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., VII-Sem., ECE-A
ACADEMIC YEAR	: 2017-18
COURSE NAME & CODE	: Optical communications - S 330
L-T-P STRUCTURE	: 4-1-0
COURSE CREDITS	: 3
COURSE INSTRUCTOR	: Dr.M.V.Sudhakar, Professor
COURSE COORDINATOR	: Dr.M.V.Sudhakar, Professor

COURSE OBJECTIVE : This course gives knowledge on optical communication fundamentals, fiber types, and fiber materials. This course also describe about transmission losses in the fiber, optical sources, source to fiber coupling scheme, and optical receivers. This course also provides understanding of digital optical link, analog optical systems, wavelength division multiplexing and optical networks.

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	Comprehend the fundamental concepts of optical fiber Communications.	3	-	-	-	-	2	2	-	-	-	-	2	2	-	-
2	Estimate numerous types of losses in different fibers during optical signal transmission.	2	-	2	-	-	2	2	-	-	-	-	2	2	-	-
3	Summarize the basics of power launching and coupling from optical sources to fiber.	2	2	-	-	-	2	2	-	-	-	-	2	2	-	-
4	Interpret various optical receivers and their performance measures.	3	2	2	-	-	-	2	-	-	-	-	2	2	-	-
5	Analyze the digital optical link, Wavelength division multiplexing and optical networks	3	2	3	-	-	2	3	-	-	-	-	3	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 Gerd Keiser,Optical Fiber Communications, Mc Graw-Hill International edition, 4thEdition, 2008.

2 M. Senior, Optical Fiber Communications, PHI, 2ndEdition, 2002.

BOS APPROVED REFERENCE BOOKS:

1 Govind P. Agarwal,Fiber Optic Communication Systems, John Wiley, 3rd Edition, 2004.

2 S.C.Gupta,Text Book on Optical Fiber Communication and its Applications, PHI, 2005.

3 Joseph C. Palais,Fiber Optic Communications, Pearson Education, 4th Edition, 2004.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Overview of Optical Fiber Communications

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	1	27.06.2017		TLM2	
2.	The general System, Advantages of Optical Fiber Communications	1	28.06.2017		TLM1	
3.	The Evolution Of Fiber Optic Systems	1	30.06.2017		TLM2	
4.	Elements of an Optical Fiber Transmission Link	1	10.07.2017		TLM1	
5.	Basic Optical Laws and Definitions	1	11.07.2017		TLM1,TLM4	
6.	Total internal Reflection, Critical Angle	1	12.07.2017		TLM1,TLM4	
7.	Optical Fiber Modes and Configurations : Fiber-Types	1	14.07.2017		TLM2	
8.	Tutorial-1	1	17.07.2017		TLM3	
9.	Step Index Fiber Structure, Graded Index Fiber Structure	1	18.07.2017		TLM2	
10.	Ray Optics Representation, Acceptance Angle	1	19.07.2017		TLM1,TLM2	
11.	Numerical Aperture, Skew Rays	1	21.07.2017		TLM1,TLM4	
12.	Mode Theory for Circular Waveguides: Overview of Modes, Summary of Key Modal Concepts.	1	24.07.2017		TLM1	
13.	Single-Mode Fibers	1	25.07.2017		TLM2	
14.	Cutoff Wavelength, Mode Field Diameter.	1	26.07.2017		TLM1	
15.	Assignment /Quiz-1	1	28.07.2017		TLM6	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : Signal Degradation in Optical Fibers

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.	Fiber Materials, Glass Fibers, Active Glass Fibers	1	31.07.2017		TLM1	
17.	Plastic Optical Fibers, Attenuation, Attenuation Units	1	01.08.2017		TLM1,TLM4	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Absorption, Scattering Losses	1	02.08.2017		TLM2	
19.	Bending Losses,Core and Cladding losses	1	04.08.2017		TLM2	
20.	Tutorial-2	1	07.08.2017		TLM3	
21.	Signal Distortion in Optical Waveguides:Information Capacity determination, Group Delay	1	08.08.2017		TLM1,TLM2	
22.	Material Dispersion, Polarization-Mode Dispersion	1	09.08.2017		TLM1,TLM4	
23.	Intermodal Distortion, Pulse Broadening in Graded-Index Waveguides	1	11.08.2017		TLM2	
24.	Mode Coupling, Design Optimization Of Single-Mode Fibers	1	14.08.2017		TLM1	
25.	Refractive-Index Profiles, Cutoff Wavelength.	1	16.08.2017		TLM1	
26.	Assignment /Quiz-2	1	18.08.2017		TLM6	
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : Optical Sources

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Light Emitting Diodes: LED Structures, Light Source Materials	1	28.08.2017		TLM2	
28.	Quantum Efficiency , LED Power, Modulation of an LED	1	29.08.2017		TLM1,TLM4	
29.	LASER Diodes: Laser Diode Modes and Threshold Conditions	1	30.08.2017		TLM1,TLM2	
30.	Semiconductor Laser Diodes, Fabry Perot Lasers, Distributed Feedback (DFB) Lasers	1	01.09.2017		TLM1,TLM4	
31.	Laser diode rate equations, External quantum efficiency	1	04.09.2017		TLM1,TLM4	
32.	Tutorial-3	1	05.09.2017		TLM 3	
33.	Resonant frequencies, Reliability Considerations	1	06.09.2017		TLM1	
34.	Power Launching and Coupling, Source to fiber power launching, Source Output Pattern	1	08.09.2017		TLM1,TLM4	
35.	Power-Coupling Calculation	1	11.09.2017		TLM1,TLM4	
36.	Lensing Schemes for Coupling improvement, Laser Diode-to-Fiber Coupling.	1	12.09.2017		TLM1,TLM4	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Assignment /Quiz-3	1	13.09.2017		TLM6	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : Optical 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
38.	Photo detectors, Physical Principles of Photodiodes	1	15.09.2017		TLM2	
39.	The pin Photo detector	1	18.09.2017		TLM1,TLM2	
40.	Avalanche Photo diodes	1	19.09.2017		TLM1,TLM2	
41.	Detector Response time : Response time, Temperature effect on Avalanche gain,	1	20.09.2017		TLM1	
42.	Comparison of Photo detectors.	1	22.09.2017		TLM1	
43.	Tutorial-4	1	25.09.2017		TLM3	
44.	Optical receiver operation, Fundamental receiver operation, Digital signal transmission	1	26.09.2017		TLM2	
45.	Error sources, Receiver configuration	1	27.09.2017		TLM1,TLM4	
46.	Digital receiver performance, Probability of error,	1	29.09.2017		TLM1,TLM4	
47.	The Quantum limit, Analog Receivers.	1	3.10.2017		TLM1	
48.	Assignment /Quiz-4	1	4.10.2017		TLM6	
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V : Digital Transmission 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
49.	Point to point links, systems considerations	1	6.10.2017		TLM1	
50.	Link Power budget,	1	9.10.2017		TLM1	
51.	Rise time budget	1	10.10.2017		TLM1,TLM4	
52.	Line coding, NRZ Codes, RZ Codes,	1	11.10.2017		TLM1,TLM4	
53.	Tutorial-5	1	13.10.2017		TLM3	
54.	WDM Features	1	16.10.2017		TLM1	
55.	Operational principles of WDM	1	17.10.2017		TLM1,TLM2	
56.	SONET/ SDH Networks.	1	20.10.2017		TLM1,TLM2	
57.	SONET/ SDH Networks.	1	23.10.2017		TLM1,TLM2	
58.	Assignment /Quiz-5	1	24.10.2017		TLM 6	

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
59.	Introduction to free space optical communication	1	25.10.2017		TLM2	
60.	Introduction to under water optical wireless communication	1	27.10.2017		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	27-06-2017	19-08-2017	8 W
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	10 W
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1½ W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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.M.V.Sudhakar	Dr.M.V.Sudhakar	Mr.G.L.N Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

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

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1	Comprehend the fundamental concepts of optical fiber Communications.	3	-	-	-	-	2	2	-	-	-	-	2	2	-	-
2	Estimate numerous types of losses in different fibers during optical signal transmission.	2	-	2	-	-	2	2	-	-	-	-	2	2	-	-
3	Summarize the basics of power launching and coupling from optical sources to fiber.	2	2	-	-	-	2	2	-	-	-	-	2	2	-	-
4	Interpret various optical receivers and their performance measures.	3	2	2	-	-	-	2	-	-	-	-	2	2	-	-
5	Analyze the digital optical link, Wavelength division multiplexing and optical networks	3	2	3	-	-	2	3	-	-	-	-	3	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).

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2 S.C.Gupta,Text Book on Optical Fiber Communication and its Applications, PHI, 2005.

3 Joseph C. Palais,Fiber Optic Communications, Pearson Education, 4th Edition, 2004.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Overview of Optical Fiber Communications

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	1	29.06.2017		TLM2	
2.	The general System, Advantages of Optical Fiber Communications	1	30.06.2017		TLM1	
3.	The Evolution Of Fiber Optic Systems	1	01.07.2017		TLM2	
4.	Elements of an Optical Fiber Transmission Link	1	10.07.2017		TLM1	
5.	Basic Optical Laws and Definitions	1	13.07.2017		TLM1,TLM4	
6.	Total internal Reflection, Critical Angle	1	14.07.2017		TLM1,TLM4	
7.	Optical Fiber Modes and Configurations : Fiber-Types	1	15.07.2017		TLM2	
8.	Tutorial-1	1	17.07.2017		TLM3	
9.	Step Index Fiber Structure, Graded Index Fiber Structure	1	20.07.2017		TLM2	
10.	Ray Optics Representation, Acceptance Angle	1	21.07.2017		TLM1,TLM2	
11.	Numerical Aperture, Skew Rays	1	22.07.2017		TLM1,TLM4	
12.	Mode Theory for Circular Waveguides: Overview of Modes, Summary of Key Modal Concepts.	1	24.07.2017		TLM1	
13.	Single-Mode Fibers	1	27.07.2017		TLM2	
14.	Cutoff Wavelength, Mode Field Diameter.	1	28.07.2017		TLM1	
15.	Assignment /Quiz-1	1	29.07.2017		TLM6	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : Signal Degradation in Optical Fibers

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.	Fiber Materials, Glass Fibers, Active Glass Fibers	1	31.07.2017		TLM1	
17.	Plastic Optical Fibers, Attenuation, Attenuation Units	1	03.08.2017		TLM1,TLM4	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Absorption, Scattering Losses	1	04.08.2017		TLM2	
19.	Bending Losses,Core and Cladding losses	1	05.08.2017		TLM2	
20.	Tutorial-2	1	07.08.2017		TLM3	
21.	Signal Distortion in Optical Waveguides:Information Capacity determination, Group Delay	1	10.08.2017		TLM1,TLM2	
22.	Material Dispersion, Polarization-Mode Dispersion	1	11.08.2017		TLM1,TLM4	
23.	Intermodal Distortion, Pulse Broadening in Graded-Index Waveguides	1	14.08.2017		TLM2	
24.	Mode Coupling, Design Optimization Of Single-Mode Fibers	1	17.08.2017		TLM1	
25.	Refractive-Index Profiles, Cutoff Wavelength.	1	18.08.2017		TLM1	
26.	Assignment /Quiz-2	1	19.08.2017		TLM6	
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : Optical Sources

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Light Emitting Diodes: LED Structures, Light Source Materials	1	28.08.2017		TLM2	
28.	Quantum Efficiency , LED Power, Modulation of an LED	1	31.08.2017		TLM1,TLM4	
29.	LASER Diodes: Laser Diode Modes and Threshold Conditions	1	01.09.2017		TLM1,TLM2	
30.	Semiconductor Laser Diodes, Fabry Perot Lasers, Distributed Feedback (DFB) Lasers	1	04.09.2017		TLM1,TLM4	
31.	Laser diode rate equations, External quantum efficiency	1	07.09.2017		TLM1,TLM4	
32.	Tutorial-3	1	08.09.2017		TLM 3	
33.	Resonant frequencies, Reliability Considerations	1	11.09.2017		TLM1	
34.	Power Launching and Coupling, Source to fiber power launching, Source Output Pattern	1	14.09.2017		TLM1,TLM4	
35.	Power-Coupling Calculation	1	15.09.2017		TLM1,TLM4	
36.	Lensing Schemes for Coupling improvement, Laser Diode-to-Fiber Coupling.	1	16.09.2017		TLM1,TLM4	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Assignment /Quiz-3	1	18.09.2017		TLM6	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV : Optical 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
38.	Photo detectors, Physical Principles of Photodiodes	1	21.09.2017		TLM2	
39.	The pin Photo detector	1	22.09.2017		TLM1,TLM2	
40.	Avalanche Photo diodes	1	23.09.2017		TLM1,TLM2	
41.	Detector Response time : Response time, Temperature effect on Avalanche gain,	1	25.09.2017		TLM1	
42.	Comparison of Photo detectors.	1	28.09.2017		TLM1	
43.	Tutorial-4	1	29.09.2017		TLM3	
44.	Optical receiver operation, Fundamental receiver operation, Digital signal transmission	1	05.10.2017		TLM2	
45.	Error sources, Receiver configuration	1	06.10.2017		TLM1,TLM4	
46.	Digital receiver performance, Probability of error,	1	07.10.2017		TLM1,TLM4	
47.	The Quantum limit, Analog Receivers.	1	09.10.2017		TLM1	
48.	Assignment /Quiz-4	1	12.10.2017		TLM6	
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V : Digital Transmission 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
49.	Point to point links, systems considerations	1	13.10.2017		TLM1	
50.	Link Power budget,	1	16.10.2017		TLM1	
51.	Rise time budget	1	10.10.2017		TLM1,TLM4	
52.	Line coding, NRZ Codes, RZ Codes,	1	19.10.2017		TLM1,TLM4	
53.	Tutorial-5	1	20.10.2017		TLM3	
54.	WDM Features	1	21.10.2017		TLM1	
55.	Operational principles of WDM	1	23.10.2017		TLM1,TLM2	
56.	SONET/ SDH Networks.	1	26.10.2017		TLM1,TLM2	
57.	SONET/ SDH Networks.	1	27.10.2017		TLM1,TLM2	
58.	Assignment /Quiz-5	1	28.10.2017		TLM 6	

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
59.	Introduction to free space optical communication	1	30.10.2017		TLM2	
60.	Introduction to under water optical wireless communication	1	02.11.2017		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:

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I Phase of Instructions-1	27-06-2017	19-08-2017	8 W
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II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1½ W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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.M.V.Sudhakar	Dr.M.V.Sudhakar	Mr.G.L.N Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

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COURSE HANDOUT

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COURSE INSTRUCTOR	: Mr.CH.V Naga Bhaskar, Asst Professor
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2	Estimate numerous types of losses in different fibers during optical signal transmission.	2	-	2	-	-	2	2	-	-	-	-	2	2	-	-
3	Summarize the basics of power launching and coupling from optical sources to fiber.	2	2	-	-	-	2	2	-	-	-	-	2	2	-	-
4	Interpret various optical receivers and their performance measures.	3	2	2	-	-	-	2	-	-	-	-	2	2	-	-
5	Analyze the digital optical link, Wavelength division multiplexing and optical networks	3	2	3	-	-	2	3	-	-	-	-	3	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   Gerd Keiser,Optical Fiber Communications, Mc Graw-Hill International edition, 4thEdition, 2008.

2   M. Senior, Optical Fiber Communications, PHI, 2ndEdition, 2002.

BOS APPROVED REFERENCE BOOKS:

1 Govind P. Agarwal,Fiber Optic Communication Systems, John Wiley, 3rd Edition, 2004.

2 S.C.Gupta,Text Book on Optical Fiber Communication and its Applications, PHI, 2005.

3 Joseph C. Palais,Fiber Optic Communications, Pearson Education, 4th Edition, 2004.

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I : Overview of Optical Fiber Communications

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	1	28/6/17		TLM2	
2.	The general System, Advantages of Optical Fiber Communications	1	30/6/17		TLM1	
3.	The Evolution Of Fiber Optic Systems	1	01/7/17		TLM2	
4.	Elements of an Optical Fiber Transmission Link	1	03/7/17		TLM1	
5.	Basic Optical Laws and Definitions	1	05/7/17		TLM1,TLM4	
6.	Total internal Reflection, Critical Angle	1	07/7/17		TLM1,TLM4	
7.	Optical Fiber Modes and Configurations : Fiber-Types	1	10/7/17		TLM2	
8.	Tutorial-1	1	12/7/17		TLM3	
9.	Step Index Fiber Structure, Graded Index Fiber Structure	1	14/7/17		TLM2	
10.	Ray Optics Representation, Acceptance Angle	1	15/7/17		TLM1,TLM2	
11.	Numerical Aperture, Skew Rays	1	17/7/17		TLM1,TLM4	
12.	Mode Theory for Circular Waveguides: Overview of Modes, Summary of Key Modal Concepts.	1	19/7/17		TLM1	
13.	Single-Mode Fibers	1	21/7/17		TLM2	
14.	Cutoff Wavelength, Mode Field Diameter.	1	22/7/17		TLM1	
15.	Assignment /Quiz-1	1	24/7/17		TLM6	
No. of classes required to complete UNIT-I		15	No. of classes taken:			

UNIT-II : Signal Degradation in Optical Fibers

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.	Fiber Materials, Glass Fibers, Active Glass Fibers	1	26/7/17		TLM1	
17.	Plastic Optical Fibers, Attenuation, Attenuation Units	1	28/7/17		TLM1,TLM4	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Absorption, Scattering Losses	1	29/7/17		TLM2	
19.	Bending Losses,Core and Cladding losses	1	31/7/17		TLM2	
20.	Tutorial-3	1	02/8/17		TLM3	
21.	Signal Distortion in Optical Waveguides:Information Capacity determination, Group Delay	1	04/8/17		TLM1,TLM2	
22.	Material Dispersion, Polarization-Mode Dispersion	1	05/8/17		TLM1,TLM4	
23.	Intermodal Distortion, Pulse Broadening in Graded-Index Waveguides	1	07/8/17		TLM2	
24.	Mode Coupling, Design Optimization Of Single-Mode Fibers	1	09/817		TLM1	
25.	Refractive-Index Profiles, Cutoff Wavelength.	1	11/8/17		TLM1	
26.	Assignment /Quiz-2	1	14/8/17		TLM6	
No. of classes required to complete UNIT-II		11	No. of classes taken:			

UNIT-III : Optical Sources

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
27.	Light Emitting Diodes: LED Structures, Light Source Materials	1	16/8/17		TLM2	
28.	Quantum Efficiency , LED Power, Modulation of an LED	1	18/8/17		TLM1,TLM4	
29.	LASER Diodes: Laser Diode Modes and Threshold Conditions	1	19/8/17		TLM1,TLM2	
30.	Semiconductor Laser Diodes, Fabry Perot Lasers, Distributed Feedback (DFB) Lasers	1	28/8/17		TLM1,TLM4	
31.	Laser diode rate equations, External quantum efficiency	1	30/8/17		TLM1,TLM4	
32.	Tutorial-5	1	01/9/17		TLM 3	
33.	Resonant frequencies, Reliability Considerations	1	04/9/17		TLM1	
34.	Power Launching and Coupling, Source to fiber power launching, Source Output Pattern	1	06/9/17		TLM1,TLM4	
35.	Power-Coupling Calculation	1	08/9/17		TLM1,TLM4	
36.	Lensing Schemes for Coupling improvement, Laser Diode-to-Fiber Coupling.	1	11/9/17		TLM1,TLM4	
37.	Assignment /Quiz-3	1	13/9/17		TLM6	

No.of classes required to complete UNIT-III	11	No. of classes taken:

UNIT-IV : Optical 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
38.	Photo detectors, Physical Principles of Photodiodes	1	15/9/17		TLM2	
39.	The pin Photo detector	1	16/9/17		TLM1,TLM2	
40.	Avalanche Photo diodes	1	18/9/17		TLM1,TLM2	
41.	Detector Response time : Response time, Temperature effect on Avalanche gain,	1	20/9/17		TLM1	
42.	Comparison of Photo detectors.	1	22/9/17		TLM1	
43.	Tutorial-7	1	23/9/17		TLM3	
44.	Optical receiver operation, Fundamental receiver operation, Digital signal transmission	1	25/9/17		TLM2	
45.	Error sources, Receiver configuration	1	27/9/17		TLM1,TLM4	
46.	Digital receiver performance, Probability of error,	1	29/9/17		TLM1,TLM4	
47.	The Quantum limit, Analog Receivers.	1	04/10/17		TLM1	
48.	Assignment /Quiz-4	1	06/10/17		TLM6	
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V : Digital Transmission 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
49.	Point to point links, systems considerations	1	07/10/17		TLM1	
50.	Link Power budget,	1	09/10/17		TLM1	
51.	Rise time budget	1	11/10/17		TLM1,TLM4	
52.	Line coding, NRZ Codes, RZ Codes,	1	13/10/17		TLM1,TLM4	
53.	Tutorial-9	1	16/10/17		TLM3	
54.	WDM Features	1	20/10/17		TLM1	
55.	Operational principles of WDM	1	21/10/17		TLM1,TLM2	
56.	SONET/ SDH Networks.	1	23/10/17		TLM1,TLM2	
57.	SONET/ SDH Networks.	1	25/10/17		TLM1,TLM2	
58.	Assignment /Quiz-5	1	27/10/17		TLM 6	
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
59.	Introduction to free space optical communication	1	28/10/2017		TLM2	
60.	Introduction to under water optical wireless communication	1	30/10/2017		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	27-06-2017	19-08-2017	8 W
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	10 W
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1½ W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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. CH. V Naga Bhaskar	Dr.M.V.Sudhakar	Mr.G.L.N Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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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., VII-Sem., ECE-A
ACADEMIC YEAR	: 2017-18
COURSE NAME & CODE	: Cellular and Mobile Communication - S 155
L-T-P STRUCTURE	: 4-1-0
COURSE CREDITS	: 3
COURSE INSTRUCTOR	: V.V.Rama Krishna, Associate Professor
COURSE COORDINATOR	: Dr.Y.S.V.Raman, Professor

COURSE OBJECTIVE: In this course, students are able to understand the fundamental concepts of mobile cellular systems and specifics of current and proposed cellular systems

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 related to different cellular systems and their operation.	3	2	1	-	3	3	1	-	-	-	-	3	3	2	-
2	Analyze radio propagation losses at different cell site and mobile antennas.	3	2	3	3	-	-	-	-	-	-	-	3	3	-	1
3	Design and differentiate the co-channel and adjacent channel interferences.	3	-	3	2	3	-	-	-	-	-	-	3	3	-	-
4	Gain the knowledge on various handoffs and different channel assignments.	2	-	3	-	3	2	-	-	-	-	-	-	3	-	-
5	Understand the different digital cellular systems and multiple access techniques.	2	2	3	-	-	-	-	-	-	-	-	3	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 Mobile Cellular Telecommunications by William.C.Y. Lee, Tata McGraw Hill, 2nd Edition, 1995.

2 Wireless Communications by Theodore. S. Rappaport, Pearson education, 2nd Edition, 2002.

BOS APPROVED REFERENCE BOOKS:

1 Cellular Communications Explained From Basics to 3G by Ian Poole, Elsevier Ltd, 2006.

2 Wireless and Cellular Telecommunications by William.C.Y. Lee, McGraw Hill, 3rd Edition, 2006.

3 Mobile Cellular Communication by G Sasibhushana Rao, Pearson Education, 1st Edition, 2012.

COURSE DELIVERY PLAN (LESSON PLAN): Section-

UNIT-I: Introduction to Cellular 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
61.	Introduction to Subject	1	27-06-17			
62.	Course Outcomes	1	28-06-17			
63.	Basic Analog and Digital Cellular systems	1	30-06-17			
64.	Components of a Cellular system	1	10-07-17			
65.	Operation of cellular systems	1	11-07-17			
66.	How a Cellular Telephone call is made, Operational channels, Performance criteria.	1	12-07-17			
67.	Tutorial-1	1	14-07-17			
68.	Hexagonal shaped cells, Frequency Reuse, Frequency Reuse distance	1	17-07-17			
69.	Concept of frequency Reuse channels	1	18-07-17			
70.	Co-channel-Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system	1	19-07-17			
71.	Cell splitting.	1	21-07-17			
72.	Tutorial-2	1				
73.	Omni directional antennas,	1	24-07-17			
74.	Directional antennas for interference reduction	1	25-07-17			
75.	Space diversity antennas, umbrella pattern antennas	1	26-07-17			
76.	Minimum separation of cell site receiving antennas, Mobile high gain antennas.	1	28-07-17			
77.	Tutorial-3	1	31-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Mobile Radio Propagation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
78.	Free space propagation Model, Basic propagation mechanisms	1	01-08-17			

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.	Ground Reflection (2-ray) Model , Knife-edge Diffraction Model	1	02-08-17			
80.	Link budget design using Path Loss Models	1	04-08-17			
81.	Outdoor Propagation models, Indoor Propagation models,	1	07-08-17			
82.	Tutorial-4	1	08-08-17			
83.	Small scale multipath propagation	1	09-08-17			
84.	Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements,	1	11-08-17			
85.	Types of small-scale fading,	1	14-08-17			
86.	Parameters of Mobile Multipath Channels Statistical models for multipath propagation.	1	16-08-17			
87.	Tutorial-5	1	18-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: Cochannel and non Co channel interference

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
88.	Introduction to Co-Channel Interference	1	28-08-17			
89.	Real time Co-Channel interference, Determination of Co-Channel interference area	1	29-08-17			
90.	Design of Omni directional Antenna system	1	30-08-17			
91.	Design of directional Antenna system,	1	01-09-17			
92.	Lowering the antenna height, Reduction of cochannel interference by means of a notch in the tilted antenna	1	04-09-17			
93.	Umbrella pattern, parasitic elements	1	05-09-17			
94.	Tutorial-6	1	06-09-17			
95.	Adjacent channel interference, Near end to Far end interference	1	08-09-17			
96.	Interference between systems, Long distance interference	1	11-09-17			
97.	UHF TV interference.	1	12-09-17			
98.	Tutorial-7	1	13-09-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Frequency Management, Channel Assignment, Handoff and Dropped Calls

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
99.	Numbering and grouping		15-09-17			
100.	Setup channels		18-09-17			
101.	Access channels and Paging channels		19-09-17			
102.	Channel assignments to cell sites and mobile units		20-09-17			
103.	Channel sharing and borrowing		22-09-17			
104.	Sectorization, overlaid cells, non-fixed channel assignment.		25-09-17			
105.	Tutorial-8		26-09-17			
106.	Types of handoff, handoff invitation, delaying Handoff		27-09-17			
107.	Forced handoff, mobile assigned handoff, Intersystem handoff		29-09-17			
108.	Dropped call rates And their evaluation.		03-10-17			
109.	Tutorial-9					
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Multiple access Techniques and Digital Cellular 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
110.	Frequency Division Multiple Access: Principle of operation, Number of channels, Advantages and Disadvantages, Applications	1	03-10-17			
111.	Time Division Multiple Access: Principle of operation, Number of channels, Frame structure, Efficiency, Advantages and Disadvantages, Applications	1	04-10-17			
112.	Code Division Multiple Access Principle of operation, Types of codes used in CDMA, Advantages and Disadvantages, Handoffs in CDMA, Near-far Problem, Call processing in CDMA Mobile Phones	1	06-10-17			
113.	Space Division Multiple Access: Principle of operation and Advantages	1	09-10-17			

		No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
114.	Comparison of performances of multiple access techniques SDMA,TDMA,FDMA,CDMA	1	11-10-17			
115.	Tutorial-10	1	13-10-17			
116.	Global System for Mobile: Important features of GSM, advantages of GSM over analog system, architecture of GSM	1	16-10-17			
117.	Different subsystems of the GSM, Layer modelling of GSM, frame structure of GSM, GSM Channels and Channel Modes, Tele services, Data services, supplementary services of GSM, concepts related to Multiple acess scheme of GSM, operation of GSM	1	17-10-17			
118.	**B2GSystems-**General Packet Radio Service; GPRS network structure, Layers, GPRS mobiles, GPRS coding, GPRS physical channel, Channel allocation, Logical channels, GPRS operation	1	20-10-17			
119.	**3G Systems-**Universal Mobile Telecommunications System; Wideband CDMA; CDMA 2000	1	23-10-17			
120.	Tutorial-11	1	24-10-17			
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
121.	5G systems	1	25-10-17			
122.	Applications	1	27-10-17			

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	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)

II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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	Dr.Y.S.V.Raman	G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

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

COURSE HANDOUT

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

ACADEMIC YEAR : 2017-18

COURSE NAME & CODE : Cellular and Mobile Communication - S 155

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

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr Y.S.V.Raman**, Professor

COURSE COORDINATOR : Dr.Y.S.V.Raman

COURSE OBJECTIVE: In this course, students are able to understand the fundamental concepts of mobile cellular systems and specifics of current and proposed cellular systems **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 related to different cellular systems and their operation.	3	2	1	-	3	3	1	-	-	-	-	3	3	2	-
2	Analyze radio propagation losses at different cell site and mobile antennas.	3	2	3	3	-	-	-	-	-	-	-	3	3	-	1
3	Design and differentiate the co-channel and adjacent channel interferences.	3	-	3	2	3	-	-	-	-	-	-	3	3	-	-
4	Gain the knowledge on various handoffs and different channel assignments.	2	-	3	-	3	2	-	-	-	-	-	-	3	-	-
5	Understand the different digital cellular systems and multiple access techniques.	2	2	3	-	-	-	-	-	-	-	-	3	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).

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Mobile Cellular Communication by G Sasibhushana Rao, Pearson Education, 1st Edition, 2012.

3

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Introduction to Cellular 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
1.	Introduction to Subject	1	27-06-17			
2.	Course Outcomes	1	28-06-17			
3.	Basic Analog and Digital Cellular systems	1	29-06-17			
4.	Components of a Cellular system	1	03-07-17			
5.	Operation of cellular systems	1	04-07-17			
6.	How a Cellular Telephone call is made, Operational channels, Performance criteria.	1	05-07-17			
7.	Tutorial-1	1	06-07-17			
8.	Hexagonal shaped cells, Frequency Reuse, Frequency Reuse distance	1	10-07-17			
9.	Concept of frequency Reuse channels	1	11-07-17			
10.	Co-channel-Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system	1	12-07-17			
11.	Cell splitting.	1	13-07-17			
12.	Tutorial-2	1	17-07-17			
13.	Omni directional antennas,	1	18-07-17			
14.	Directional antennas for interference reduction	1	19-07-17			
15.	Space diversity antennas, umbrella pattern antennas	1	20-07-17			
16.	Minimum separation of cell site receiving antennas, Mobile high gain antennas.	1	24-07-17			
17.	Tutorial-3	1	25-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Mobile Radio Propagation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Introduction to UNIT-II	1	26-07-17			
19.	Free space propagation Model, Basic propagation mechanisms	1	27-07-17			
20.	Ground Reflection (2-ray) Model , Knife-edge Diffraction Model	1	31-07-17			
21.	Link budget design using Path Loss Models	1	01-08-17			
22.	Outdoor Propagation models, Indoor Propagation models,	1	2-08-17			
23.	Tutorial-4	1	03-08-17			
24.	Small scale multipath propagation	1	07-08-17			
25.	Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements,	1	08-08-17			
26.	Types of small-scale fading,	1	09-08-17			
27.	Parameters of Mobile Multipath Channels	1	10-08-17			
28.	Statistical models for multipath propagation.	1	14-08-17			
29.	Tutorial-5	1	16-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: Cochannel and non Co channel interference

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Introduction to Co-Channel Interference		17-08-17			
31.	Real time Co-Channel interference, Determination of Co-Channel interference area		28-08-17			
32.	Design of Omni directional Antenna system		29-08-17			
33.	Design of directional Antenna system,		30-08-17			

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.	Lowering the antenna height, Reduction of cochannel interference by means of a notch in the tilted antenna		31-08-17			
35.	Umbrella pattern, parasitic elements		04-09-17			
36.	Tutorial-6		05-09-17			
37.	Adjacent channel interference, Near end to Far end interference		06-09-17			
38.	Interference between systems, Long distance interference		07-09-17			
39.	UHF TV interference.		11-09-17			
40.	Tutorial-7		12-09-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Frequency Management, Channel Assignment, Handoff and Dropped Calls

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.	Numbering and grouping		13-09-17			
42.	Setup channels		14-09-17			
43.	Access channels and Paging channels		18-09-17			
44.	Channel assignments to cell sites and mobile units		19-09-17			
45.	Channel sharing and borrowing		20-09-17			
46.	Sectorization, overlaid cells, non-fixed channel assignment.		21-09-17			
47.	Tutorial-8		25-09-17			
48.	Types of handoff, handoff invitation, delaying Handoff		26-09-17			
49.	Forced handoff, mobile assigned handoff, Intersystem handoff		27-09-17			
50.	Dropped call rates And their evaluation.		28-09-17			
51.	Tutorial-9		03-10-2017			
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Multiple access Techniques and Digital Cellular 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
52.	Frequency Division Multiple Access: Principle of operation, Number of channels, Advantages and Disadvantages, Applications	1	04-10-2017			
53.	Time Division Multiple Access: Principle of operation, Number of channels, Frame structure, Efficiency, Advantages and Disadvantages, Applications	1	05-10-2017			
54.	Code Division Multiple Access Principle of operation, Types of codes used in CDMA, Advantages and Disadvantages, Handoffs in CDMA, Near-far Problem, Call processing in CDMA Mobile Phones	1	09-10-2017			
55.	Space Division Multiple Access: Principle of operation and Advantages	1	10-10-2017			
56.	Comparison of performances of multiple access techniques SDMA,TDMA,FDMA,CDMA	1	11-10-2017			
57.	Tutorial-10	1	12-10-2017			
58.	Global System for Mobile: Important features of GSM, advantages of GSM over analog system, architecture of GSM	2	16-10-2017 17-10-2017			
59.	Different subsystems of the GSM, Layer modelling of GSM, frame structure of GSM, GSM Channels and Channel Modes, Tele services, Data services, supplementary services	2	19-10-2017 23-10-2017			

S.No.	Topics	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	of GSM, concepts related to Multiple acess scheme of GSM, operation of GSM					
60.	**B2GSystems-**General Packet Radio Service; GPRS network structure, Layers, GPRS mobiles, GPRS coding, GPRS physical channel, Channel allocation, Logical channels, GPRS operation	1	24-10-2017 30-10-2017			
61.	**3G Systems-**Universal Mobile Telecommunications System; Wideband CDMA; CDMA 2000	1	31-10-2017 01-11-2017			
62.	Tutorial-11	1	02-11-2017			
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
63.	5G systems	1	25-10-2017			
64.	Applications	1	26-10-2017			

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	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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 Y.S.V.Raman	Dr Y.S.V.Raman	G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
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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., VII-Sem., ECE-C

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : Cellular and Mobile Communication - S 155

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

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : **Dr Y.S.V.Raman**, Professor

COURSE COORDINATOR   :

COURSE OBJECTIVE: In this course, students are able to understand the fundamental concepts of mobile cellular systems and specifics of current and proposed cellular systems **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 related to different cellular systems and their operation.	3	2	1	-	3	3	1	-	-	-	-	3	3	2	-
2	Analyze radio propagation losses at different cell site and mobile antennas.	3	2	3	3	-	-	-	-	-	-	-	3	3	-	1
3	Design and differentiate the co-channel and adjacent channel interferences.	3	-	3	2	3	-	-	-	-	-	-	3	3	-	-
4	Gain the knowledge on various handoffs and different channel assignments.	2	-	3	-	3	2	-	-	-	-	-	-	3	-	-
5	Understand the different digital cellular systems and multiple access techniques.	2	2	3	-	-	-	-	-	-	-	-	3	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:

3   Mobile Cellular Telecommunications by William.C.Y. Lee, Tata McGraw Hill, 2nd Edition, 1995.

4   Wireless Communications by Theodore. S. Rappaport, Pearson education, 2nd Edition, 2002.

BOS APPROVED REFERENCE BOOKS:

3   Cellular Communications Explained From Basics to 3G by Ian Poole, Elsevier Ltd, 2006.

4   Wireless and Cellular Telecommunications by William.C.Y. Lee, McGraw Hill, 3rd Edition, 2006.

3 Mobile Cellular Communication by G Sasibhushana Rao, Pearson Education, 1st Edition, 2012.

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I: Introduction to Cellular 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
1.	Introduction to Subject	1	27-06-17			
2.	Course Outcomes	1	28-06-17			
3.	Basic Analog and Digital Cellular systems	1	29-06-17			
4.	Components of a Cellular system	1	01-07-17			
5.	Operation of cellular systems	1	03-07-17			
6.	How a Cellular Telephone call is made, Operational channels, Performance criteria.	1	04-07-17			
7.	Tutorial-1	1	05-07-17			
8.	Hexagonal shaped cells, Frequency Reuse, Frequency Reuse distance	1	10-07-17			
9.	Concept of frequency Reuse channels	1	11-07-17			
10.	Co-channel-Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system	1	12-07-17			
11.	Cell splitting.	1	15-07-17			
12.	Tutorial-2	1	17-07-17			
13.	Omni directional antennas,	1	18-07-17			
14.	Directional antennas for interference reduction	1	19-07-17			
15.	Space diversity antennas, umbrella pattern antennas	1	22-07-17			
16.	Minimum separation of cell site receiving antennas, Mobile high gain antennas.	1	24-07-17			
17.	Tutorial-3	1	25-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Mobile Radio Propagation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Introduction to UNIT-II	1	26-07-17			
19.	Free space propagation Model, Basic propagation mechanisms	1	29-07-17			
20.	Ground Reflection (2-ray) Model , Knife-edge Diffraction Model	1	31-07-17			
21.	Link budget design using Path Loss Models	1	01-08-17			
22.	Outdoor Propagation models, Indoor Propagation models,	1	2-08-17			
23.	Tutorial-4	1	05-08-17			
24.	Small scale multipath propagation	1	07-08-17			
25.	Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements,	1	08-08-17			
26.	Types of small-scale fading,	1	09-08-17			
27.	Parameters of Mobile Multipath Channels	1	12-08-17			
28.	Statistical models for multipath propagation.	1	14-08-17			
29.	Tutorial-5	1	16-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: Cochannel and non Co channel interference

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Introduction to Co-Channel Interference		19-08-17			
31.	Real time Co-Channel interference, Determination of Co-Channel interference area		28-08-17			
32.	Design of Omni directional Antenna system		29-08-17			
33.	Design of directional Antenna system,		30-08-17			

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.	Lowering the antenna height, Reduction of cochannel interference by means of a notch in the tilted antenna		04-09-17			
35.	Umbrella pattern, parasitic elements		05-09-17			
36.	Tutorial-6		06-09-17			
37.	Adjacent channel interference, Near end to Far end interference		11-09-17			
38.	Interference between systems, Long distance interference		12-09-17			
39.	UHF TV interference.		13-09-17			
40.	Tutorial-7		16-09-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Frequency Management, Channel Assignment, Handoff and Dropped Calls

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.	Numbering and grouping		18-09-17			
42.	Setup channels		19-09-17			
43.	Access channels and Paging channels		20-09-17			
44.	Channel assignments to cell sites and mobile units		23-09-17			
45.	Channel sharing and borrowing		25-09-17			
46.	Sectorization, overlaid cells, non-fixed channel assignment.		26-09-17			
47.	Tutorial-8		27-09-17			
48.	Types of handoff, handoff invitation, delaying Handoff		29-09-17			
49.	Forced handoff, mobile assigned handoff, Intersystem handoff		03-10-2017			
50.	Dropped call rates And their evaluation.		04-10-2017			
51.	Tutorial-9		07-10-2017			
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Multiple access Techniques and Digital Cellular 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
52.	Frequency Division Multiple Access: Principle of operation, Number of channels, Advantages and Disadvantages, Applications	1	09-10-2017			
53.	Time Division Multiple Access: Principle of operation, Number of channels, Frame structure, Efficiency, Advantages and Disadvantages, Applications	1	10-10-2017			
54.	Code Division Multiple Access Principle of operation, Types of codes used in CDMA, Advantages and Disadvantages, Handoffs in CDMA, Near-far Problem, Call processing in CDMA Mobile Phones	1	11-10-2017			
55.	Space Division Multiple Access: Principle of operation and Advantages	1	16-10-2017			
56.	Comparison of performances of multiple access techniques SDMA,TDMA,FDMA,CDMA	1	17-10-17			
57.	Tutorial-10	1	21-10-17			
58.	Global System for Mobile: Important features of GSM, advantages of GSM over analog system, architecture of GSM	2	22-10-2017			
59.	Different subsystems of the GSM, Layer modelling of GSM, frame structure of GSM, GSM Channels and Channel Modes, Tele services, Data services, supplementary services	2	24-10-2017			

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	of GSM, concepts related to Multiple acess scheme of GSM, operation of GSM					
60.	**B2GSystems-**General Packet Radio Service; GPRS network structure, Layers, GPRS mobiles, GPRS coding, GPRS physical channel, Channel allocation, Logical channels, GPRS operation	1	25-10-2017 28-10-2017			
61.	**3G Systems-**Universal Mobile Telecommunications System; Wideband CDMA; CDMA 2000	1	30-10-2017			
62.	Tutorial-11	1	31-10-2017			
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
63.	5G systems	1	01-11-2017			
64.	Applications	1	04-11-2017			

Teaching Learning Methods

TLM1	Chalk and Talk	**TLM 4**	Problem Solving	**TLM7**	Seminars or GD
TLM 2	PPT	**TLM 5**	Programming	**TLM8**	Lab Demo
TLM 3	Tutorial	**TLM 6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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 Y.S.V.Raman   Dr Y.S.V.Raman   G.L.N.Murthy   Prof.B.Ramesh Reddy

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

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

COURSE HANDOUT

PROGRAM   : **B.Tech., VII-Sem., ECE – A section**

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : Computer Networks - S 168

L-T-P STRUCTURE   : 3-1-0

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : **Dr A. Narendra Babu**

COURSE COORDINATOR   : Dr A. Narendra Babu

COURSE OBJECTIVE: This course is to provide students with an overview of network hardware and software for different computer networks, design issues and protocols at data link layer, network layer, transport layer and application layer of OSI/TCP/IP reference models, routing, congestion control, flow control algorithms and Domain Name System to design secure computer networks.

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 need of network hardware and software for different computer networks	2												3		
2	Solve design issues and implement protocols at data link layer	2		3	3									3		
3	Realize routing and congestion control algorithms at network layer	2		3	3									3		
4	Identify services and implement TCP/UDP protocols at transport layer	2		3	3									3		
5	Build secure computer network with various protocols			3	3				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   Andrews S. Tanenbaum, "Computer Networks", Fourth Edition, PHI, 2002.
BOS APPROVED REFERENCE BOOKS:

1. William Stallings, " Data and Computer Communications", seventh Edition, Pearson Education
2. Behrouz A Fourouzan, "TCP/IP Protocol Suite", Fouth Edition, Tata-McGraw Hill.
3. James F. Kurose, Keith W.Ross,"Computer Networking –A Top-Down Approach featuring the Internet", Pearson Education

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Introduction

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
123.	Introduction	1	27-06-17			
124.	Use of Computer Networks	1	28-06-17			
125.	Network Hardware LAN, WAN, MAN	1	30-06-17			
126.	Network software-protocols, layer issues	1	01-07-17			
127.	connection oriented and connection less services, Service primitives and protocols	1	11-07-17			
128.	Tutorial	1	12-07-17			
129.	Reference models-OSI, TCP/IP, Comparison between OSI and TCP/IP	1	14-07-17			
130.	Example Networks, ARPANET, X.25	1	15-07-17			
131.	ATM, ETHERNET WIRLESS LAN	1	18-07-17			
132.	Network Standardization	1	19-07-17			
133.	Physical Layer- Theoretical basis for Data communications	1	21-07-17			
134.	Guided transmission Media	1	22-07-17			
135.	Tutorial	1	25-07-17			
Number of Classes required to complete UNIT-I		13				

UNIT-II : Data Link Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
136.	Design Issues	1	26-07-17			
137.	Framing, Error Detection and Correction, CRC	1	28-07-17			

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
138.	Elementary Data protocols, simplex, Stop & wait	1	29-07-17			
139.	Sliding window, one bit, go-back -n, Selective repeat protocols	1	01-08-17			
140.	Medium Access control sub layer, channel allocation problem	1	02-08-17			
141.	Multiple Access protocols-ALOHA, CSMA protocols	1	04-08-17			
142.	Tutorial	1	05-08-17			
143.	Token bus, token ring, Ethernet, collision free protocols	1	08-08-17			
144.	Data link Layer switching, bridges, Bridge learning algorithms	1	09-08-17			
145.	Bridges from 802.x to 802.y	1	11-08-17			
146.	Local networking, spanning Tree bridges , Remote Bridges	1	16-08-17			
147.	Tutorial	1	18-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III : Network Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
148.	Network Layer Design Issues	1	19-08-17			
149.	Routing algorithms- Shortest Path	1	29-08-17			
150.	Flooding, Distance vector routing	1	30-08-17			
151.	Link state routing, Hierarchical routing	1	01-09-17			
152.	Board cast routing & Multicast Routing	1	05-09-17			
153.	ICMP, ARP, RARP, BOOTP, DHCP	1	06-09-17			
154.	Tutorial	1	08-09-17			
155.	Congestion control algorithms-Leaky Bucket, Token Bucket	1	12-09-17			
156.	Quality of service	1	13-09-17			
157.	Internetworking	1	15-09-17			
158.	Network layer in the internet	1	16-09-17			
159.	Tutorial	1	19-09-17			
No. of classes required to complete UNIT-III		12	No. of classes taken:			

UNIT-IV : Transport Layer

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

		Required	Completion	Completion	Methods	Weekly
160.	Transport Service	1	20-09-17			
161.	Elements of transport protocols -I	1	22-09-17			
162.	Elements of transport protocols -II	1	23-09-17			
163.	Congestion Control	1	26-09-17			
164.	Tutorial	1	27-09-17			
165.	Internet transport protocols: TCP-I	1	29-09-17			
166.	Internet transport protocols: TCP-II	1	03-10-17			
167.	Internet transport protocols: UDP-I	1	04-10-17			
168.	Internet transport protocols: UDP-II	1	06-10-17			
169.	Flow control-Segments	1	07-10-17			
170.	TCP Timers	1	11-10-17			
171.	Tutorial	1	13-10-17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Application Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
172.	Domain Name System	1	17-10-17			
173.	Electronic Mail	1	20-10-17			
174.	The world wide web	1	21-10-17			
175.	Tutorial	1	24-10-17			
176.	Network Security	1	25-10-17			
177.	Cryptography	1	27-10-17			
178.	Symmetric Key Algorithms -DES	1	28-10-17			
179.	Public Key Algorithms - RSA	1	31-10-17			
180.	Communication Security -I	1	01-11-17			
181.	Communication Security-II	1	03-11-17			
182.	Tutorial	1	04-11-17			
No. of classes required to complete UNIT-V		11	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
183.	Authentication Protocols	1	7-11-17			
184.	Web Security	1	8-11-17			

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	27-06-17	19-08-17	7 W
I Mid Examinations	21-08-17	26-08-17	1 W
II Phase of Instructions	28-08-17	04-11-17	9 W
II Mid Examinations	06-11-17	11-11-17	1 W
Preparation and Practicals	13-11-17	22-11-17	2 W
Semester End Examinations	23-11-17	04-12-17	2 W

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. Y. Amar Babu	Dr. A. Narendra Babu	Mr.G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module 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., VII-Sem., ECE – B section

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE : Computer Networks - S 168

L-T-P STRUCTURE   : 3-1-0

COURSE CREDITS   : 3

COURSE INSTRUCTOR : Mr Y. AMAR BABU

COURSE COORDINATOR : Dr A. Narendra Babu

COURSE OBJECTIVE: This course provides an overview of network hardware and software for different computer networks. It also gives knowledge about the design issues and protocols of data link layer, network layer, transport layer and application layer of OSI/TCP/IP reference models. The course also introduces routing, congestion control, flow control algorithms and Domain Name System to design secure computer networks.

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 need of network hardware and software for different computer networks	2												3		
2	Solve design issues and implement protocols at data link layer	2		3	3									3		
3	Realize routing and congestion control algorithms at network layer	2		3	3									3		
4	Classify services and implement TCP/UDP protocols at transport layer	2		3	3									3		
5	Design secure computer network with various protocols			3	3				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   Andrews S. Tanenbaum, "Computer Networks", Fourth Edition, PHI, 2002.
BOS APPROVED REFERENCE BOOKS:

1   William Stallings, " Data and Computer Communications", seventh Edition, Pearson Education
2   Behrouz A Fourouzan, "TCP/IP Protocol Suite", Fouth Edition, Tata-McGraw Hill.
3   James F. Kurose, Keith W.Ross,"Computer Networking –A Top-Down Approach featuring the Internet", Pearson Education

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Introduction

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	27-06-17			
2.	Use of Computer Networks	1	28-06-17			
3.	Network Hardware LAN, WAN, MAN	1	30-06-17			
4.	Network software-protocols, layer issues	1	01-07-17			
5.	connection oriented and connection less services, Service primitives and protocols	1	11-07-17			
6.	Tutorial	1	12-07-17			
7.	Reference models-OSI, TCP/IP, Comparison between OSI and TCP/IP	1	14-07-17			
8.	Example Networks, ARPANET, X.25, Frame Relay	1	15-07-17			
9.	ATM, ETHERNET, WIRLESS LAN	1	18-07-17			
10.	Network Standardization	1	19-07-17			
11.	Physical Layer- Theoretical basis for Data communications	1	21-07-17			
12.	Guided transmission Media	1	22-07-17			
13.	Tutorial	1	25-07-17			
Number of Classes required to complete UNIT-I		13				

UNIT-II : Data Link Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Design Issues	1	26-07-17			
15.	Framing, Error Detection and Correction, CRC	1	28-07-17			

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.	Elementary Data protocols, simplex, Stop & wait	1	29-07-17			
17.	Sliding window, one bit, go-back - n, Selective repeat protocols	1	1-08-17			
18.	Medium Access control sub layer, channel allocation problem	1	2-08-17			
19.	Multiple Access protocols- ALOHA, CSMA protocols	1	4-08-17			
20.	Tutorial	1	5-08-17			
21.	Token bus, token ring, Ethernet, collision free protocols	1	8-08-17			
22.	Data link Layer switching, bridges, Bridge learning algorithms	1	9-08-17			
23.	Bridges from 802.x to 802.y	1	11-08-17			
24.	Local networking, spanning Tree bridges , Remote Bridges	1	16-08-17			
25.	Tutorial	1	18-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III : Network Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Network Layer Design Issues	1	19-08-17			
27.	Routing algorithms- Shortest Path	1	29-08-17			
28.	Flooding, Distance vector routing	1	30-08-17			
29.	Link state routing, Hierarchical routing	1	1-09-17			
30.	Board cast routing & Multicast Routing	1	5-09-17			
31.	ICMP, ARP, RARP, BOOTP, DHCP	1	6-09-17			
32.	Tutorial	1	8-09-17			
33.	Congestion control algorithms-Leaky Bucket, Token Bucket	1	12-09-17			
34.	Quality of service	1	13-09-17			
35.	Internetworking	1	15-09-17			
36.	Network layer in the internet	1	16-09-17			
37.	Tutorial	1	19-09-17			
No. of classes required to complete UNIT-III		12	No. of classes taken:			

UNIT-IV : Transport Layer

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

		Required	Completion	Completion	Methods	Weekly
38.	Transport Service	1	20-09-17			
39.	Elements of transport protocols -I	1	22-09-17			
40.	Elements of transport protocols -II	1	23-09-17			
41.	Congestion Control	1	26-09-17			
42.	Tutorial	1	27-09-17			
43.	Internet transport protocols: TCP-I	1	29-09-17			
44.	Internet transport protocols: TCP-II	1	3-10-17			
45.	Internet transport protocols: UDP-I	1	4-10-17			
46.	Internet transport protocols: UDP-II	1	6-10-17			
47.	Flow control-Segments	1	7-10-17			
48.	TCP Timers	1	11-10-17			
49.	Tutorial	1	13-10-17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Application Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50.	Domain Name System	1	17-10-17			
51.	Electronic Mail	1	20-10-17			
52.	The world wide web	1	21-10-17			
53.	Tutorial	1	24-10-17			
54.	Network Security	1	25-10-17			
55.	Cryptography	1	27-10-17			
56.	Symmetric Key Algorithms -DES	1	28-10-17			
57.	Public Key Algorithms - RSA	1	31-10-17			
58.	Communication Security -I	1	1-11-17			
59.	Communication Security-II	1	3-11-17			
60.	Tutorial	1	4-11-17			
No. of classes required to complete UNIT-V		11	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
61.	Authentication Protocols	1	7-11-17			
62.	Web Security	1	8-11-17			

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	27-06-17	19-08-17	7 W
I Mid Examinations	21-08-17	26-08-17	1 W
II Phase of Instructions	28-08-17	04-11-17	9 W
II Mid Examinations	06-11-17	11-11-17	1 W
Preparation and Practicals	13-11-17	22-11-17	2 W
Semester End Examinations	23-11-17	04-12-17	2 W

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. Y. Amar Babu	Dr. A. Narendra Babu	Mr.G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

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

COURSE HANDOUT

PROGRAM   : **B.Tech., VII-Sem., ECE – C section**

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : Computer Networks - S 168

L-T-P STRUCTURE   : 3-1-0

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : **Dr A. Narendra Babu**

COURSE COORDINATOR   : Dr A. Narendra Babu

COURSE OBJECTIVE: This course is to provide students with an overview of network hardware and software for different computer networks, design issues and protocols at data link layer, network layer, transport layer and application layer of OSI/TCP/IP reference models, routing, congestion control, flow control algorithms and Domain Name System to design secure computer networks.

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 need of network hardware and software for different computer networks	2												3		
2	Solve design issues and implement protocols at data link layer	2		3	3									3		
3	Realize routing and congestion control algorithms at network layer	2		3	3									3		
4	Identify services and implement TCP/UDP protocols at transport layer	2		3	3									3		
5	Build secure computer network with various protocols			3	3				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   Andrews S. Tanenbaum, "Computer Networks", Fourth Edition, PHI, 2002.
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2 Behrouz A Fourouzan, "TCP/IP Protocol Suite", Fouth Edition, Tata-McGraw Hill.

3 James F. Kurose, Keith W.Ross,"Computer Networking –A Top-Down Approach featuring the Internet", Pearson Education

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Introduction

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	27-06-17			
2.	Use of Computer Networks	1	28-06-17			
3.	Network Hardware LAN, WAN, MAN	1	30-06-17			
4.	Network software-protocols, layer issues	1	01-07-17			
5.	connection oriented and connection less services, Service primitives and protocols	1	11-07-17			
6.	Tutorial	1	12-07-17			
7.	Reference models-OSI, TCP/IP, Comparison between OSI and TCP/IP	1	14-07-17			
8.	Example Networks, ARPANET, X.25	1	15-07-17			
9.	ATM, ETHERNET WIRLESS LAN	1	18-07-17			
10.	Network Standardization	1	19-07-17			
11.	Physical Layer- Theoretical basis for Data communications	1	21-07-17			
12.	Guided transmission Media	1	22-07-17			
13.	Tutorial	1	25-07-17			
Number of Classes required to complete UNIT-I		13				

UNIT-II : Data Link Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	Design Issues	1	26-07-17			
15.	Framing, Error Detection and Correction, CRC	1	28-07-17			

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.	Elementary Data protocols, simplex, Stop & wait	1	29-07-17			
17.	Sliding window, one bit, go-back -n, Selective repeat protocols	1	01-08-17			
18.	Medium Access control sub layer, channel allocation problem	1	02-08-17			
19.	Multiple Access protocols- ALOHA, CSMA protocols	1	04-08-17			
20.	Tutorial	1	05-08-17			
21.	Token bus, token ring, Ethernet, collision free protocols	1	08-08-17			
22.	Data link Layer switching, bridges, Bridge learning algorithms	1	09-08-17			
23.	Bridges from 802.x to 802.y	1	11-08-17			
24.	Local networking, spanning Tree bridges , Remote Bridges	1	16-08-17			
25.	Tutorial	1	18-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III : Network Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
26.	Network Layer Design Issues	1	19-08-17			
27.	Routing algorithms- Shortest Path	1	29-08-17			
28.	Flooding, Distance vector routing	1	30-08-17			
29.	Link state routing, Hierarchical routing	1	01-09-17			
30.	Board cast routing & Multicast Routing	1	05-09-17			
31.	ICMP, ARP, RARP, BOOTP, DHCP	1	06-09-17			
32.	Tutorial	1	08-09-17			
33.	Congestion control algorithms-Leaky Bucket, Token Bucket	1	12-09-17			
34.	Quality of service	1	13-09-17			
35.	Internetworking	1	15-09-17			
36.	Network layer in the internet	1	16-09-17			
37.	Tutorial	1	19-09-17			
No. of classes required to complete UNIT-III		12	No. of classes taken:			

UNIT-IV : Transport Layer

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

		Required	Completion	Completion	Methods	Weekly
38.	Transport Service	1	20-09-17			
39.	Elements of transport protocols -I	1	22-09-17			
40.	Elements of transport protocols -II	1	23-09-17			
41.	Congestion Control	1	26-09-17			
42.	Tutorial	1	27-09-17			
43.	Internet transport protocols: TCP-I	1	29-09-17			
44.	Internet transport protocols: TCP-II	1	03-10-17			
45.	Internet transport protocols: UDP-I	1	04-10-17			
46.	Internet transport protocols: UDP-II	1	06-10-17			
47.	Flow control-Segments	1	07-10-17			
48.	TCP Timers	1	11-10-17			
49.	Tutorial	1	13-10-17			
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Application Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50.	Domain Name System	1	17-10-17			
51.	Electronic Mail	1	20-10-17			
52.	The world wide web	1	21-10-17			
53.	Tutorial	1	24-10-17			
54.	Network Security	1	25-10-17			
55.	Cryptography	1	27-10-17			
56.	Symmetric Key Algorithms -DES	1	28-10-17			
57.	Public Key Algorithms - RSA	1	31-10-17			
58.	Communication Security -I	1	01-11-17			
59.	Communication Security-II	1	03-11-17			
60.	Tutorial	1	04-11-17			
No. of classes required to complete UNIT-V		11	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
61.	Authentication Protocols	1	7-11-17			
62.	Web Security	1	8-11-17			

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	27-06-17	19-08-17	7 W
I Mid Examinations	21-08-17	26-08-17	1 W
II Phase of Instructions	28-08-17	04-11-17	9 W
II Mid Examinations	06-11-17	11-11-17	1 W
Preparation and Practicals	13-11-17	22-11-17	2 W
Semester End Examinations	23-11-17	04-12-17	2 W

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. Y. Amar Babu	Dr. A. Narendra Babu	Mr.G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coordinator**	**BOS Chairman&HOD**

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

COURSE HANDOUT

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

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : DIGITAL SIGNAL PROCESSORS - S193

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

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : V.V.Rama Krishna, Associate Professor

COURSE COORDINATOR   : T.Anil Raju, Associate Professor

COURSE OBJECTIVE: In this course, students are able to learn various Digital Signal Processors and implement algorithms of filters and FFT

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	Gain knowledge in basics of digital signal processor design issues.	1	2										2	1	2	1
2	Analyze fixed and floating point digital signal processors.		1	2										2	3	1
3	Realize FIR and IIR algorithms using digital signal processors		2	1										2	3	1
4	Implement FFT algorithms using digital signal processors.		2	1										2	3	1
5	Understand interfacing and programming of digital signal processors.	1		2										2	3	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   Sen M.Kuo and Woon-Seng S.Gan, "Digital Signal Processors Architectures, Implementations and Applications", Pearson education Publishers, 1st Edition, 2004.
2   Avatar Singh and S. Srinivasan, Digital Signal Processing, Thomson Publications, 2004.

BOS APPROVED REFERENCE BOOKS:
1   B.Venkata Ramani and M.Bhaskar, Digital Signal Processors, Architecture,

Programming and Applications, Tata MC GrawHill Publishers.

2 Phil Lapsley, Jeff Bier, Amit Shoham, Edward Lee, "DSP Processor Fundamentals, Architectures and Features" ,WILEY-INDIA, 1996.Mobile Cellular Communication by

3 Jonathan Stein, Digital Signal Processing, John Wiley, 2005

LESSON PLAN

Section-UNIT-I: Digital Signals, Introduction to Digital Signal Processing Systems and Implementation Issues

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
185.	Review of Digital signals and operations	1	27-06-17			
186.	Z-transform, LTI Systems	1	29-06-17			
187.	Digital Filters	1	30-06-17			
188.	Discrete Fourier Transform	1	01-07-17			
189.	Fast Fourier Transform	1	04-07-17			
190.	Digital Signal Processing System	1	06-07-17			
191.	Different types of Digital signal Processors (TMS Processors)	1	07-07-17			
192.	DSP Processor architectures	1	11-07-17			
193.	Tutorial-1	1	13-07-17			
194.	Software developments, Hardware issues, System Considerations.	1	14-07-17			
195.	Fixed Point, Floating Point Arithmetic, Finite word length effects in DSP systems	1	15-07-17			
196.	Programming issues	1	18-07-17			
197.	Real time implementation considerations, Hardware interfacing	1	20-07-17			
198.	Dynamic Range and Precision,	1	21-07-17			
199.	DSP Computational errors, A/D Conversion errors	1	22-07-17			
200.	D/A Conversion Errors	1	25-07-17			
201.	Tutorial-2	1	27-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Fixed and Floating Point Digital signal Processors

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

		Required	Completion	Completion	Methods	Weekly
202.	Fixed Point Architecture, Addressing modes ,Instruction set	1	28-07-17			
203.	TMS320C2000 processor	1	29-07-17			
204.	TMS320C54X processor	1	01-08-17			
205.	TMS320C55X processor	1	03-08-17			
206.	TMS320C62X processor	1	04-08-17			
207.	TMS320C64X processor	1	05-08-17			
208.	Tutorial-3	1	08-08-17			
209.	Floating Point Architecture, Addressing modes ,Instruction set	1	10-08-17			
210.	TMS320C3X Processors	1	11-08-17			
211.	TMS320C67X Processors	1	12-08-17			
212.	Tutorial-4		17-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: FIR Filtering and IIR Filtering using Digital Signal Processors

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
213.	Finite-Impulse Response Filters		18-08-17			
214.	Design of FIR Filtering using MAT LAB		19-08-17			
215.	Fixed point & Floating- point Implementations		29-08-17			
216.	Applications		31-08-17			
217.	Tutorial-5		01-09-17			
218.	Infinite-Impulse Response Filters		05-09-17			
219.	Implementations of IIR Filters		07-09-17			
220.	Design of IIR Filters Using MATLAB		08-09-17			
221.	Fixed-Point Implementations		12-09-17			
222.	Floating-Point Implementations		14-09-17			
223.	Applications		15-09-17			
224.	Tutorial-6		16-09-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Fast Fourier Transforms using Digital Signal Processors

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
225.	Introduction to the DFT Algorithms		19-09-17			

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.	Fast Fourier Transform Algorithms		21-09-17			
227.	Analysis and Implementation Using MATLAB and C		22-09-17			
228.	Tutorial-7		23-09-17			
229.	Implementation considerations		26-09-17			
230.	Fixed-Point Implementations		28-09-17			
231.	Floating-Point Implementations,		29-09-17			
232.	Applications		03-10-17			
233.	Tutorial-8		05-10-17			
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Interfacing Memory and I/O Peripherals to Programmable DSP devices and Interfacing Serial converters to Programmable DSP devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
234.	Memory space organization	1	06-10-17			
235.	External bus interfacing signals	1	07-10-17			
236.	Memory interface	1	10-10-17			
237.	Parallel I/O interface	1	12-10-17			
238.	Programmed I/O, Interrupts and I/O	1	13-10-17			
239.	Direct memory access (DMA)	1	17-10-17			
240.	Tutorial-9	1	19-10-17			
241.	Synchronous Serial Interface	1	20-10-17			
242.	Multichannel buffered serial port	1	21-10-17			
243.	McBSP Programming	1	24-10-17			
244.	CODEC interface	1	26-10-17			
245.	Circuit programming		27-10-17			
246.	CODEC-DSP interface example	1	28-10-17			
247.	Tutorial-10		31-10-17			
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
248.	5G systems	1	03-11-17			
249.	Applications	1	04-11-17			

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	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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. Anil Raju	T. Anil Raju	T. Anil Raju	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module Coord**	**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., VII-Sem., ECE-B

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : DIGITAL SIGNAL PROCESSORS - S193

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

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : V.V.Rama Krishna, Associate Professor

COURSE COORDINATOR   : T.Anil Raju, Associate Professor

COURSE OBJECTIVE: In this course, students are able to learn various Digital Signal Processors and implement algorithms of filters and FFT

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	Gain knowledge in basics of digital signal processor design issues.	1	2										2	1	2	1
2	Analyze fixed and floating point digital signal processors.		1	2										2	3	1
3	Realize FIR and IIR algorithms using digital signal processors		2	1										2	3	1
4	Implement FFT algorithms using digital signal processors.		2	1										2	3	1
5	Understand interfacing and programming of digital signal processors.	1		2										2	3	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   Sen M.Kuo and Woon-Seng S.Gan, "Digital Signal Processors Architectures, Implementations and Applications", Pearson education Publishers, 1st Edition, 2004.
2   Avatar Singh and S. Srinivasan, Digital Signal Processing, Thomson Publications, 2004.

BOS APPROVED REFERENCE BOOKS:
1   B.Venkata Ramani and M.Bhaskar, Digital Signal Processors, Architecture,

Programming and Applications, Tata MC GrawHill Publishers.

2   Phil Lapsley, Jeff Bier, Amit Shoham, Edward Lee, "DSP Processor Fundamentals, Architectures and Features" ,WILEY-INDIA, 1996.Mobile Cellular Communication by

3   Jonathan Stein, Digital Signal Processing, John Wiley, 2005

COURSE DELIVERY PLAN (LESSON PLAN): Section-

UNIT-I: Digital Signals, Introduction to Digital Signal Processing Systems and Implementation Issues

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.	Review of Digital signals and operations		28-06-17			
2.	Z-transform, LTI Systems		29-06-17			
3.	Digital Filters		30-06-17			
4.	Discrete Fourier Transform,		03-07-17			
5.	Fast Fourier Transform		05-07-17			
6.	A typical Digital Signal Processing System		06-07-17			
7.	Different types of Digital signal Processors (TMS Processors)		07-07-17			
8.	Digital signal Processor architectures		10-07-17			
9.	Tutorial-1		12-07-17			
10.	Software developments, Hardware issues, System Considerations.		13-07-17			
11.	Fixed Point, Floating Point Arithmetic, Finite word length effects in DSP systems		14-07-17			
12.	Programming issues		17-07-17			
13.	Real time implementation considerations, Hardware interfacing		19-07-17			
14.	Dynamic Range and Precision,		20-07-17			
15.	Sources of error in DSP implementations, A/D Conversion errors		21-07-17			
16.	DSP Computational errors, D/A Conversion Errors		24-07-17			
17.	Tutorial-2		26-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Mobile Radio Propagation

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	TMS320C2000 processor	1	27-07-17			
19.	TMS320C54X processor	1	28-07-17			
20.	TMS320C55X processor	1	31-07-17			
21.	TMS320C62X processor	1	02-08-17			
22.	TMS320C64X processor	1	03-08-17			
23.	Tutorial-3		04-08-17			
24.	TMS320C3X Processors	1	07-08-17			
25.	TMS320C67X Processors	1	09-08-17			
26.	Tutorial-4	1	10-08-17			
27.		1	11-08-17			
28.		1	14-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: FIR Filtering using Digital Signal Processors and IIR Filtering using Digital Signal Processors

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Finite-Impulse Response Filters		28-08-17			
30.	Design of FIR Filtering using MAT LAB		30-08-17			
31.	Fixed point Implementations, Floating-point Implementations		31-08-17			
32.	Applications.		01-09-17			
33.	Tutorial-5					
34.	Infinite-Impulse Response Filters		04-09-17			
35.	Design and Implementation of IIR Filters		06-09-17			
36.	Design of IIR Filters Using MATLAB		07-09-17			
37.	Fixed-Point Implementations		08-09-17			
38.	Floating-Point Implementations, Applications		11-09-17			
39.	Tutorial-6		13-09-17			
40.			14-09-17			

No. of classes required to complete UNIT-III	11	No. of classes taken:

UNIT-IV: Fast Fourier Transforms using Digital Signal Processors

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.	Introduction to the Discrete Fourier Transform Algorithms		15-09-17			
42.	Fast Fourier Transform Algorithms		18-09-17			
43.	Analysis and Implementation Using MATLAB and C		20-09-17			
44.	Tutorial-7		21-09-17			
45.	Implementation considerations, Fixed-Point Implementations,		22-09-17			
46.	Floating-Point Implementations, Applications		25-09-17			
47.	Tutorial-8		27-09-17			
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Interfacing Memory and I/O Peripherals to Programmable DSP devices and Interfacing Serial converters to Programmable DSP devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
48.	Memory space organization	1	28-09-17			
49.	External bus interfacing signals	1	29-09-17			
50.	Memory interface	1	04-10-17			
51.	Parallel I/O interface,	1	05-10-17			
52.	Programmed I/O, Interrupts and I/O	1	06-10-17			
53.	Direct memory access (DMA)	1	09-10-17			
54.	Tutorial-9		11-10-17			
55.	Synchronous Serial Interface	1	12-10-17			
56.	Multichannel buffered serial port (McBSP)	1	13-10-17			
57.	McBSP Programming	1	16-10-17			
58.	CODECinterface circuit, CODEC programming	1	19-10-17			
59.	CODEC-DSP interface example	1	20-10-17			
60.	Tutorial-10		23-10-17			
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
61.	5G systems	1	25-10-17			
62.	Applications	1	26-10-17			

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	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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   T.Anil Raju   T.Anil Raju   Prof.B.Ramesh Reddy

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

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COURSE HANDOUT

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

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE   : DIGITAL SIGNAL PROCESSORS - S193

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

COURSE CREDITS   : 3

COURSE INSTRUCTOR   : V.V.Rama Krishna, Associate Professor

COURSE COORDINATOR   : T.Anil Raju, Associate Professor

COURSE OBJECTIVE: In this course, students are able to learn various Digital Signal Processors and implement algorithms of filters and FFT

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	Gain knowledge in basics of digital signal processor design issues.	1	2										2	1	2	1
2	Analyze fixed and floating point digital signal processors.		1	2										2	3	1
3	Realize FIR and IIR algorithms using digital signal processors		2	1										2	3	1
4	Implement FFT algorithms using digital signal processors.		2	1										2	3	1
5	Understand interfacing and programming of digital signal processors.	1		2										2	3	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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Programming and Applications, Tata MC GrawHill Publishers.

2 Phil Lapsley, Jeff Bier, Amit Shoham, Edward Lee, "DSP Processor Fundamentals, Architectures and Features" ,WILEY-INDIA, 1996.Mobile Cellular Communication by

3 Jonathan Stein, Digital Signal Processing, John Wiley, 2005

COURSE DELIVERY PLAN (LESSON PLAN):
Section-UNIT-I: Digital Signals, Introduction to Digital Signal Processing Systems and   Implementation Issues

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.	Review of Digital signals and operations	1	27-06-17			
2.	Z-transform, LTI Systems	1	29-06-17			
3.	Digital Filters	1	01-07-17			
4.	Discrete Fourier Transform	1	04-07-17			
5.	Fast Fourier Transform	1	05-07-17			
6.	Digital Signal Processing System	1	06-07-17			
7.	Different types of Digital signal Processors (TMS Processors)	1	11-07-17			
8.	DSP Processor architectures	1	12-07-17			
9.	Tutorial-1	1	13-07-17			
10.	Software developments, Hardware issues, System Considerations.	1	15-07-17			
11.	Fixed Point, Floating Point Arithmetic, Finite word length effects in DSP systems	1	18-07-17			
12.	Programming issues	1	19-07-17			
13.	Real time implementation considerations, Hardware interfacing	1	20-07-17			
14.	Dynamic Range and Precision,	1	22-07-17			
15.	DSP Computational errors, A/D Conversion errors	1	25-07-17			
16.	D/A Conversion Errors	1	26-07-17			
17.	Tutorial-2	1	27-07-17			
No. of classes required to complete UNIT-I		17	No. of classes taken:			

UNIT-II: Fixed and Floating Point Digital signal Processors

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Fixed Point Architecture, Addressing modes ,Instruction set	1	29-07-17			
19.	TMS320C2000 processor	1	01-08-17			
20.	TMS320C54X processor	1	02-08-17			
21.	TMS320C55X processor	1	03-08-17			
22.	TMS320C62X processor	1	05-08-17			
23.	TMS320C64X processor	1	08-08-17			
24.	Tutorial-3	1	09-08-17			
25.	Floating Point Architecture, Addressing modes ,Instruction set	1	10-08-17			
26.	TMS320C3X Processors	1	11-08-17			
27.	TMS320C67X Processors	1	16-08-17			
28.	Tutorial-4		19-08-17			
No. of classes required to complete UNIT-II		12	No. of classes taken:			

UNIT-III: FIR Filtering and IIR Filtering using Digital Signal Processors

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Finite-Impulse Response Filters		18-08-17			
30.	Design of FIR Filtering using MAT LAB		19-08-17			
31.	Fixed point & Floating- point Implementations		29-08-17			
32.	Applications		31-08-17			
33.	Tutorial-5		01-09-17			
34.	Infinite-Impulse Response Filters		05-09-17			
35.	Implementations of IIR Filters		07-09-17			
36.	Design of IIR Filters Using MATLAB		08-09-17			
37.	Fixed-Point Implementations		12-09-17			
38.	Floating-Point Implementations		14-09-17			
39.	Applications		15-09-17			
40.	Tutorial-6		16-09-17			
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Fast Fourier Transforms using Digital Signal Processors

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

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.	Introduction to the DFT Algorithms		19-09-17			
42.	Fast Fourier Transform Algorithms		21-09-17			
43.	Analysis and Implementation Using MATLAB and C		22-09-17			
44.	Tutorial-7		23-09-17			
45.	Implementation considerations		26-09-17			
46.	Fixed-Point Implementations		28-09-17			
47.	Floating-Point Implementations,		29-09-17			
48.	Applications		03-10-17			
49.	Tutorial-8		05-10-17			
No. of classes required to complete UNIT-IV		11	No. of classes taken:			

UNIT-V: Interfacing Memory and I/O Peripherals to Programmable DSP devices and Interfacing Serial converters to Programmable DSP devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50.	Memory space organization	1	07-10-17			
51.	External bus interfacing signals	1	10-10-17			
52.	Memory interface	1	11-10-17			
53.	Parallel I/O interface	1	12-10-17			
54.	Programmed I/O, Interrupts and I/O	1	14-10-17			
55.	Direct memory access (DMA)	1	17-10-17			
56.	Tutorial-9	1	18-10-17			
57.	Synchronous Serial Interface	1	19-10-17			
58.	Multichannel buffered serial port	1	21-10-17			
59.	McBSP Programming	1	24-10-17			
60.	CODEC interface circuit programming	1	25-10-17			
61.	circuit programming	1	26-10-17			
62.	CODEC-DSP interface	1	28-10-17			
63.	Interface Example	1	31-10-17			
64.	Tutorial-10	1	01-11-17			
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
65.	5G systems	1	03-11-17			
66.	Applications	1	04-11-17			

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	27-06-2017	19-08-2017	7 W(1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	04-11-2017	9 W(1W CRT)
II Mid Examinations	06-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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. Anil Raju   T. Anil Raju   Prof.B.Ramesh Reddy

  Course Instructor   **Course&ModuleCoordinator**   **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., VII-Sem., ECE-A

ACADEMIC YEAR   : 2017-18

COURSE NAME & CODE : Microwave Engineering - S 314

L-T-P STRUCTURE   : 3-1-0

COURSE CREDITS   : 3

COURSE INSTRUCTOR : V.Ravi Sekhara Reddy, Sr.Asst.Professor

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

COURSE OBJECTIVE : This course provides the knowledge on microwave communication interms of various bands, advantages, applications. The course will give an idea about microwave active and passive devices. The course also gives the complete information regarding microwave bench setup and microwave measurements.

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	Know about the Microwave spectrum and applications of microwaves.	3		1										3		
2	Understand the operation and use of Microwave tubes.	3												3		
3	Understand the applications of semiconductor microwave devices.	3	2											3		
4	Derive the S-parameters of waveguide components	3												3		
5	Use a Microwave bench setup to measure the various microwave parameters.	3		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   Samuel Y. Liao, "Microwave Devices and Circuits", PHI Publishers, 3rdEdition, 2003.

2 David M.Pozar, "Microwave Engineering", John Wiley Publishers,4thEdition, 2012.

BOS APPROVED REFERENCE BOOKS:

1 Peter Rizzi, "Microwave Engineering: Passive Circuits", Prentice-Hall Publishers.

2 G.S.N.Raju,"Microwave Engineering", IK International Publishers, New Delhi.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I : Microwave Tubes-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
250.	Introduction to Subject	1	28.6.17		**TLM1**	
251.	Course Outcomes	1	29.6.17		**TLM1**	
252.	Introduction to UNIT-I	1	30.6.17		**TLM1**	
253.	Definition of Microwave, Microwave frequency bands, Applications of Microwaves	1	1.7.17		**TLM1**	
254.	Limitations and Losses of conventional tubes at microwave frequencies	1	5.7.17		**TLM1**	
255.	TUTORIAL-1	1	6.7.17		**TLM3**	
256.	Microwave tubes-O type and M type classifications	1	7.7.17		**TLM1**	
257.	TUTORIAL-2	1	8.7.17		**TLM3**	
258.	Two Cavity Klystron – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process, Expressions for o/p Power and Efficiency	4	12.7.17 13.7.17 14.7.17 15.7.17		**TLM1**	
259.	TUTORIAL-3	1	19.7.17		**TLM3**	
260.	Reflex Klystron– Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance, Oscillating Modes and o/p Characteristics	4	20.7.17 21.7.17 22.7.17 26.7.17		**TLM1**	
261.	Assignment/Quiz-1	1	27.7.17		**TLM6**	
No. of classes required to complete UNIT-I		18	No. of classes taken:			

UNIT-II : Microwave Tubes-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
262.	Introduction to UNIT-II	1	28.7.17		**TLM1**	
263.	Helix TWT:Significance, Types and Characteristics of Slow Wave Structures	1	29.7.17		**TLM1**	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
264.	Structure of TWT and Amplification Process, Axial Electric Field	2	2.8.17 3.8.17		**TLM1**	
265.	Convection Current, Propagation Constants, Gain Considerations	2	4.8.17 5.8.17		**TLM1**	
266.	TUTORIAL-4	1	9.8.17		**TLM3**	
267.	M-type tubes: Introduction, Cross-field effects, Different Types of Magnetrons	1	10.8.17		**TLM1**	
268.	8-Cavity Cylindrical Travelling Wave Magnetron	1	11.8.17		**TLM1**	
269.	TUTORIAL-5	1	12.8.17		**TLM3**	
270.	Hull Cut-off and Hartee Conditions, Modes of Resonance and PI-Mode Operation	1	16.8.17		**TLM1**	
271.	o/p characteristics, Frequency Pulling and Frequency Pushing, Strapping	1	17.8.17		**TLM1**	
272.	TUTORIAL-6	1	18.8.17		**TLM3**	
273.	Assignment/Quiz-2	1	19.8.17		**TLM6**	
No. of classes required to complete UNIT-II		14	No.of classes taken:			

UNIT-III : Microwave Solid State Devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
274.	Classification, Applications of Microwave Solid State Devices	1	30.8.17		**TLM1**	
275.	Transferred Electron Devices:Introduction	1	31.8.17		**TLM1**	
276.	Gunn Diode – Principle, Two Valley Model Theory, RWH Theory	1	1.9.17		**TLM1**	
277.	TUTORIAL-7	1	6.9.17		**TLM3**	
278.	Characteristics, Modes of Operation	1	7.9.17		**TLM1**	
279.	Avalanche Transit Time Devices: Introduction,	1	8.9.17		**TLM1**	
280.	IMPATT	1	9.9.17		**TLM1**	
281.	TUTORIAL-8	1	13.9.17		**TLM3**	
282.	TRAPATT Diodes – Principle of Operation and Characteristics	1	14.9.17		**TLM1**	
283.	PIN Diode	1	15.9.17		**TLM1**	
284.	Crystal Diode	1	16.9.17		**TLM1**	
285.	Assignment/Quiz-3	1	20.9.17		**TLM6**	
No. of classes required to complete UNIT-III		12	No. of classes taken:			

UNIT-IV : Waveguide Components-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
286.	Introduction to UNIT-IV	1	21.9.17		**TLM1**	
287.	Waveguide Multiport Junctions	1	22.9.17		**TLM1**	
288.	Working principle of E plane Tee and H plane	1	23.9.17		**TLM1**	
289.	TUTORIAL-9	1	27.9.17		**TLM3**	
290.	Magic Tee, Hybrid Ring, Directional Couplers-2 Hole, Bethe Hole types	1	28.9.17		**TLM1**	
291.	Scattering Matrix- S-parameters	1	29.9.17		**TLM1**	
292.	Properties of S Matrix	1	4.10.17		**TLM1**	
293.	TUTORIAL-10	1	5.10.17		**TLM3**	
294.	S Matrix Calculations for E plane Tee and H plane Tee	1	6.10.17		**TLM1**	
295.	Magic Tee	1	7.10.17		**TLM1**	
296.	Directional Coupler	1	11.10.17		**TLM1**	
297.	Assignment/Quiz-4	1	12.10.17		**TLM6**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Waveguide Components-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
298.	Coupling Mechanisms–Probe, Loop, Aperture types	1	13.10.17		**TLM1**	
299.	Waveguide Discontinuities-Waveguide irises, Tuning Screws and Posts, Matched Load	1	14.10.17		**TLM1**	
300.	Waveguide Attenuators – Resistive Card, Rotary Vane types	1	18.10.17		**TLM1**	
301.	Waveguide Phase Shifters – Dielectric, Rotary Vane types	1	20.10.17		**TLM1**	
302.	TUTORIAL-11	1	21.10.17		**TLM3**	
303.	Ferrite Components-Ferrites, Composition and Characteristics of Ferrites, Faraday Rotation	1	25.10.17		**TLM1**	
304.	Principle of Gyrator, Isolator, Circulators	1	26.10.17		**TLM1**	
305.	TUTORIAL-12	1	27.10.17		**TLM3**	
306.	Description of Microwave Bench, different blocks and their features, Precautions, Measurement of Attenuation	1	28.10.17		**TLM8**	
307.	Frequency, VSWR, Cavity Q,	1	1.11.17		**TLM8**	

S.No.		No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Impedance, Power.					
308.	Assignment/Quiz-5	1	2.11.17		**TLM6**	
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
309.	RADAR	1	3.11.17		**TLM1**	
310.	RF Microstrip Passive Devices	1	4.11.17		**TLM1**	

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	27-06-2017	19-08-2017	7 W (1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	4-11-2017	9 W (1W CRT)
II Mid Examinations	6-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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.v.Ravi Sekhara Reddy   Mr.V.Ravi Sekhara Reddy   Mr.G.L.N.Murthy   Prof.B.Ramesh Reddy

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

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COURSE HANDOUT

PROGRAM	: B.Tech., VII-Sem., ECE
ACADEMIC YEAR	: 2017-18
COURSE NAME & CODE	: Microwave Engineering - S 314
L-T-P STRUCTURE	: 3-1-0
COURSE CREDITS	: 3
COURSE INSTRUCTOR	: V.Ravi Sekhara Reddy, Sr.Asst.Professor
COURSE COORDINATOR	: V.Ravi Sekhara Reddy, Sr.Asst.Professor

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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	Know about the Microwave spectrum and applications of microwaves.	3		1										3		
2	Understand the operation and use of Microwave tubes.	3												3		
3	Understand the applications of semiconductor microwave devices.	3	2											3		
4	Derive the S-parameters of waveguide components	3												3		
5	Use a Microwave bench setup to measure the various microwave parameters.	3		1										3		

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
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2 G.S.N.Raju,"Microwave Engineering", IK International Publishers, New Delhi.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I : Microwave Tubes-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
1.	Introduction to Subject	1	28.6.17		**TLM1**	
2.	Course Outcomes	1	29.6.17		**TLM1**	
3.	Introduction to UNIT-I	1	30.6.17		**TLM1**	
4.	Definition of Microwave, Microwave frequency bands, Applications of Microwaves	1	1.7.17		**TLM1**	
5.	Limitations and Losses of conventional tubes at microwave frequencies	1	5.7.17		**TLM1**	
6.	TUTORIAL-1	1	6.7.17		**TLM3**	
7.	Microwave tubes-O type and M type classifications	1	7.7.17		**TLM1**	
8.	TUTORIAL-2	1	8.7.17		**TLM3**	
9.	Two Cavity Klystron – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process, Expressions for o/p Power and Efficiency	4	12.7.17 13.7.17 14.7.17 15.7.17		**TLM1**	
10.	TUTORIAL-3	1	19.7.17		**TLM3**	
11.	Reflex Klystron– Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance, Oscillating Modes and o/p Characteristics	4	20.7.17 21.7.17 22.7.17 26.7.17		**TLM1**	
12.	Assignment/Quiz-1	1	27.7.17		**TLM6**	
No. of classes required to complete UNIT-I		18	No. of classes taken:			

UNIT-II : Microwave Tubes-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
13.	Introduction to UNIT-II	1	28.7.17		**TLM1**	
14.	Helix TWT:Significance, Types and Characteristics of Slow Wave Structures	1	29.7.17		**TLM1**	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Structure of TWT and Amplification Process, Axial Electric Field	2	2.8.17 3.8.17		**TLM1**	
16.	Convection Current, Propagation Constants, Gain Considerations	2	4.8.17 5.8.17		**TLM1**	
17.	TUTORIAL-4	1	9.8.17		**TLM3**	
18.	M-type tubes: Introduction, Cross-field effects, Different Types of Magnetrons	1	10.8.17		**TLM1**	
19.	8-Cavity Cylindrical Travelling Wave Magnetron	1	11.8.17		**TLM1**	
20.	TUTORIAL-5	1	12.8.17		**TLM3**	
21.	Hull Cut-off and Hartee Conditions, Modes of Resonance and PI-Mode Operation	1	16.8.17		**TLM1**	
22.	o/p characteristics, Frequency Pulling and Frequency Pushing, Strapping	1	17.8.17		**TLM1**	
23.	TUTORIAL-6	1	18.8.17		**TLM3**	
24.	Assignment/Quiz-2	1	19.8.17		**TLM6**	
No. of classes required to complete UNIT-II		14	No.of classes taken:			

UNIT-III : Microwave Solid State Devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Classification, Applications of Microwave Solid State Devices	1	30.8.17		**TLM1**	
26.	Transferred Electron Devices:Introduction	1	31.8.17		**TLM1**	
27.	Gunn Diode – Principle, Two Valley Model Theory, RWH Theory	1	1.9.17		**TLM1**	
28.	TUTORIAL-7	1	6.9.17		**TLM3**	
29.	Characteristics, Modes of Operation	1	7.9.17		**TLM1**	
30.	Avalanche Transit Time Devices: Introduction,	1	8.9.17		**TLM1**	
31.	IMPATT	1	9.9.17		**TLM1**	
32.	TUTORIAL-8	1	13.9.17		**TLM3**	
33.	TRAPATT Diodes – Principle of Operation and Characteristics	1	14.9.17		**TLM1**	
34.	PIN Diode	1	15.9.17		**TLM1**	
35.	Crystal Diode	1	16.9.17		**TLM1**	
36.	Assignment/Quiz-3	1	20.9.17		**TLM6**	

No. of classes required to complete UNIT-III	12	No. of classes taken:

UNIT-IV : Waveguide Components-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
37.	Introduction to UNIT-IV	1	21.9.17		**TLM1**	
38.	Waveguide Multiport Junctions	1	22.9.17		**TLM1**	
39.	Working principle of E plane Tee and H plane	1	23.9.17		**TLM1**	
40.	TUTORIAL-9	1	27.9.17		**TLM3**	
41.	Magic Tee, Hybrid Ring, Directional Couplers-2 Hole, Bethe Hole types	1	28.9.17		**TLM1**	
42.	Scattering Matrix- S-parameters	1	29.9.17		**TLM1**	
43.	Properties of S Matrix	1	4.10.17		**TLM1**	
44.	TUTORIAL-10	1	5.10.17		**TLM3**	
45.	S Matrix Calculations for E plane Tee and H plane Tee	1	6.10.17		**TLM1**	
46.	Magic Tee	1	7.10.17		**TLM1**	
47.	Directional Coupler	1	11.10.17		**TLM1**	
48.	Assignment/Quiz-4	1	12.10.17		**TLM6**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Waveguide Components-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
49.	Coupling Mechanisms–Probe, Loop, Aperture types	1	13.10.17		**TLM1**	
50.	Waveguide Discontinuities-Waveguide irises, Tuning Screws and Posts, Matched Load	1	14.10.17		**TLM1**	
51.	Waveguide Attenuators – Resistive Card, Rotary Vane types	1	18.10.17		**TLM1**	
52.	Waveguide Phase Shifters – Dielectric, Rotary Vane types	1	20.10.17		**TLM1**	
53.	TUTORIAL-11	1	21.10.17		**TLM3**	
54.	Ferrite Components-Ferrites, Composition and Characteristics of Ferrites, Faraday Rotation	1	25.10.17		**TLM1**	
55.	Principle of Gyrator, Isolator, Circulators	1	26.10.17		**TLM1**	
56.	TUTORIAL-12	1	27.10.17		**TLM3**	
57.	Description of Microwave Bench, different blocks and their features, Precautions, Measurement of	1	28.10.17		**TLM8**	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Attenuation					
58.	Frequency, VSWR, Cavity Q, Impedance, Power.	1	1.11.17		**TLM8**	
59.	Assignment/Quiz-5	1	2.11.17		**TLM6**	
No. of classes required to complete UNIT-V		13	No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
60.	RADAR	1	3.11.17		**TLM1**	
61.	RF Microstrip Passive Devices	1	4.11.17		**TLM1**	

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	27-06-2017	19-08-2017	7 W (1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	4-11-2017	9 W (1W CRT)
II Mid Examinations	6-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	1 1/2 W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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.v.Ravi Sekhara Reddy   Mr.V.Ravi Sekhara Reddy   Mr.G.L.N.Murthy   Prof.B.Ramesh Reddy

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COURSE HANDOUT

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

ACADEMIC YEAR : 2017-18

COURSE NAME & CODE : Microwave Engineering - S 314

L-T-P STRUCTURE : 3-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : P.Rakesh Kumar, Sr.Asst.Professor

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

COURSE OBJECTIVE : This course provides the knowledge on microwave communication interms of various bands, advantages, applications. The course will give an idea about microwave active and passive devices. The course also gives the complete information regarding microwave bench setup and microwave measurements.

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	Know about the Microwave spectrum and applications of microwaves.	3		1										3		
2	Understand the operation and use of Microwave tubes.	3												3		
3	Understand the applications of semiconductor microwave devices.	3	2											3		
4	Derive the S-parameters of waveguide components	3												3		
5	Use a Microwave bench setup to measure the various microwave parameters.	3		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   Samuel Y. Liao, "Microwave Devices and Circuits", PHI Publishers, 3rdEdition, 2003.

2 David M.Pozar, "Microwave Engineering", John Wiley Publishers,4thEdition, 2012.

BOS APPROVED REFERENCE BOOKS:

1 Peter Rizzi, "Microwave Engineering: Passive Circuits", Prentice-Hall Publishers.

2 G.S.N.Raju,"Microwave Engineering", IK International Publishers, New Delhi.

COURSE DELIVERY PLAN (LESSON PLAN): Section-C

UNIT-I : Microwave Tubes-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
1.	Introduction to Subject	1	28.6.17		**TLM1**	
2.	Course Outcomes	1	29.6.17		**TLM1**	
3.	Introduction to UNIT-I	1	30.6.17		**TLM1**	
4.	Definition of Microwave, Microwave frequency bands, Applications of Microwaves	1	1.7.17		**TLM1**	
5.	Limitations and Losses of conventional tubes at microwave frequencies	1	5.7.17		**TLM1**	
6.	TUTORIAL-1	1	6.7.17		**TLM3**	
7.	Microwave tubes-O type and M type classifications	1	7.7.17		**TLM1**	
8.	TUTORIAL-2	1	8.7.17		**TLM3**	
9.	Two Cavity Klystron – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process, Expressions for o/p Power and Efficiency	4	12.7.17 13.7.17 14.7.17 15.7.17		**TLM1**	
10.	TUTORIAL-3	1	19.7.17		**TLM3**	
11.	Reflex Klystron– Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance, Oscillating Modes and o/p Characteristics	4	20.7.17 21.7.17 22.7.17 26.7.17		**TLM1**	
12.	Assignment/Quiz-1	1	27.7.17		**TLM6**	
No. of classes required to complete UNIT-I		18	No. of classes taken:			

UNIT-II : Microwave Tubes-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
13.	Introduction to UNIT-II	1	28.7.17		**TLM1**	
14.	Helix TWT:Significance, Types and Characteristics of Slow Wave Structures	1	29.7.17		**TLM1**	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Structure of TWT and Amplification Process, Axial Electric Field	2	2.8.17 3.8.17		**TLM1**	
16.	Convection Current, Propagation Constants, Gain Considerations	2	4.8.17 5.8.17		**TLM1**	
17.	TUTORIAL-4	1	9.8.17		**TLM3**	
18.	M-type tubes: Introduction, Cross-field effects, Different Types of Magnetrons	1	10.8.17		**TLM1**	
19.	8-Cavity Cylindrical Travelling Wave Magnetron	1	11.8.17		**TLM1**	
20.	TUTORIAL-5	1	12.8.17		**TLM3**	
21.	Hull Cut-off and Hartee Conditions, Modes of Resonance and PI-Mode Operation	1	16.8.17		**TLM1**	
22.	o/p characteristics, Frequency Pulling and Frequency Pushing, Strapping	1	17.8.17		**TLM1**	
23.	TUTORIAL-6	1	18.8.17		**TLM3**	
24.	Assignment/Quiz-2	1	19.8.17		**TLM6**	
No. of classes required to complete UNIT-II		14	No.of classes taken:			

UNIT-III : Microwave Solid State Devices

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Classification, Applications of Microwave Solid State Devices	1	30.8.17		**TLM1**	
26.	Transferred Electron Devices:Introduction	1	31.8.17		**TLM1**	
27.	Gunn Diode – Principle, Two Valley Model Theory, RWH Theory	1	1.9.17		**TLM1**	
28.	TUTORIAL-7	1	6.9.17		**TLM3**	
29.	Characteristics, Modes of Operation	1	7.9.17		**TLM1**	
30.	Avalanche Transit Time Devices: Introduction,	1	8.9.17		**TLM1**	
31.	IMPATT	1	9.9.17		**TLM1**	
32.	TUTORIAL-8	1	13.9.17		**TLM3**	
33.	TRAPATT Diodes – Principle of Operation and Characteristics	1	14.9.17		**TLM1**	
34.	PIN Diode	1	15.9.17		**TLM1**	
35.	Crystal Diode	1	16.9.17		**TLM1**	
36.	Assignment/Quiz-3	1	20.9.17		**TLM6**	

No. of classes required to complete UNIT-III	12	No. of classes taken:

UNIT-IV : Waveguide Components-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
37.	Introduction to UNIT-IV	1	21.9.17		**TLM1**	
38.	Waveguide Multiport Junctions	1	22.9.17		**TLM1**	
39.	Working principle of E plane Tee and H plane	1	23.9.17		**TLM1**	
40.	TUTORIAL-9	1	27.9.17		**TLM3**	
41.	Magic Tee, Hybrid Ring, Directional Couplers-2 Hole, Bethe Hole types	1	28.9.17		**TLM1**	
42.	Scattering Matrix- S-parameters	1	29.9.17		**TLM1**	
43.	Properties of S Matrix	1	4.10.17		**TLM1**	
44.	TUTORIAL-10	1	5.10.17		**TLM3**	
45.	S Matrix Calculations for E plane Tee and H plane Tee	1	6.10.17		**TLM1**	
46.	Magic Tee	1	7.10.17		**TLM1**	
47.	Directional Coupler	1	11.10.17		**TLM1**	
48.	Assignment/Quiz-4	1	12.10.17		**TLM6**	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V : Waveguide Components-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
49.	Coupling Mechanisms–Probe, Loop, Aperture types	1	13.10.17		**TLM1**	
50.	Waveguide Discontinuities-Waveguide irises, Tuning Screws and Posts, Matched Load	1	14.10.17		**TLM1**	
51.	Waveguide Attenuators – Resistive Card, Rotary Vane types	1	18.10.17		**TLM1**	
52.	Waveguide Phase Shifters – Dielectric, Rotary Vane types	1	20.10.17		**TLM1**	
53.	TUTORIAL-11	1	21.10.17		**TLM3**	
54.	Ferrite Components-Ferrites, Composition and Characteristics of Ferrites, Faraday Rotation	1	25.10.17		**TLM1**	
55.	Principle of Gyrator, Isolator, Circulators	1	26.10.17		**TLM1**	
56.	TUTORIAL-12	1	27.10.17		**TLM3**	
57.	Description of Microwave Bench, different blocks and their features, Precautions, Measurement of	1	28.10.17		**TLM8**	

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	Attenuation					
58.	Frequency, VSWR, Cavity Q, Impedance, Power.	1	1.11.17		**TLM8**	
59.	Assignment/Quiz-5	1	2.11.17		**TLM6**	
No. of classes required to complete UNIT-V		13	No. of classes taken:			

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
60.	RADAR	1	3.11.17		**TLM1**	
61.	RF Microstrip Passive Devices	1	4.11.17		**TLM1**	

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	27-06-2017	19-08-2017	7 W (1W CRT)
I Mid Examinations	21-08-2017	26-08-2017	1 W
II Phase of Instructions	28-08-2017	4-11-2017	9 W (1W CRT)
II Mid Examinations	6-11-2017	11-11-2017	1 W
Preparation and Practicals	13-11-2017	22-11-2017	$1\frac{1}{2}$ W
Semester End Examinations	23-11-2017	04-12-2017	2 W

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.P.Rakesh Kumar	Mr.V.Ravi Sekhara Reddy	Mr.G.L.N.Murthy	Prof.B.Ramesh Reddy
Course Instructor	**Course Coordinator**	**Module 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., VII-Sem., ECE-A
ACADEMIC YEAR   **:** 2017-18
COURSE NAME & CODE   **:** Industrial Management(S270)
L-T-P STRUCTURE   **:** 4-1-0
COURSE CREDITS   **:** 3
COURSE INSTRUCTOR   **:** Mr. P. SIVA REDDY
COURSE COORDINATOR **:** Mr. U.Rambabu

Course Educational Objectives:

1. To make students understand management, its principles, contribution to management, organization, and its basic issues and types
2. To make students the concept of plant location and its factors and plant layout and types, method of production and work study importance
3. To make students understand quality control uses and material management techniques
4. To make understand the concept of HRM and its functions
5. To make students understand PERT & CPM methods in effective project management and need of project crashing and its consequence on cost of project

Course Outcomes: After the completion of the course, students should be able to

CO1: Apply management principles to the particle situations to be in a position to know which type of business organization structure suits

CO2: Able to make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilization input factors by designing the better working methods and with better work study techniques.

CO3: Able to improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory

CO4: Able to manage people in working environment with the practices of HRM across corporate businesses.

CO5: Able to use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises.

COURSE ARTICULATION MATRIX (Correlation between Cos &POs, PSOs)

Mapping CO with PO

		1	2	3	4	5	6	7	8	9	10	11	12
COs	CO1								3	1			2
	CO2												2
	CO3												2
	CO4										2	1	2
	CO5											1	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).

Resources Used:

Text Book:

Management Science, TMH, Dr. Aryasri, 4th edition, 2009

References:
1. Kooniz and Waihrich- Essentials of Management, TMH, 8th edition, 2010
2. O.P.Khana, Industrial Engineering and Management.

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Over view of Industrial Management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
311.	Over view of industrial management	1	27-06-2017		**TLM1**	
312.	Management Introduction and Definition,	1	29-06-2017		**TLM1**	
313.	Nature Importance of management	1	30-06-2017		**TLM1**	
314.	Functions	1	03-07-2017		**TLM1**	
315.	Taylor's scientific management theory	1	04-07-2017		**TLM1**	
316.	Fayal's principles of management	1	06-07-2017		**TLM1**	
317.	Contribution of Elton mayo	1	07-07-2017		**TLM1**	
318.	MASLOW theory	1	10-07-2017		**TLM1**	
319.	Tutorials and Herzberg theory of motivation	1	11-07-2017		**TLM1**	
320.	Douglas MC Gregor theory of motivation	1	13-07-2017		**TLM1**	
321.	basic concepts of Organization Basic concept	1	14-07-2017		**TLM1**	
322.	Authority and responsibility and Delegation of Authority and responsibility	1	17-07-2017		**TLM1**	
323.	Span of control	1	18-07-2017		**TLM1**	
324.	Departmentation and Decentralization	1	20-07-2017		**TLM1**	
325.	Orgn.structure :line organization structure	1	21-07-2017		**TLM1**	
326.	Line and staff organization &tutorial	1	24-07-2017		**TLM1**	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
327.	Functional organization organization	1	25-07-2017		**TLM1**	
328.	Committee and Matrix	1	27-07-2017		**TLM1**	
No. of classes required to complete UNIT-I		18	No. of classes taken:			

UNIT II Operations Management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
329.	**UNIT II Operations Management**	1	28-07-2017		**TLM1**	
330.	Plant location ,Factors influencing location	1	31-07-2017		**TLM1**	
331.	Principles and types of plant layouts	1	01-08-2017		**TLM1**	
332.	Methods of production : job batch and mass production	1	03-08-2017		**TLM1**	
333.	Work study	1	04-08-2017		**TLM1**	
334.	Basic procedure involved in method study	1	07-08-2017		**TLM1**	
335.	Work measurement Objectives and Importance	1	08-08-2017		**TLM1**	
336.	Basic procedure involved in work measurement	1	10-08-2017		**TLM1**	
337.	Problems on time study	1	11-08-2017		**TLM1**	
No. of classes required to complete UNIT-II		09	No. of classes taken:			

UNIT-III :Quality and materials management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
338.	**UNIT III quality and materials management**	1	11-08-2017		**TLM1**	
339.	Statistical quality control Meaning	1	14-08-2017		**TLM1**	
340.	Variables and attributes	1	17-08-2017		**TLM1**	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
341.	X chart problems and R Chart problems	1	18-08-2017		**TLM1**	
342.	**I MID EXAM**	1	21-08-2017			
343.	**I MID EXAM**	1	22-08-2017			
344.	**I MID EXAM**	1	24-08-2017			
345.	**I MID EXAM**	1	28-08-2017			
346.	C Chart problems AND P Chart problems	1	29-08-2017		**TLM1**	
347.	Acceptance sampling & Sampling plans	1	31-08-2017		**TLM1**	
348.	Deming's contribution to quality	1	01-09-2017		**TLM1**	
349.	Materials management : Objectives of Materials management	1	04-09-2017		**TLM1**	
350.	Need for inventory control	1	05-09-2017		**TLM1**	
351.	Purchase procedure, Store records	1	07-09-2017		**TLM1**	
352.	Methods of inventory control	1	08-09-2017		**TLM1**	
353.	Store records	1	11-09-2017		**TLM1**	
354.	ABC analysis & EOQ analysis EOQ Problems	1	12-09-2017		**TLM1**	
355.	Stock levels & Problems on stock levels	1	14-09-2017		**TLM1**	
356.	Tutorial	1	15-09-2017			
No. of classes required to complete UNIT-III		15	No. of classes taken:			

UNIT-IV : Human Resource management

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

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
357.	**UNIT IV Human Resource management**	1	18-09-2017		**TLM1**	
358.	Concepts of HRM Basic functions of HR manager	1	19-09-2017		**TLM1**	
359.	Basic functions of HR manager	1	21-09-2017		**TLM1**	
360.	Man power planning	1	22-09-2017		**TLM1**	
361.	Recruitment	1	25-09-2017		**TLM1**	
362.	Selection	1	26-09-2017		**TLM1**	
363.	Training and development	1	28-09-2017		**TLM1**	
364.	Placement	1	29-09-2017		**TLM1**	
365.	Wage and salary administration	1	03-10-2017		**TLM1**	
366.	Promotion Transfer & Separation	1	05-10-2017		**TLM1**	
367.	Performance Appraisal	1	06-10-2017		**TLM1**	
368.	Job evaluation	1	09-10-2017		**TLM1**	
369.	Merit raring	1	10-10-2017		**TLM1**	
370.	Tutorial	1	12-10-2017		**TLM1**	
No. of classes required to complete UNIT-IV		14	No. of classes taken:			

UNIT-V :Project management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
371.	**UNIT V project management**	1	13-10-2017		**TLM1**	
372.	Early techniques in project management	1	16-10-2017		**TLM1**	

373.	Network analysis	1	17-10-2017		**TLM1**	
374.	Rules for drawing of networks	1	19-10-2017		**TLM1**	
375.	Critical path method	1	20-10-2017		**TLM1**	
376.	Identifying critical path	1	23-10-2017		**TLM1**	
377.	Problems on CPM	1	24-10-2017		**TLM1**	
378.	Problems on CPM	1	26-10-2017		**TLM1**	
379.	Problems on CPM	1	27-10-2017		**TLM1**	
380.	Programme evaluation and review technique (PERT)	1	30-10-2017		**TLM1**	
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
381.	Corporate social responsibility	1	03-11-17		**TLM1**	

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	19-06-2017	05-08-2017	7 W
I Mid Examinations	07-08-2017	12-08-2017	1 W
II Phase of Instructions	16-08-2017	14-10-2017	9 W
II Mid Examinations	16-10-2017	21-10-2017	1 W
Preparation and Practicals	23-10-2017	02-11-2017	2 W
Semester End Examinations	03-11-2017	18-11-2017	2 W

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**

K.RaviKiranYasaswi   U.Rambabu   U.Rambabu   Prof. A.Adisesha Reddy.
  Course Instructor   **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.

<u>**COURSE HANDOUT**</u>

PROGRAM **:** B.Tech., VII-Sem., ECE-B
ACADEMIC YEAR **:** 2017-18
COURSE NAME & CODE **:** Industrial Management(S355)
L-T-P STRUCTURE **:** 4-1-0
COURSE CREDITS **:** 3
COURSE INSTRUCTOR **:** Mr. K.RaviKiranYasaswi
COURSE COORDINATOR **:** Mr. U.Rambabu

Course Educational Objectives:

6. To make students understand management, its principles, contribution to management, organization, and its basic issues and types
7. To make students the concept of plant location and its factors and plant layout and types, method of production and work study importance
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CO1: Apply management principles to the particle situations to be in a position to know which type of business organization structure suits

CO2: Able to make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilization input factors by designing the better working methods and with better work study techniques.

CO3: Able to improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory

CO4: Able to manage people in working environment with the practices of HRM across corporate businesses.

CO5: Able to use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises.

COURSE ARTICULATION MATRIX (Correlation between Cos &POs, PSOs)

Mapping CO with PO

		1	2	3	4	5	6	7	8	9	10	11	12
COs	CO1								3	1			2
	CO2												2
	CO3												2
	CO4										2	1	2
	CO5											1	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).

Resources Used:

Text Book:

Management Science, TMH, Dr. Aryasri, 4th edition, 2009

References:
3. Kooniz and Waihrich- Essentials of Management, TMH, 8th edition, 2010
4. O.P.Khana, Industrial Engineering and Management.

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

UNIT-I: Over view of Industrial Management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
382.	Over view of industrial management	1	29-06-2017		**TLM1**	
383.	Management Introduction and Definition,	1	30-06-2017		**TLM1**	
384.	Nature Importance of management	1	01-07-2017		**TLM1**	
385.	Functions	1	03-07-2017		**TLM1**	
386.	Taylor's scientific management theory	1	06-07-2017		**TLM1**	
387.	Fayal's principles of management	1	07-07-2017		**TLM1**	
388.	Contribution of Elton mayo	1	08-07-2017		**TLM1**	
389.	MASLOW theory	1	10-07-2017		**TLM1**	
390.	Tutorials and Herzberg theory of motivation	1	13-07-2017		**TLM1**	
391.	Douglas MC Gregor theory of motivation	1	14-07-2017		**TLM1**	
392.	basic concepts of Organization Basic concept	1	15-07-2017		**TLM1**	
393.	Authority and responsibility and Delegation of Authority and responsibility	1	17-07-2017		**TLM1**	
394.	Span of control	1	20-07-2017		**TLM1**	
395.	Departmentation and Decentralization	1	21-07-2017		**TLM1**	
396.	Orgn.structure :line organization structure	1	22-07-2017		**TLM1**	
397.	Line and staff organization & tutorial	1	24-07-2017		**TLM1**	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
398.	Functional organization organization	1	27-07-2017		**TLM1**	
399.	Committee and Matrix	1	28-07-2017		**TLM1**	
No. of classes required to complete UNIT-I		18	No. of classes taken:			

UNIT II Operations Management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
400.	**UNIT II Operations Management**	1	29-07-2017		**TLM1**	
401.	Plant location ,Factors influencing location	1	31-07-2017		**TLM1**	
402.	Principles and types of plant layouts	1	03-08-2017		**TLM1**	
403.	Methods of production : job batch and mass production	1	04-08-2017		**TLM1**	
404.	Work study	1	05-08-2017		**TLM1**	
405.	Basic procedure involved in method study	1	07-08-2017		**TLM1**	
406.	Work measurement Objectives and Importance	1	10-08-2017		**TLM1**	
407.	Basic procedure involved in work measurement	1	11-08-2017		**TLM1**	
408.	Problems on time study	1	12-08-2017		**TLM1**	
No. of classes required to complete UNIT-II		09	No. of classes taken:			

UNIT-III :Quality and materials management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
409.	**UNIT III quality and materials management**	1	14-08-2017		**TLM1**	
410.	Statistical quality control Meaning	1	17-08-2017		**TLM1**	
411.	Variables and attributes	1	18-08-2017		**TLM1**	

S. No.	Topics to be covered	No. of Classes	Tentative Date of	Actual Date of	Teaching Learning	HOD Sign
412.	X chart problems and R Chart problems	1	19-08-2017		**TLM1**	
413.	**I MID EXAM**	1	21-08-2017			
414.	**I MID EXAM**	1	24-08-2017			
415.	**I MID EXAM**	1	26-08-2017			
416.	C Chart problems And P Chart problems	1	28-08-2017		**TLM1**	
417.	C Chart problems AND P Chart problems	1	31-08-2017		**TLM1**	
418.	Acceptance sampling & Sampling plans	1	01-09-2017		**TLM1**	
419.	Deming's contribution to quality	1	04-09-2017		**TLM1**	
420.	Materials management : Objectives of Materials management	1	07-09-2017		**TLM1**	
421.	Need for inventory control	1	08-09-2017		**TLM1**	
422.	Purchase procedure, Store records	1	09-09-2017		**TLM1**	
423.	Methods of inventory control	1	11-09-2017		**TLM1**	
424.	Store records	1	14-09-2017		**TLM1**	
425.	ABC analysis & EOQ analysis EOQ Problems	1	15-09-2017		**TLM1**	
426.	Stock levels & Problems on stock levels	1	16-09-2017		**TLM1**	
427.	Tutorial	1	18-09-2017			
No. of classes required to complete UNIT-III		15	No. of classes taken:			

UNIT-IV : Human Resource management

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

		Required	Completion	Completion	Methods	Weekly
428.	**UNIT IV Human Resource management**	1	21-09-2017		**TLM1**	
429.	Concepts of HRM Basic functions of HR manager	1	22-09-2017		**TLM1**	
430.	Basic functions of HR manager	1	23-09-2017		**TLM1**	
431.	Man power planning	1	25-09-2017		**TLM1**	
432.	Recruitment	1	28-09-2017		**TLM1**	
433.	Selection	1	29-09-2017		**TLM1**	
434.	Training and development	1	05-10-2017		**TLM1**	
435.	Placement	1	06-10-2017		**TLM1**	
436.	Wage and salary administration	1	07-10-2017		**TLM1**	
437.	Promotion Transfer & Separation	1	09-10-2017		**TLM1**	
438.	Performance Appraisal	1	12-10-2017		**TLM1**	
439.	Job evaluation	1	13-10-2017		**TLM1**	
440.	Merit raring	1	14-10-2017		**TLM1**	
441.	Tutorial	1	16-10-2017		**TLM1**	
No. of classes required to complete UNIT-IV		14	No. of classes taken:			

UNIT-V : Project management

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
442.	**UNIT V project management**	1	19-10-2017		**TLM1**	
443.	Early techniques in project management	1	20-10-2017		**TLM1**	
444.	Network analysis	1	21-10-2017		**TLM1**	
445.	Rules for drawing of	1	23-10-2017		**TLM1**	

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	networks					
446.	Critical path method	1	26-10-2017		**TLM1**	
447.	Identifying critical path	1	27-10-2017		**TLM1**	
448.	Problems on CPM	1	28-10-2017		**TLM1**	
449.	Problems on CPM	1	30-10-2017		**TLM1**	
450.	Problems on CPM	1	02-11-2017		**TLM1**	
451.	Programme evaluation and review technique (PERT)	1	03-11-2017		**TLM1**	
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
452.	Corporate social responsibility	1	03-11-17		**TLM1**	

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	19-06-2017	05-08-2017	7 W
I Mid Examinations	07-08-2017	12-08-2017	1 W
II Phase of Instructions	16-08-2017	14-10-2017	9 W
II Mid Examinations	16-10-2017	21-10-2017	1 W
Preparation and Practicals	23-10-2017	02-11-2017	2 W
Semester End Examinations	03-11-2017	18-11-2017	2 W

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**

K.RaviKiranYasaswi   U.Rambabu   U.Rambabu   Prof. A.Adisesha Reddy.
Course Instructor   **Course Coordinator**   **Module Coordinator**   **HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (Autonomous)

L.B.Reddy Nagar, Mylavaram-521 230. Andhra Pradesh, INDIA
Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi
NAAC Accredited with "A" grade, Accredited by NBA,
New Delhi & Certified by ISO 9001:2008, http://www.lbrce.ac.in

DEPARTMENT OF ELECTRONICS&COMMUNICATION ENGINEERING

Phone: 08659-222933/Extn: 411hodece@lbrce.ac.in,

COURSE HANDOUT

PROGRAM   : B.Tech., VII-Sem., ECE-C
ACADEMIC YEAR   : 2017-18
COURSE NAME & CODE   : Industrial Management(S270)
L-T-P STRUCTURE   : 4-1-0
COURSE CREDITS   : 3
COURSE INSTRUCTOR   : Mrs. Kalyani Dasari
COURSE COORDINATOR   : Mr. U.Rambabu

Course Educational Objectives:

11. To make students understand management, its principles, contribution to management, organization, and its basic issues and types
12. To make students the concept of plant location and its factors and plant layout and types, method of production and work study importance
13. To make students understand quality control uses and material management techniques
14. To make understand the concept of HRM and its functions
15. To make students understand PERT & CPM methods in effective project management and need of project crashing and its consequence on cost of project

Course Outcomes: After the completion of the course, students should be able to

CO1: Apply management principles to the particle situations to be in a position to know which type of business organization structure suits

CO2: Able to make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilization input factors by designing the better working methods and with better work study techniques.

CO3: Able to improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory

CO4: Able to manage people in working environment with the practices of HRM across corporate businesses.

CO5: Able to use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises.

COURSE ARTICULATION MATRIX (Correlation between Cos &POs, PSOs)

Mapping CO with PO

		1	2	3	4	5	6	7	8	9	10	11	12
COs	CO1								3	1			2
	CO2												2
	CO3												2
	CO4										2	1	2
	CO5											1	2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
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References:
    5. Kooniz and Waihrich- Essentials of Management, TMH, 8th edition, 2010
    6. O.P.Khana, Industrial Engineering and Management.

COURSE DELIVERY PLAN :

Lecture No.	Date as per Aca. Calendar Actual Date	Content	Teaching Methodology	Faculty Approach	Student approach	Learningoutcome	Remarks
1.	28-06-2017	**UNIT-I** Over view of industrial management	DM1	Explanation	Listens and participate	Understand the subject	
2.	29-06-2017	Management Introduction Definition, Nature	DM1	Explanation	Listens and participate	Different meanings of management	
3.	01-07-2017	Importance of Management, Functions	DM1	Explanation	Listens and par Listens and participatetici	Identifies the importance of management, Understand the functions performed in management	
4.	03-07-2017	Taylor's scientific management theory	DM1	Explanation	Listens and participate	Understand the principles of scientific management theory	
5.	05-07-2017	Fayal's principles of management	DM1	Explanation	Listens and participate	Understand the principle	
6	06-07-2017	Principles of management	DM1	Explanation	Listens and participate	Understand the principles	
7	10-07-2017	Contribution of Elton	DM1	Explanation	Listens and	Understand Hawthorne	

		mayo			Participate	experiment	
8	12-07-2017	MASLOW theory	DM1	Explanation	Listens and Participate	Understand level of hierarchy needs and how to employee is motivated	
9	13-07-2017	Herzberg, Douglas, MC Gregor,	DM1	Explanation	Listens and Participate	understand meaning of organisation	
10	15-07-2017	basic concepts of Organization Basic concept	DM1	Explanation	Listens and Participate	Understand how superior controlled subordinates	
11	17-07-2017	Authority and responsibility, Delegation of Authority	DM1	Explanation	Listens and participate	Understand the meaning of Authority and responsibility	
12	19-07-2017	span of control	DM1	Explanation	Listens and participate	Understanding the concept	
13	20-07-2017	Depart mentation	DM1	Explanation	Listens and participate	Understanding the concept	
14	22-07-2017	Decentralization	DM1	Explanation	Listens and participate	Understand Functional organization	
15	24-07-2017	Organization Structure : line organization structure	DM1	Explanation	Listens and participate	Understand Line and staff organization organisation structure Understand Committee Matrix organization organization organisation structure	

16	26-07-2017	Line and staff organization	DM1	Explanation	Listens and participate	Understand Line and staff organization structure	
17	27-07-2017	Functional organization	DM1	Explanation	Listens and participate	Understand Functional organization organisation	
18	29-07-2017	Committee Matrix	DM1	Explanation	Listens and participate	Understand committee organization, matrix organisation	
19	31-07-2017	Tutorial	DM2	Exam	participate	Write an exam	
20	02-08-2017	**UNIT II Operations Management**	DM1	Explanation	Listens and participate	Understand meaning of operation management	
21	03-08-2017	Plant location ,Factors influencing location involved in method	DM1	Explanation	Listens and participate	Understand factors influencing for selection plant location	
22	05-08-2017	Principles and types of plant layouts	DM1	Explanation	Listens and participate	How to arrange the plant layout	
23	07-08-2017	Methods of production : job batch and mass production	DM1	Explanation	Listens and Participate	Understand methods production	
24	09-08-2017	Work study Basic procedure involved in work	DM1	Explanation	Listens and Participate	Understand the objectives for conducting work study, Steps in method study	
25	10-08-2017	Work measurement Objectives and Importance	DM1	Explanation	Listens and Participate	Measure the time for completing work Reason for developing of new	

26	14-08-2017	Work measurement Objectives and Importance	DM1	Explanation	Listens and Participate	Measure the time for completing work Reason for developing of new methods	
27	16-08-2017	Basic procedure involved in work measurement	DM1	Explanation	Listens and participate	Understand the objectives for conducting work measurement	
28	17-08-2017	Problems on time study	DM1	Explanation	Listens and participate	Measure the time for completing work	
29	19-08-2017	Tutorial	DM2	Exam	participate	Write an exam	

I-MID EXAM 21-08-2017 to 26-8-2017

30	28-08-2017	**UNIT III quality and materials management**	DM1	Explanation	Listens and participate	Understand the concepts	
31	30-08-2017	Statistical quality control Meaning, Variables and	DM1	Explanation	Listens and participate	Understand the concepts Statistical quality control Meaning	
32	31-08-2017	X chart problems	DM1	Explanation	Listens and participate	Understand the production process and take the decision weather product is accept or reject	
33	04-09-2017	R Chart problems	DM1	Explanation	Listens and participate	Understand the production process and take the decision weather product is accept or	
34	06-09-2017	C Chart problems	DM1	Explanation	Listens and	Understand the production	
35	07-09-2017	P Chart problems placement	DM1	Explanation	Listens and participate	Understand the production process and take the decision weather product is accept or	
36	11-09-2017	Acceptance sampling	DM1	Explanation	Listens and	Understand Acceptance sampling	

		& Sampling plans,			participate	& Sampling plans,	
37	13-09-2017	Materials management : Objectives of Materials	DM1	Explanation	Listens and participate	Understand need of inventory control	
38	14-09-2017	Need for inventory control Purchase procedure, Store records	DM1	Explanation	Listens and participate	Understand the concepts and write exam Understand steps in purchase procedure	
39	16-09-2017	Purchase procedure, Store records	DM1	Explanation	Listens and participate	Understand steps in purchase procedure	
40	18-09-2017	Methods of inventory control, Store records	DM1	Explanation	Listens and participate	What type of records should be maintain in inventory, What type of records should be maintain in inventory	
41	20-09-2017	ABC analysis	DM1	Explanation	Listens and participate	Understand meaning and objectives	
42	21-09-2017	EOQ analysis EOQ Problems	DM1	Explanation	Listens and participate	Understand ordering and carrying cost	
43	23-09-2017	Stock levels, Problems on stock levels	DM1	Explanation	Listens and participate	Understand how to categorised Material	
44	25-09-2017	Tutorial	DM2	exam	participate	Write an exam	
45	27-09-2017	**UNIT IV Human**	DM1	Explanation	Listens and	Meaning HRM	

		Resource			participate		
46	28-09-2017	Concepts of HRM Basic functions of HR	DM1	Explanation	Listens and participate	Understand functions of hr manager	
47	04-10-2017	Man power planning	DM1	Explanation	Listens and participate	How to estimate manpower demand and supply	
48	05-10-2017	Recruitment, Selection	DM1	Explanation	Listens and participate	Understand the concept of recruitment, Steps in selection and sources of	
49	07-10-2017	Training and development, Placement	DM1	Explanation	Listens and participate	Method of training Understand the concept of placement	
50	09-10-2017	Wage and salary administration	DM1	Explanation	Listens and participate	Understand Wage and salary	
51	11-10-2017	Promotion,separation Transfer	DM1	Explanation	Listens and participate	Understand the concept of promotion, separation	
52	12-10-2017	Performance Appraisal, Job evaluation	DM1	Explanation	Listens and participate	Understand the concept of Performance Appraisal and how to assess the job and methods	
53	16-10-2017	Merit raring	DM1	Explanation	Listens and participate	Understand methods of merit rating	
54	19-10-2017	Tutorial	DM2	Exam	participate	Write exam on a topic	
55	21-10-2017	**UNIT V project management:** Early techniques in	DM1	Explanation	Listens and participate	Understand the concept of project management	

56	23-10-2017	Network analysis, Rules for drawing of	DM1	Explanation	Listens and participate	what is the maximum time required for completion of project	
57	25-10-2017	Critical path method, Identifying critical path	DM1	Explanation	participate	Understand the concept of critical path method and time required to complete the project.	
58	26-10-2017	Problems on CPM	DM1	Exam	participate	Understand the techniques	
59	28-10-2017	Programme evaluation and review technique (PERT)	DM1	Explanation	Listens and participate	What is possibility for the completion of the project	
60	30-10-2017	Problems on PERT	DM1	Explanation	Listens and participate	Understand the concepts of pert	
61	01-11-2017	Project cost analysis project crashing	DM1	Explanation	Listens and participate	Understand Project crashing	
62	02-11-2017	Problems on project crashing	DM1	Explanation	Listens and participate	Understand Project crashing	
63	04-11-2017	Revision on pert, cpm and project crashing	DM1	Explanation	Listens and participate	Understand the techniques in detail	
II-MID EXAM 6-11-2017 to 11-11-2017							

NOTE: DELIVERY METHODS :**DM1**: Lecture interspersed with discussions/BB, **DM2:** Tutorial,
DM3: Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit),
DM6: Group Discussion, **DM7:** Group Assignment/ Project, **DM8:** Presentations/PPT, **DM9**:Asynchronous Discussion..

Signature				
	Name of the faculty	Name of the course Co-ordinator	Name of the Module Co-ordinator	HOD
	Mrs.D.Kalyani	Mr. U. Rambabu	Mr. U. Rambabu	Dr.A.Adisesha Reddy