SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN – THEORY

Department of Information Technology	**LP: EC16351**
	Rev. No: 00
B.Tech : Information Technology Regulation: 2016	Date: 29-06-2017
Sub. Code / Sub. Name : EC16351/ ANALOG AND DIGITAL COMMUNICATION	
Unit : I	

Unit Syllabus:

Noise: Source of Noise - External Noise- Internal Noise- Noise Calculation. Introduction to **Communication Systems:** Modulation – Types - Need for Modulation. Theory of Amplitude Modulation - Evolution and Description of SSB Techniques - Theory of Frequency and Phase Modulation – Comparison of various Analog Communication System (AM – FM – PM).

Objective:

To understand the basic concepts of Amplitude, Frequency and Phase modulation techniques

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to analog and digital communication, Electromagnetic Frequency Spectrum; characteristic of a signal, **Basics of Analog and Digital Communication**	1-ch.1;Pg-(1-20)	BB/LCD
2.	Noise Analysis – Types of noise, Signal to noise ratio; Noise Figure; Noise Factor; Problems	1-ch.1;Pg-(21-31)	BB/LCD
3.	Modulation; Need for modulation; Principles of amplitude modulation	1-ch.1;Pg-(12-14,116)	BB/LCD
4.	AM envelope, frequency spectrum and bandwidth; Modulation index and percent modulation AM Voltage distribution; AM power distribution	1-ch.4;Pg-(116-131)	BB/LCD
5.	SSB- Systems (SSBFC, SSBSC, SSBRC, ISB, VSB); Advantage of SSB transmission;	1-ch.6;Pg-(206-213)	BB/LCD
6.	Mathematical analysis of Suppressed carrier AM; SSB Generation (Balanced Ring Modulator)	1-ch.6;Pg-(213-216)	BB/LCD
7.	Angle modulation; Mathematical analysis; Deviation sensitivity; FM and PM waveforms	1-ch.7;Pg-(244-250)	BB/LCD
8.	Phase deviation and modulation index; Frequency deviation and percent modulation - FM and PM	1-ch.7;Pg-(250-254)	BB/LCD
9.	Frequency analysis of angle modulated waves; Bandwidth requirements for Angle modulated waves; Comparison of AM-FM-PM ; Overview of Unit-1	1-ch.7;Pg-(254-261)	BB/LCD

Content beyond syllabus covered (if any): Basics of Analog and Digital Communication

* Session duration: 50 minutes

Sub. Code / Sub. Name: **EC16351/ ANALOG AND DIGITAL COMMUNICATION**

Unit : II

Unit Syllabus :

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) Minimum Shift Keying (MSK) – Phase Shift Keying (PSK) – BPSK – QPSK – 8 PSK – 16 PSK - Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK– FSK – PSK – QAM).

Objective:

To learn the concepts of Digital Modulation techniques.

Session No *	Topics to be covered	Ref	Teaching Aids
11.	Introduction to Digital Communication (Shannon limit for information capacity, bit rate baud rate, M-array encoding)	1-ch.9;Pg-(331-336)	BB/LCD
12.	Digital amplitude modulation ASK; Frequency shift keying FSK - bit rate, baud rate, bandwidth	1-ch.9;Pg-(336-341)	BB/LCD
13.	FSK transmitter & receiver	1-ch.9;Pg-(341-343)	BB/LCD
14.	MSK, PSK (Transmitter, Bandwidth consideration, Receiver)	1-ch.9;Pg-(343-348)	BB/LCD
15.	QPSK (Transmitter, Bandwidth consideration, Receiver)	1-ch.9;Pg-(348-355)	BB/LCD
16.	8-PSK, 16-PSK (Transmitter, Receiver, Bandwidth consideration)	1-ch.9;Pg-(355-362)	BB/LCD
17.	QAM, 8-QAM, 16-QAM	1-ch.9;Pg-(362-368)	BB/LCD
18.	Bandwidth Efficiency; Comparison of ASK, FSK,PSK, QAM	1-ch.9;Pg-(368-370)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **EC16351/ ANALOG AND DIGITAL COMMUNICATION**
Unit : III

Unit Syllabus :

Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Error Detection and Correction Techniques - Data communication Hardware - serial and parallel interfaces. **Pulse Communication:** Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) - Comparison of various Pulse Communication System (PAM – PTM – PCM).

Objective:

To understand the basic concepts of digital data and pulse communication.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Introduction to Data Communications; History of Data communications; Network Architecture Protocol and Standards	1-ch.21;Pg-(802-807)	BB/LCD
20	Standards Organizations for data communication; Data communication circuits; Serial Parallel Data Transmission; Data Communication Circuit Arrangement	1-ch.21;Pg-(808-810,818-820)	BB/LCD
21	Data communication codes, Error control, Error Detection(RC,VRC, LRC, Checksum)	1-ch.22;Pg-(838-849)	BB/LCD
22	Error Detection (CRC); Error correction (Retransmission, FEC)	1-ch.22;Pg-(850-855)	BB/LCD
23	Error correction (Hamming Code); Problems	1-ch.22;Pg-(855-857)	BB/LCD
24	Data communication Hardware (DTE, DCE)	1-ch.22,Pg-(859-863)	BB/LCD
25	Serial interfaces (RS232, RS449, RS530)	1-ch.22;Pg-(872-886)	BB/LCD
26	Parallel interfaces (Centronics Parallel interface and IEEE488 Bus)	1-ch.22;Pg-(886-889)	BB/LCD
27	Pulse Communication Introduction and PAM	1-ch.10;Pg-(390-392)	BB/LCD
28	PTM (PWM, PPM) - Transmitter, Receiver	1-ch.10,Pg-(390-392)	BB/LCD
29	PCM - Transmitter, Receiver	1-ch.10;Pg-(392-406)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **EC16351/ ANALOG AND DIGITAL COMMUNICATION**
Unit : IV

Unit Syllabus :

Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, channel coding theorem, Error Control Coding, linear block codes, cyclic codes, convolution codes, viterbi decoding algorithm.

Objective:

To understand the basic concepts of digital data communication.

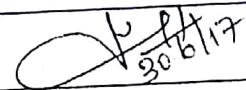| Session No *	Topics to be covered	Ref	Teaching Aids
30.	Introduction: Entropy, Properties of entropy	2-ch.9;Pg-(567-573)	BB/LCD
31.	Source coding theorem; Huffman coding	2-ch.9;Pg-(574-574,	BB/LCD
32.	Shannon fano coding;	2-ch.9;Pg-(581-583)	BB/LCD
33.	Mutual information; Channel capacity	2-ch.9;Pg-(584-589)	BB/LCD
34.	Introduction- Error Control Coding;	2ch.10;Pg-(626-628,)	BB/LCD
35.	Linear block codes – Syndrome, Minimum Distance Consideration, Syndrome Decoding	2ch.10;Pg-(632-641)	BB/LCD
36.	Cyclic codes – Generator Polynomial; Parity Check Polynomial	2ch.10;Pg-(641-645)	BB/LCD
37.	Cyclic codes - Calculation of Syndrome	2ch.10;Pg-(646-650)	BB/LCD
38.	Convolution Codes – Code Tree; Trellis; State Diagram	2ch.10;Pg-(654-660)	BB/LCD
39.	Maximum Likelihood Decoding of Convolutional Code – Viterbi Algorithm	2ch.10;Pg-(660-668)	BB/LCD

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **EC16351/ ANALOG AND DIGITAL COMMUNICATION**
Unit : V

Unit Syllabus :

Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM) – Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse - Channel Assignment and Hand - Overview of Multiple Access Schemes - Satellite Communication - Bluetooth.

Objective:

To study the types of multi user radio communication systems and multiple access techniques in wireless communication systems.

Session No *	Topics to be covered	Ref	Teaching Aids
40.	Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM)	1-ch.20;Pg-(758-762)	BB/LCD
41.	Cellular Concept and Frequency Reuse	1-ch.19;Pg-(746-752)	BB/LCD
42.	Channel Assignment and Handover	1-ch.9;Pg-(752-758)	BB/LCD
43.	Multiple Access Schemes – TDMA FDMA CDMA; TDMA (GSM); CDMA (IS-95)	Internet	BB/LCD
44.	Satellite Communication	1-ch.25;Pg-(994-1027)	BB/LCD
45.	Satellite Communication	1-ch.25;Pg-(994-1027)	BB/LCD
46.	Bluetooth,LTE(4G),Wifi	Internet	BB/LCD

Content beyond syllabus covered (if any): **LTE(4G),Wifi**

* Session duration: 50 mins

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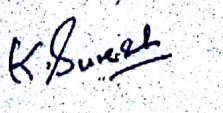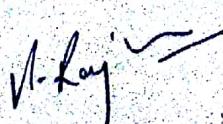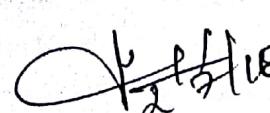Sub Code / Sub Name: **EC16351/ ANALOG AND DIGITAL COMMUNICATION**

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2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004
3. Rappaport T.S, "Wireless Communications: Principles and Practice", 2nd Edition, Pearson Education, 2007
4. H.Taub, D L Schilling and G Saha, "Principles of Communication", 3rd Edition, Pearson Education, 2007.
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6. OxfordUniversity Press, 2007.
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8. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, Prentice Hall of India, 2002.
9. B.Sklar, "Digital Communication Fundamentals and Applications" 2nd Edition Pearson Education 2007.

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Signature	K.Suresh V.Raj	30/6/17
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Designation	Assistant Professor/IT	HOD/IT
Date	29-06-2017	29-06-2017
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD.

It was decided that the same lesson plan has to be followed for the upcoming semester (2018-19) in the course committee meeting

K.Suresh
V.Raj

2/7/18
HOD i/c/IT