		**TLM1**	
2.	Introduction to Unit-I	1	2.12.16		**TLM1**	
3.	Vector Algebra	1	3.12.16		**TLM1**	
4.	Coordinate System	1	6.12.16		**TLM1**	
5.	Vector Calculus	1	7.12.16		**TLM1**	
6.	Coulomb's Law	1	8.12.16		**TLM1**	
7.	Electric Field Intensity	1	9.12.16		**TLM1**	
8.	Electric Field due to line charge	1	10.12.16		**TLM4**	
9.	Electric Field due to surface charge	1	14.12.16		**TLM4**	
10.	Electric Flux Density(D), Relation b/n E&D	1	15.12.16		**TLM1**	
11.	**TUTORIAL-1**	1	16.12.16		**TLM3**	
12.	Gauss's Law and Limitations	1	17.12.16		**TLM1**	
13.	Applications of Gauss's Law	1	20.12.16		**TLM4**	
14.	Electric Potential, Potential Gradient	1	21.12.16		**TLM1**	
15.	Dipole and Dipole Moment	1	22.12.16		**TLM1**	
16.	Electrostatic Energy and Energy Density	1	23.12.16		**TLM1**	
17.	Poisson's and Laplace's Equations Capacitance- Parallel Plate Capacitor	1	24.12.16		**TLM4**	
18.	Capacitance- Coaxial & Spherical Capacitor	1	27.12.16		**TLM4**	
19.	**TUTORIAL-2**	1	28.12.16		**TLM3**	
20.	Assignment/Quiz-1	1	29.12.16		**TLM6**	
No. of classes required to complete UNIT-I		20	No. of classes taken:			

UNIT-II: Magnetostatics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction to UNIT-II	1	30.12.16		**TLM1**	
22.	Biot-Savart's Law	2	31.12.16 3.1.17		**TLM1**	
23.	Ampere's Circuit Law	1	4.1.17		**TLM1**	
24.	Applications of Ampere's Circuit Law	1	5.1.17		**TLM4**	
25.	**TUTORIAL-3**	1	6.1.17		**TLM3**	
26.	Magnetic Flux Density, Maxwell's Equations	1	7.1.17		**TLM1**	
27.	Magnetic Energy and Energy Density	1	17.1.17		**TLM1**	
28.	Force on a charged particle , current element, Force b/n two current elements	1	18.1.17		**TLM1**	
29.	Magnetic Scalar and Vector Potentials concept of inductance	1	19.1.17		**TLM1**	

30.	**TUTORIAL-4**	1	20.1.17		**TLM3**	
31.	Assignment/Quiz-2	1	21.1.17		**TLM6**	
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III : Maxwell's equations

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Introduction to Time Varying Fields, Faraday's Law	1	27-1-17		**TLM1**	
33.	Continuity Equation	1	28-1-17		**TLM1**	
34.	Inconsistency of Amperes Law	1	31-1-17		**TLM1**	
35.	Displacement Current Density and Displacement Current	1	01-2-17		**TLM1**	
36.	**TUTORIAL-5**	1	02-2-17		**TLM3**	
37.	Differential and Integral Form of Four Maxwell's Equations	1	03-2-17		**TLM1**	
38.	Boundary Conditions	1	04-2-17		**TLM4**	
39.	Boundary Conditions	1	07-2-17		**TLM4**	
40.	**TUTORIAL-6**	1	08-2-17		**TLM3**	
41.	Assignment/Quiz-3	1	09-2-17		**TLM6**	
No. of classes required to complete UNIT-III		10	No. of classes taken:			

UNIT-IV : Electromagnetic Waves – 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
42.	Concept of Electromagnetic Wave, Waves in General	1	10-2-17		**TLM2**	
43.	Uniform Plane Wave	1	11-2-17		**TLM1**	
44.	Wave Propagation in Lossy Dielectrics	1	14-2-17		**TLM1**	
45.	Scalar Form of Wave Equations, Vector Form of Wave Equations	1	15-2-17		**TLM4**	
46.	Characteristics of wave propagation	1	16-2-17		**TLM1**	
47.	**TUTORIAL-7**	1	17-2-17		**TLM3**	
48.	Wave Propagation in Lossless Dielectrics	1	18-2-17		**TLM1**	
49.	Wave Propagation in Free Space	1	21-2-17		**TLM1**	
50.	Wave Propagation in Good Conductors	1	22-2-17		**TLM1**	
51.	**TUTORIAL-8**	1	23-2-17		**TLM3**	
52.	WavePropagation in Good Conductors- Skin Depth	1	25-2-17		**TLM1**	
53.	Wave Equations for Perfect Dielectric Media	1	28-2-17		**TLM1**	
54.	Concept of Polarization	1	01-3-17		**TLM1**	
55.	**TUTORIAL-9**	1	02-3-17		**TLM3**	
56.	Assignment/Quiz-4	1	03-3-17		**TLM6**	

No. of classes required to complete UNIT-IV	15	No. of classes taken:

UNIT-V : Electromagnetic Waves – 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
57.	Poynting Theorem	1	04-3-17		**TLM1**	
58.	Poynting Vector, Time Average Power, Total Power Crossing the Surface	1	07-3-17		**TLM4**	
59.	Power Loss in a Plane Conductor	1	08-3-17		**TLM1**	
60.	Reflection of a plane wave at normal incidence(Dielectric-Dielectric)	1	09-3-17		**TLM1**	
61.	Reflection of a plane wave at normal incidence(Dielectric-Conductor)	1	10.3.17		**TLM1**	
62.	**TUTORIAL-10**	1	11-3-17		**TLM3**	
63.	Reflection of a Plane Wave at Oblique Incidence (Parallel Polarization)	2	14-3-17 15-3-17		**TLM1**	
64.	Reflection of a Plane Wave at Oblique Incidence (Perpendicular Polarization)	2	16-3-17 17-3-17		**TLM1**	
65.	**TUTORIAL-11**	1	18-3-17		**TLM3**	
66.	Brewster Angle	1	21-3-17		**TLM1**	
67.	Critical Angle and Total Internal Reflection	1	22-3-17		**TLM4**	
68.	Surface Impedance	1	23-3-17		**TLM1**	
69.	**TUTORIAL-12**	1	24-3-17		**TLM3**	
70.	Assignment/Quiz-5	1	25-3-17		**TLM6**	
No. of classes required to complete UNIT-V		16	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
71.	Transmission Lines & Wave guides	1	28-3-17		**TLM2**	
72.	Antennas, Microwave Devices	1	30-3-17		**TLM2**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

B.Siva Hari Prasad	Mr.V.RaviSekhara Reddy	Mr.G.L.N.Murthy	Dr.J.Babu	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., IV-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : Electromagnetic Fields and Waves - S 223

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : B. Siva Hari Prasad, Sr. Asst. Professor

COURSE COORDINATOR : V.Ravi Sekhar Reddy, Sr. Asst. Professor

COURSE OBJECTIVE: This course provides the knowledge on electric and magnetic fields in both static and dynamic domains. The course will give an idea about application of Maxwell's equations. The course also gives the complete information regarding the Electromagnetic wave propagation in different mediums.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	Analyze the basic concepts of Electric fields in static and time varying conditions	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
2	Analyze the basic concepts of Magnetic fields in static and time varying conditions	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
3	Apply Maxwell's equations to solve the equations of EM fields	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-
4	Understand characteristics of EM wave propagation in different mediums	2	3	2	1	-	1	-	-	-	-	-	-	-	-	-
5	Gain the knowledge on the different Poynting vectors to obtain the power flow	2	3	2	1	-	-	-	-	-	--	-	-	-	-	-

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

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1. Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics", Oxford University Press, 4th Edition.
2. William Hayt, "Engineering Electromagnetics", TMH Publishers,7th Edition.

BOS APPROVED REFERENCE BOOKS:

1. Jordan and Balmain, Electromagnetic fields and Radiating systems, Pearson education.
2. G.S.N Raju, "EM Field Theory and Transmission Lines", Pearson Education Publishers.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Electrostatics

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 Subject	1	1.12.16		**TLM1**	
2.	Introduction to Unit-I	1	2.12.16		**TLM1**	
3.	Vector Algebra	1	3.12.16		**TLM1**	
4.	Coordinate System	1	6.12.16		**TLM1**	
5.	Vector Calculus	1	7.12.16		**TLM1**	
6.	Coulomb's Law	1	8.12.16		**TLM1**	
7.	Electric Field Intensity	1	9.12.16		**TLM1**	
8.	Electric Field due to line charge	1	10.12.16		**TLM4**	
9.	Electric Field due to surface charge	1	14.12.16		**TLM4**	
10.	Electric Flux Density(D), Relation b/n E&D	1	15.12.16		**TLM1**	
11.	**TUTORIAL-1**	1	16.12.16		**TLM3**	
12.	Gauss's Law and Limitations	1	17.12.16		**TLM1**	
13.	Applications of Gauss's Law	1	20.12.16		**TLM4**	
14.	Electric Potential, Potential Gradient	1	21.12.16		**TLM1**	
15.	Dipole and Dipole Moment	1	22.12.16		**TLM1**	
16.	Electrostatic Energy and Energy Density	1	23.12.16		**TLM1**	
17.	Poisson's and Laplace's Equations Capacitance- Parallel Plate Capacitor	1	24.12.16		**TLM4**	
18.	Capacitance- Coaxial & Spherical Capacitor	1	27.12.16		**TLM4**	
19.	**TUTORIAL-2**	1	28.12.16		**TLM3**	
20.	Assignment/Quiz-1	1	29.12.16		**TLM6**	
No. of classes required to complete UNIT-I		20	No. of classes taken:			

UNIT-II: Magnetostatics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
21.	Introduction to UNIT-II	1	30.12.16		**TLM1**	
22.	Biot-Savart's Law	2	31.12.16 3.1.17		**TLM1**	
23.	Ampere's Circuit Law	1	4.1.17		**TLM1**	
24.	Applications of Ampere's Circuit Law	1	5.1.17		**TLM4**	
25.	**TUTORIAL-3**	1	6.1.17		**TLM3**	
26.	Magnetic Flux Density, Maxwell's Equations	1	7.1.17		**TLM1**	
27.	Magnetic Energy and Energy Density	1	17.1.17		**TLM1**	
28.	Force on a charged particle , current element, Force b/n two current elements	1	18.1.17		**TLM1**	
29.	Magnetic Scalar and Vector Potentials concept of inductance	1	19.1.17		**TLM1**	

30.	**TUTORIAL-4**	1	20.1.17		**TLM3**	
31.	Assignment/Quiz-2	1	21.1.17		**TLM6**	
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III : Maxwell's equations

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
32.	Introduction to Time Varying Fields, Faraday's Law	1	27-1-17		**TLM1**	
33.	Continuity Equation	1	28-1-17		**TLM1**	
34.	Inconsistency of Amperes Law	1	31-1-17		**TLM1**	
35.	Displacement Current Density and Displacement Current	1	01-2-17		**TLM1**	
36.	**TUTORIAL-5**	1	02-2-17		**TLM3**	
37.	Differential and Integral Form of Four Maxwell's Equations	1	03-2-17		**TLM1**	
38.	Boundary Conditions	1	04-2-17		**TLM4**	
39.	Boundary Conditions	1	07-2-17		**TLM4**	
40.	**TUTORIAL-6**	1	08-2-17		**TLM3**	
41.	Assignment/Quiz-3	1	09-2-17		**TLM6**	
No. of classes required to complete UNIT-III		10	No. of classes taken:			

UNIT-IV : Electromagnetic Waves – 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
42.	Concept of Electromagnetic Wave, Waves in General	1	10-2-17		**TLM2**	
43.	Uniform Plane Wave	1	11-2-17		**TLM1**	
44.	Wave Propagation in Lossy Dielectrics	1	14-2-17		**TLM1**	
45.	Scalar Form of Wave Equations, Vector Form of Wave Equations	1	15-2-17		**TLM4**	
46.	Characteristics of wave propagation	1	16-2-17		**TLM1**	
47.	**TUTORIAL-7**	1	17-2-17		**TLM3**	
48.	Wave Propagation in Lossless Dielectrics	1	18-2-17		**TLM1**	
49.	Wave Propagation in Free Space	1	21-2-17		**TLM1**	
50.	Wave Propagation in Good Conductors	1	22-2-17		**TLM1**	
51.	**TUTORIAL-8**	1	23-2-17		**TLM3**	
52.	WavePropagation in Good Conductors- Skin Depth	1	25-2-17		**TLM1**	
53.	Wave Equations for Perfect Dielectric Media	1	28-2-17		**TLM1**	
54.	Concept of Polarization	1	01-3-17		**TLM1**	
55.	**TUTORIAL-9**	1	02-3-17		**TLM3**	
56.	Assignment/Quiz-4	1	03-3-17		**TLM6**	

No. of classes required to complete UNIT-IV	15	No. of classes taken:

UNIT-V : Electromagnetic Waves – 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
57.	Poynting Theorem	1	04-3-17		**TLM1**	
58.	Poynting Vector, Time Average Power, Total Power Crossing the Surface	1	07-3-17		**TLM4**	
59.	Power Loss in a Plane Conductor	1	08-3-17		**TLM1**	
60.	Reflection of a plane wave at normal incidence(Dielectric-Dielectric)	1	09-3-17		**TLM1**	
61.	Reflection of a plane wave at normal incidence(Dielectric-Conductor)	1	10.3.17		**TLM1**	
62.	**TUTORIAL-10**	1	11-3-17		**TLM3**	
63.	Reflection of a Plane Wave at Oblique Incidence (Parallel Polarization)	2	14-3-17 15-3-17		**TLM1**	
64.	Reflection of a Plane Wave at Oblique Incidence (Perpendicular Polarization)	2	16-3-17 17-3-17		**TLM1**	
65.	**TUTORIAL-11**	1	18-3-17		**TLM3**	
66.	Brewster Angle	1	21-3-17		**TLM1**	
67.	Critical Angle and Total Internal Reflection	1	22-3-17		**TLM4**	
68.	Surface Impedance	1	23-3-17		**TLM1**	
69.	**TUTORIAL-12**	1	24-3-17		**TLM3**	
70.	Assignment/Quiz-5	1	25-3-17		**TLM6**	
No. of classes required to complete UNIT-V		16	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
71.	Transmission Lines & Wave guides	1	28-3-17		**TLM2**	
72.	Antennas, Microwave Devices	1	30-3-17		**TLM2**	

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	01-12-2016	07-01-2017	6W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	21-01-2017	1W
I Mid Examinations	23-01-2017	25-01-2017	½ W
II Phase of Instructions	27-01-2017	30-03-2017	9W
II Mid Examinations	31-03-2017	03-04-2017	½ W
Preparation and Practicals	04-04-2017	11-04-2017	1W
Semester End Examinations	12-04-2017	25-04-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**1,2,3,4,5**	**100**

B.Siva Hari Prasad	Mr.V.RaviSekhara Reddy	Mr.G.L.N.Murthy	Dr.J.Babu	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

AIC LAB SCHEDULE (LESSON PLAN): Section-A

BATCH-1

S.No.	Experiments to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	CYCLE-1					
302.	Introduction to Lab	3	7-12-16	7-12-16	TLM8	
303.	OP-AMPApplications adder,subtractor,comparator	3	14-12-16	14-12-16	TLM5	
304.	Integrator and Differentiator	3	21-12-16	28-12-16	TLM5	
305.	Function Generator using OP-AMP	3	28-12-16	04-01-17	TLM5	
306.	Active filters applications-LPF,HPF	3	04-1-17	21-02-16	TLM5	
307.	Band Pass Filter using OP-AMP	3	18-1-17	11-01-17	TLM5	
	CYCLE-2					
308.	Band Stop Filter using OP-AMP	3	01-1-17	01-1-17	TLM5	
309.	RC Phase shift Oscillator using OP-AMP	3	08-2-17	08-2-17	TLM5	
310.	Wien Bridge Oscillator using OP-AMP	3	15-2-17	15-2-17	TLM5	
311.	IC-555 Timer Monostable Multivibrator	3	22-2-17	22-2-17	TLM5	
312.	IC-555 Timer Astable Multivibrator	3	01-3-17	15-03-17	TLM5	
313.	Voltage Regulator using IC 723	3	08-3-17	08-03-17	TLM5	
314.	3bit DAC Using OP-AMP	3	15-3-17	15-03-17	TLM5	
315.	**Revision lab**	3	22-3-16		TLM5	
316.	**Internal exam**	3	29-3-16	22-03017	----	
No. of classes required to complete LAB		45	No. of classes conducted:			

BATCH-2

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	CYCLE-1					
1.	Introduction to Lab	3	03-12-16	10-12-16	TLM8	
2.	OP-AMPApplications adder,subtractor,comparator	3	10-12-16	17-12-16	TLM5	
3.	Integrator and Differentiator	3	17-12-16	31-12-16	TLM5	
4.	Function Generator using OP-AMP	3	24-12-16	07-1-17	TLM5	
5.	Active filters applications-LPF,HPF	3	31-12-16	24-12-16	TLM5	
6.	Band Pass Filter using OP-AMP	3	07-1-17	21-1-17	TLM5	
	CYCLE-2					
7.	Band Stop Filter using OP-AMP	3	21-1-17	04-02-17	TLM5	
8.	RC Phase shift Oscillator using OP-AMP	3	28-1-17	11-2-17	TLM5	
9.	Wien Bridge Oscillator using OP-AMP	3	04-2-17	22-02-17	TLM5	
10.	IC-555 Timer Monostable Multivibrator	3	11-2-17	22-02-17	TLM5	
11.	IC-555 Timer Astable Multivibrator	3	18-2-17	18-03-17	TLM5	
12.	Voltage Regulator using IC 723	3	25-2-17	04-03-17	TLM5	
13.	3bit DAC Using OP-AMP	3	04-3-17	11-03-17	TLM5	
14.	**Revision lab**	3	11-3-17		TLM5	
15.	**Revision lab**	3	18-3-17		TLM5	
16.	**Internal exam**	3	25-3-17	25-03-17	------	
No. of classes required to complete LAB		48	No. of classes conducted:			

Contents beyond the Syllabus

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	08-12-2016	07-01-2017	4½ W
Sankranthi Holidays	09-01-2017	14-01-2017	1W
I Phase of Instructions-II	16-01-2017	01-02-2017	2½ W
I Mid Examinations	02-02-2017	04-02-2017	½ W
II Phase of Instructions	06-02-2017	08-04-2017	9W
II Mid Examinations	10-04-2017	12-04-2017	½ W
Preparation and Practicals	13-04-2017	22-04-2017	1½ W
Semester End Examinations	24-04-2017	03-05-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Day to Day work	1	A1=10
Record Writing	2	A2=5
Internal Lab Examination	1,2	B=10
Cumulative Internal Examination : A+B	3	**A+B=25**
Semester End Examinations	4	**C=50**
Total Marks: A+B+C	5	**75**

D.Sushma	Mr.G.Venkat Rao	Mr.Y.Amar Babu	Dr.M.Suman	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi,
NAAC Accredited with 'A' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., II-Sem., ECE

ACADEMIC YEAR : 2016-17

COURSE NAME & CODE : ANALOG INTEGRATED CIRCUITS LAB (L-108)

L-T-P STRUCTURE : 3-0-0

COURSE CREDITS : 2

COURSE INSTRUCTOR : T.kalpana/MVL.Bhavani/D.Sushma

COURSE COORDINATOR :Mr. G.Venkata Rao

COURSE OBJECTIVE: This course provides the Practical knowledge on operation of different circuits using IC741OP-AMP. The course also gives the idea about IC555 Timer and IC723 Voltage regulator.

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

CO	Statement At the end of the course, student will be able to	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
1	Design different circuits using IC 741 op-amp for various applications.	1			3	2		3			1	2	3		
2	Use the IC 555 for constructing various circuits.	1			3	2		3			1	2	3		
3	Design the voltage regulator using IC 723.	1			3	2		3			1	2	3		

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

BOS APPROVED TEXT BOOKS:

1. D.Roy Choudhury,Linear Integrated circuits,New Age International(P)Ltd

EDC LAB SCHEDULE (LESSON PLAN): Section-B

BATCH-1

S.No.	Experiments to be conducted	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	CYCLE-1					
317.	Introduction to Lab	3	5-12-16		TLM8	
318.	OP-AMPApplications adder,subtractor,comparator	3	12-12-16		TLM5	
319.	Integrator and Differentiator	3	19-12-16		TLM5	
320.	Function Generator using OP-AMP	3	26-12-16		TLM5	
321.	Active filters applications-LPF,HPF	3	02-1-17		TLM5	
322.	Band Pass Filter using OP-AMP	3	16-1-17		TLM5	
	CYCLE-2					
323.	Band Stop Filter using OP-AMP		30-1-17		TLM5	
324.	RC Phase shift Oscillator using OP-AMP	3	06-2-17		TLM5	
325.	Wien Bridge Oscillator using OP-AMP	3	13-2-17		TLM5	
326.	IC-555 Timer Monostable Multivibrator	3	20-2-17		TLM5	
327.	IC-555 Timer Astable Multivibrator	3	27-2-17		TLM5	
328.	Voltage Regulator using IC 723	3	06-3-17		TLM5	
329.	3bit DAC Using OP-AMP	3	13-3-17		TLM5	
330.	**Revision lab**	3	20-3-17		TLM5	
331.	**Internal exam**	3	27-3-17			
No. of classes required to complete LAB		45	No. of classes conducted:			

BATCH-2

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	CYCLE-1					
2.	Introduction to Lab	3	1-12-16		TLM8	
17.	OP-AMPApplications adder,subtractor,comparator	3	8-12-16		TLM5	
18.	Integrator and Differentiator	3	15-12-16		TLM5	
19.	Function Generator using OP-AMP	3	22-12-16		TLM5	
20.	Active filters applications-LPF,HPF	3	29-12-16		TLM5	
21.	Band Pass Filter using OP-AMP	3	05-1-17		TLM5	
22.	Band Stop Filter using OP-AMP	3	19-1-17		TLM5	
	CYCLE-2					
23.	RC Phase shift Oscillator using OP-AMP	3	02-2-17		TLM5	
24.	Wien Bridge Oscillator using OP-AMP	3	09-2-17		TLM5	
25.	IC-555 Timer Monostable Multivibrator	3	16-2-17		TLM5	
26.	IC-555 Timer Astable Multivibrator	3	23-2-17		TLM5	
27.	Voltage Regulator using IC 723	3	02-3-17		TLM5	
28.	3bit DAC Using OP-AMP	3	09-3-17		TLM5	
29.	**Revision lab**	3	16-3-17		TLM5	
30.	**Revision lab**	3	23-3-17		TLM5	
31.	**Internal exam**	3	30-3-17			
No. of classes required to complete LAB		48	No. of classes conducted:			

Contents beyond the Syllabus

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

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I Phase of Instructions-1	08-12-2016	07-01-2017	4½ W
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I Phase of Instructions-II	16-01-2017	01-02-2017	2½ W
I Mid Examinations	02-02-2017	04-02-2017	½ W
II Phase of Instructions	06-02-2017	08-04-2017	9W
II Mid Examinations	10-04-2017	12-04-2017	½ W
Preparation and Practicals	13-04-2017	22-04-2017	1½ W
Semester End Examinations	24-04-2017	03-05-2017	2W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Day to Day work	1	A1=10
Record Writing	2	A2=5
Internal Lab Examination	1,2	B=10
Cumulative Internal Examination : A+B	3	**A+B=25**
Semester End Examinations	4	**C=50**
Total Marks: A+B+C	5	**75**

Mr.L Srinivasa Reddy	Mr.K.Sasi Bhushan	Mr.Y.Amar Babu	Dr.M.Suman	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**Research Coordinator**	**BOS Chairman&HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
http://www.lbrce.ac.in, ece.lbce@gmail.com Phone: 08659-222933, Fax: 08659-222931

Notification of Lab experiments

ACADEMIC YEAR : 2016-17
COURSE : B.Tech., (IV-Sem.,)- Section A
BRANCH : Electronics and Communication Engineering
SUBJECT : Systems & Signal Processing Lab(L180)
FACULTY : G.L.N.MURTHY/M.Sivasankara Rao/V.Ravi Sekhara Reddy

S.No	Dates(Batch1)	Exp.No	Dates(Batch2)	Exp.No
1	07.12.16	Introduction	03.12.16	Introduction
2	14.12.16	1	10.12.16	1
3	21.12.16	2	17.12.16	2
4	28.12.16	3 & 4	24.12.16	3 & 4
5	04.01.17	5&6	31.12.16	5 & 6
6	18.01.17	7 & 8	07.01.17	7 & 8
7	01.02.17	9 & 10	21.01.17	9 & 10
8	08.02.17	11	28.01.17	11
9	15.02.17	12	04.02.17	12
10	22.02.17	13&14	11.02.17	13&14
11	01.03.17	15	18.02.17	15
12	08.03.17	16	25.02.17	16
13	15.03.17	17	04.03.17	17
14	22.03.17	Revision	11.03.17	Revision
15	29.03.17	Internal Exam	18.03.17	-
16	--	--	25.03.17	Internal Exam

Signature of Faculty

Signature of HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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LESSON PLAN

ACADEMIC YEAR : 2016-17
COURSE : B.Tech., (IV-Sem.,)- Section B
BRANCH : Electronics and Communication Engineering
SUBJECT : SYSTEMS AND SIGNAL PROCESSING LAB (L-180)
FACULTY :K,.lakshmi,K.Rani rudrama, B.Siva hari prasad

S.No.	Tentative Date	Topics to be covered	No. of Classes	Actual Date	Content Delivery Method
		BATCH-1			
1.	8-12-16	Introduction	3		DM5
2.	15-12-16	Basic operations on Matrices.	3		DM5
3.	22-12-16	(a) Generation of Various signals (b) Basic Operations on signals	3		DM5
4.	29-12-16	(a) Linear and circular Convolution (b) Linear and circular Convolution through DFT and IDFT	3		DM5
5.	05-1-17	a)Computation of N-Point DFT and IDFT. b) Solution of LCCDE and find the system response using Z-Transform.	3		DM5
6.	19-1-17	a)Power Spectral Density for sinusoidal signal. b)Frequency response of analog low pass & high pass filter.	3		DM5
7.	02-2-17	Design of IIR butter worth filters (LPF, HPF, BPF, and BSF).	3		DM5
8.	09-2-17	Design of IIR butterworth filters (LPF, HPF, BPF, and BSF).	3		DM5
9.	16-2-17	Design of FIR filters using window techniques.	3		DM5
10.	23-2-17	Design of Digital IIR filters using Bi-linear transformation	3		DM5
11.	02-3-17	Study of Basic Architectures of DSP Processor,	3		DM5
12.	09-3-17	Linear Convolution	3		DM5
13.	16-3-17	Implementation of a FIR and IIR filter.	3		DM5
14.	23-3-17	Computation DFT through FFT.	3		DM4
15.	27-3-17	**REVISION**	3		
16.	30-3-17	**Internal exam**	3		
Total Number of Classes Taken			48		

DELIVERY METHODS			
DM1	Lecture interspersed with discussions /BB	**DM4**	Assignment/Test
DM2	Tutorial	**DM5**	Demonstration(laboratory, field visit)
DM3	Lecture with a quiz	**DM6**	Presentations/PPT
Signature			
Name	K.Lakhmi	G.L.N.Murthy	Prof.B. RAMESH REDDY

	Subject Teacher	**Course Coordinator**	**HOD,ECE**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)
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LESSON PLAN

ACADEMIC YEAR : 2016-17
COURSE : B.Tech., (IV-Sem.,)- Section C
BRANCH : Electronics and Communication Engineering
SUBJECT : ANALOG INTEGRATED CIRCUITS LAB (L-108)
FACULTY : B.Siva hari prasad, k.lakshmi, k.Rani rudrama

S.No.	Tentative Date	Topics to be covered	No. of Classes	Actual Date	Content Delivery Method
		BATCH-2			
1.	5-12-16	Introduction	3		DM5
2.	12-12-16	Basic operations on Matrices.	3		DM5
3.	19-12-16	(a) Generation of Various signals (b) Basic Operations on signals	3		DM5
4.	26-12-16	(a) Linear and circular Convolution (b) Linear and circular Convolution through DFT and IDFT	3		DM5
5.	02-1-17	a)Computation of N-Point DFT and IDFT.	3		DM5
6.	16-1-17	a)Power Spectral Density for sinusoidal signal. b)Frequency response of analog low pass & high pass	3		DM5
7.	30-1-17	Design of IIR butter worth filters (LPF, HPF, BPF, and BSF).	3		DM5
8.	06-2-17	Design of IIR butterworth filters (LPF, HPF, BPF, and BSF).	3		DM5
9.	13-2-17	Design of FIR filters using window techniques.	3		DM5
10.	20-2-17	Design of Digital IIR filters using Bi-linear transformation	3		DM5
11.	27-2-17	Study of Basic Architectures of DSP Processor,	3		DM5
12.	06-3-17	Linear Convolution	3		DM5
13.	13-3-17	Implementation of a FIR and IIR filter.	3		DM5
14.	20-3-17	Computation DFT through FFT.	3		DM4
15.	27-3-17	**REVISION**	3		
16.	30-3-17	**Internal exam**	3		
Total Number of Classes Taken			48		

DELIVERY METHODS			
DM1	Lecture interspersed with discussions /BB	**DM4**	Assignment/Test
DM2	Tutorial	**DM5**	Demonstration(laboratory, field visit)
DM3	Lecture with a quiz	**DM6**	Presentations/PPT
Signature			
Name	K.Lakshmi	G.L.N.Murthy	Prof.B.RAMESH REDDY
	Subject Teacher	**Course Coordinator**	**HOD,ECE**