DR. A P J ABDUL KALAM UNIVERSITY, INDORE

SYLLABUS

of

MASTER OF TECHNOLOGY (DIGITAL COMMUNICATION)

Department of Electronics & Communication

(Semester/Year: IIIrd & IVth Semester/IInd Year)

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Master of Technology (Digital Communication)

Department of Electronics & Communication

List of Subject (Second Year)

S. No.	Subject Code	Subject name	Page No.
1	MTDC 301	Information Theory & Coding	**3**
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3	MTDC 3022	Optical Instrumentation & Measurement	**5**
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Sub Code: MTDC301	Sub Name: Information Theory & Coding	4 Credits

Unit 1

Introduction to uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source, coding theorem, data compression, prefix coding, HUFFMAN coding, Lempel-Ziv Coding.

Unit 2

Discrete memory less channels, Binary symmetric channel, mutual information & its properties, channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channel capacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practical communication system in light of shannon's theorem, Fading Channel.

Unit 3

Group and field of Binary system Galois field and its construction in GF (2m) and its basic properties, vector spaces and matrices in GF(2), Linear Block Codes, Systematic codes, and its encoding circuits, syndrome and error detection ,minimum distance, error detecting and correcting capabilities of block code, Decoding circuits, Probability of undetected error for linear block code in BSC, Hamming code and their applications.

Unit 4

Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding &decoding circuits, syndrome computation & error detection, cyclic Hamming codes.

Unit 5

Introduction to BCH codes, its encoding & decoding, error location & correction. Introduction to convolution codes, its construction & viterbi algorithm for maximum likelihood decoding.

References:

[1] Digital Communication by Haykins Simon Wiley Publ.
[2] Error control Coding: Theory and Application, by Shu Lin and Cosstlello,PHI.
[3] Modern analog and Digital Communication system, by B.P. Lathi.
[4] Digital Communication by Sklar, Pearson Education.
[5] Principal of Communication system by Taub & Schilling, TMH.
[6] Error Correcting Codes by Peterson W., MIT Press.
[7] Digital Communication by Carson,MGH.
[8] Digital Communication by Proakis,TMH.

Unit 1:

Introduction to digital modulation technique and their spectral characteristics, optimum receivers for signals corrupted by AWGN and their performance for memory less channel, optimum receivers for PCM, regenerative repeaters and link budget analysis.

Unit 2:

Estimation of signal parameters, carrier phase and symbol timings. Signal design band limited channels and their characterization, probability of error in detection PAM with zero ISI, modulation codes for spectrum spacing.

Unit 3:

Optimum receivers for channels with ISI and AWGN, linear equalization and decision feedback equalization, adaptive linear and adaptive decision feed back equalizer.

Unit 4:

Multi channel and multi carrier systems, spread spectrum signals for digital communication, direct sequence spread spectrum signals and frequency hopped spread spectrum signals and their performances, OFDM.

Unit 5:

Characterization of fading multi path channels, frequency non-selective slowly padding channels, diversity techniques for padding multi path channels, coded waveform for padding channels and their application.

References:

[1] Digital Communication by Proakis TMH.
[2] Digital Communication by Glover and Grantt PHI.
[3] Digital Communication by Simon Haykins.

Unit 1:

Optical Instrument: Optical Time Domain Reflector, Optical low Coherence Reflect meter, Optical Spectrum Analyzer Optical power and energy meter, Monochrometer, CCD, Ellipsometer, transducer, Lock in Amplifier, Box car Average.

Unit 2:

Fiber Optics Component and Devices: Direction Couplers, beam splitters, switches, modulations, connectors, couplers, polarizer, polarization controllers, amplifiers, fiber laser, reflector, wavelength filters, polarizing beam splitter, wavelength division multiplexes, fiber optic isolator etc.

Unit 3:

Fiber optic sensors: Pressure, temperature, strain, Magnetic & Electric field sensors based on characteristics like intensity, phase, polarization, frequency and wavelength of light wave.

Unit 4:

Fiber optic Measurement: Introduction to measurement techniques

Multimode Fiber: Refractive Index Profile, Geometric Measurement, Numerical Aperture, Total Attenuation, Scattering Loss and differential mode loss, Non destructive loss Measurement(OTDR), Transmission Bandwidth and dispersion, Bandwidth of Jointed fiber, Differential Mode Delay (DMD).

Unit 5:

Fiber optic Measurement: Introduction to measurement techniques

Single Mode Fiber: Attenuation, Refractive Index Profile (RIP), Mode Field Diameter, Equivalent step Index (EXI) Profile, Mode Cut off Wave length and the Single Mode operating regime, Dispersion, Birefringenence Measurement, Measurement of the Propagation constant of fiber mode.

References

[1] Optical Fiber Communication By S. Senior.
[2] Fiber Optics Measurement By A. Ghatak, M.R. Shenoy.
[3] Fundamental Of Fiber Optics in Telecommunication & Sensors Systems.
[4] Introduction to Fiber Optics By A. Ghatak and Tyagrajan.
[5] Optical Fiber Sensors system And Application By B. Culshaw.

Sub Code: MTDC303	**Sub Name:** Seminar	**4 Credits**

Seminar is based on the power point presentation related to the topics of the theory subjects or research project topics.

Sub Code: MTDC304	**Sub Name:** Dissertation Part I	**8 Credits**

In dissertation Part I setting aims and objectives of the Research Projects and submit the report of work and deliver presentation on work.

Sub Code: MTDC401	**Sub Name:** Dissertation Part- II	**20 Credits**

In dissertation Part II Student complete the aims and objectives of the Major Research Projects and submit the report of work and deliver presentation on work.