SHRI VENKATESHWARA UNIVERSITY

Syllabus

B.Tech

Electrical Engineering
VII SEMESTER
(Four Years Programme)

(w.e.f. 2019-20)

SCHOOL OF ENGINEERIN & TECHNOLOGY

SEMESTER- IV

Electrical Engineering SEMESTER VII													
Sl. No.	**Subject Codes**	**Subject**	**Periods**			**Evaluation Scheme**				**End Semester**		**Total**	**Credit**
			L	**T**	**P**	**CT**	**TA**	**Total**	**PS**	**TE**	**PE**		
1	**SEE- 701**	HVDC Transmission Systems	3	0	0	20	10	30		70		100	3
2	**SEE- 702**	VLSI circuits	3	0	0	20	10	30		70		100	3
3	**SEE-703**	Wavelet Transforms	3	0	0	20	10	30		70		100	3
4	SOE- 072	ICT for Development	3	0	0	20	10	30		70		100	3
5	**SOE-071**	Introduction to Industrial Management	3	0	0	20	10	30		70		100	3
6	**SEE-711**	Project Stage-I	0	0	6				50		50	100	3
7	SEE- 777	Summer Internship							100			100	3
												700	**21**
Summer Internship after VI sem													

SEE-701	**HVdc Transmission Systems**	**3L:0T:0P**	**3 credits**

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the advantages of dc transmission over ac transmission.
- Understand the operation of Line Commutated Converters and Voltage Source Converters.
- Understand the control strategies used in HVdc transmission system.
- Understand the improvement of power system stability using an HVdc system.

Module 1:dc Transmission Technology (4 hours)

Comparison of AC and dc Transmission (Economics, Technical Performance and Reliability). Application of DC Transmission. Types of HVdc Systems. Components of a HVdc system. Line Commutated Converter and Voltage Source Converter based systems.

Module 2: Analysis of Line Commutated and Voltage Source Converters (10 hours)

Line Commutated Converters (LCCs): Six pulse converter, Analysis neglecting commutation overlap, harmonics, Twelve Pulse Converters. Inverter Operation. Effect of Commutation Overlap.

Expressions for average dc voltage, AC current and reactive power absorbed by the converters. Effect of Commutation Failure, Misfire and Current Extinction in LCC links.

Voltage Source Converters (VSCs): Two and Three-level VSCs. PWM schemes: Selective Harmonic Elimination, Sinusoidal Pulse Width Modulation. Analysis of a six pulse converter. Equations in the rotating frame. Real and Reactive power control using a VSC.

Module 3: Control of HVdc Converters: (10 hours)

Principles of Link Control in a LCCHVdc system. Control Hierarchy, Firing Angle Controls – Phase-Locked Loop, Current and Extinction Angle Control, Starting and Stopping of a Link. Higher level Controllers Power control, Frequency Control, Stability Controllers. Reactive Power Control. Principles of Link Control in a VSC HVdc system: Power flow and dc Voltage Control. Reactive Power Control/AC voltage regulation.

Module 3: Components of HVdc systems: (8 hours)

Smoothing Reactors, Reactive Power Sources and Filters in LCC HVdc systems DC line: Corona Effects. Insulators, Transient Over-voltages. dc line faults in LCC systems. dc line faults in VSC systems. dc breakers. Monopolar Operation. Ground Electrodes.

Module 4:Stability Enhancement using HVdc Control (4 hours)

Basic Concepts: Power System Angular, Voltage and Frequency Stability. Power Modulation: basic principles – synchronous and asynchronous links. Voltage Stability Problem in AC/dc systems.

Module 5: MTdc Links (4 hours)

Multi-Terminal and Multi-Infeed Systems. Series and Parallel MTdc systems using LCCs. MTdc systems using VSCs. Modern Trends in HVdcTechnology. Introduction to Modular Multi-level Converters.

Text/References:

1. K. R. Padiyar, "HVDC Power Transmission Systems", New Age International Publishers, 2011.
2. J. Arrillaga, "High Voltage Direct Current Transmission", Peter Peregrinus Ltd., 1983.
3. E. W. Kimbark, "Direct Current Transmission", Vol.1, Wiley-Interscience, 1971.

SEE – 702 VLSI CIRCUITS		
	Topic	
I	Introduction: A Brief History, Preview, MOS Transistors, CMOS Logic, CMOS Fabrication and Layout, Design Partitioning, Logic Design, Circuit Design, Physical Design, Design Verification, Fabrication, Packaging and Testing.	8
I I	Delay: Introduction, Transient Response, RC delay model, Linear Delay	8
	Model, Logical Effort of Paths, Timing Analysis Delay Models. Power: Introduction, Dynamic Power, Static Power	
I I I	Energy – Delay Optimization, Low Power Architectures. Interconnect: Introduction, Interconnect Modelling, Interconnect Impact, Interconnect Engineering, Logical Effort with Wires	8
I V	Dynamic logic circuits: Introduction, basic principle of pass transistor circuits, synchronous dynamic circuit techniques, dynamic CMOS circuit techniques, domino CMOS logic. Semiconductor memories: Introduction, DRAM, SRAM, ROM, flash memory.	8
V	Low – Power CMOS Logic Circuits: Introduction, Overview of Power Consumption, Low – Power Design through voltage scaling, Estimation and Optimization of switching activity, Reduction of Switched Capacitance and Adiabatic Logic Circuits. Design for Testability: Introduction, Fault Types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based and BIST Techniques	8

Text Book:

1. Neil H.E.Weste, David Money Harris, "CMOS VLSI Design – A circuits and Systems Perspective" Pearson, 4th Edition
2. Sung-Mo Kang & Yosuf Leblebici, "CMOS Digital Integrated Circuits: Analysis & Design",TMH, 3rd Edition.

Reference Books:

1. D. A. Pucknell and K. Eshraghian, "Basic VLSI Design: Systems and Circuits", PHI, 3rd Ed.,1994.
2. W.Wolf, Modern VLSI Design: System on Chip, Third Edition, Pearson, 2002.

SEE-703	**Wavelets TRANSFORMS**	**3L:0T:0P**	**3 credits**

Introduction to time frequency analysis; the how, what and why about wavelets, Short-time Fourier transform, Wigner-Ville transform.;Continuous time wavelet transform, Discrete wavelet transform, tiling of the time-frequency plane and wave packet analysis, Construction of wavelets. Multiresolution analysis. Introduction to frames and biorthogonal wavelets, Multirate signal

processing and filter bank theory, Application of wavelet theory to signal denoising, image and video compression, multi-tone digital communication, transient detection.

Text/Reference Books:

1. Y.T. Chan, Wavelet Basics, Kluwer Publishers, Boston, 1993.
2. I. Daubechies, Ten Lectures on Wavelets, Society for Industrial and Applied Mathematics, Philadelphia, PA, 1992.
3. C. K. Chui, An Introduction to Wavelets, Academic Press Inc., New York, 1992.
4. Gerald Kaiser, A Friendly Guide to Wavelets, Birkhauser, New York, 1995.
5. P. P. Vaidyanathan, Multirate Systems and Filter Banks, Prentice Hall, New Jersey, 1993.
6. A.N. Akansu and R.A. Haddad, Multiresolution signal Decomposition: Transforms, Subbands and Wavelets, Academic Press, Oranld, Florida, 1992.
7. B.Boashash, Time-Frequency signal analysis, In S.Haykin, (editor), Advanced Spectral Analysis, pages 418--517. Prentice Hall, New Jersey, 1991.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand time-frequency nature of the signals.
2. Apply the concept of wavelets to practical problems.
3. Mathematically analyze the systems or process the signals using appropriate wavelet functions.

SOE-071

INTRODUCTION TO INDUSTRIAL MANAGEMENT

Unit I

Introduction: Concept and scope of Industrial Management. Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership.

Unit II

Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Social responsibilities of Management, Introduction to Human resources management: Nature of HRM, functions and importance of HRM.

Unit III

Work Study: Introduction, definition, objectives, steps in work study, Method study: definition, objectives, steps of method study, Work Measurement: purpose, types of study — stop watch methods — steps — allowances — standard time calculations — work sampling, Production Planning and Control Inventory Control: Inventory, Cost, Models of inventory control: EOQ, ABC, VED.

Unit IV

Quality Control: statistical quality control, Control charts for variables and attributes, Acceptance Sampling- Single sampling- Double sampling plans, Introduction to TQM.

Unit V

Project Management: Project network analysis, CPM, PERT and Project crashing and resource Leveling.

References:

1. Engineering Management (Industrial Engineering & Management)/ S.C. Sharma & T.R. Banga, Khanna Book Publishing Co. (P) Ltd., Delhi (ISBN: 978-93-86173-072)

2. Industrial Engineering and Management/ P. Khanna, Dhanpatrai publications Ltd.

3. Production & Operation Management /PaneerSelvam /PHI.

4. Industrial Engineering Management/NVS Raju/Cengage Learning.

5. Industrial Engineering Management I RaviShankar/ Galgotia