INDUSTRIAL ECONOMICS AND
PRINCIPLES OF MANAGEMENT (THU 501)

Industrial Economics:

Unit –1.Introduction: Nature and significance of Economics. Meaning of Science, Engineering and Technology and their relationship with economic development.

Unit –2. Basic Concept: The concept of demand and supply. Elasticity of Demand and Supply. Indifference Curve Analysis, Price Effect, Income Effect and Substitution Effect.

Unit –3. Money and Banking: Functions of Money, Value of Money, Inflation and measures to control it. Brief idea of functions of banking system, viz., Commercial and central banking, Business fluctuations.

Management:

Unit –4. Introduction: Definition, Nature and Significance of Management,. Evaluation of Management thought, Contributions of Max Weber, Taylor and Fayol.

Unit –5. Human Behaviour: Factors of Individual Behaviour, Perception, Learning and Personality Development, Interpersonal Relationship and Group Behaviour.

References:

1. Dewett, K.K. / Modern Economic Theory/S.Chand & Co.
2. Luthers Fred/ Organizational Behaviour.
3. Prasad L.M./ Principles of Management.
4. A.W. Stonier & D.C. Horgne / A TextBook of Economic Theory/ Oxford Publishing House Pvt. Ltd.

TEE – 501: Electro-mechanical Energy Conversion - II

L T P
3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. of Lectures
I.	**Synchronous Machine I** Constructional features, Armature winding, EMF Equation, Winding coefficients, equivalent circuit and phasor diagram, Armature reaction, O. C. & S. C. tests, Voltage Regulation using Synchronous Impedance Method, MMF Method, Potier's Triangle Method, Parallel Operation of synchronous generators, operation on infinite bus, synchronizing power and torque co-efficient	1/2	5, 6, 8/ 3	202-210,284-294,413-445,484-486/ 3.1-3.55,3.81-3.112	9
II	**Synchronous Machine II:** Two Reaction Theory, Power flow equations of cylindrical and salient pole machines, Operating characteristics **Synchronous Motor:** Starting methods, Effect of varying field current at different loads, V- Curves, Hunting & damping, synchronous condensor	1/2	8/ 3,5	445-490/ 3.56-3.81, 5.1-5.51	7

III	**Three phase Induction Machine – I** Constructional features, Rotating magnetic field, Principle of operation Phasor diagram, equivalent circuit, torque and power equations, Torque- slip characteristics, no load & blocked rotor tests, efficiency, Induction generator	1/2	9/4	522-564/ 4.1-4.42	8
IV	**Three phase Induction Machine- II** Starting, Deep bar and double cage rotors, Cogging & Crawling, Speed Control (with and without emf injection in rotor circuit.)	1 / 2	9 / 4	572-606 / 4.43-4.100	7
V	**Single phase Induction Motor** Double revolving field theory, Equivalent circuit, No load and blocked rotor tests, Starting methods, repulsion motor. **AC Commutator Motors:** Universal motor, Single phase a.c. series compensated motor, stepper motors	1 / 2	10 / 8,9	629-688 / 8.1- 8.3, 9.1-9.23	4 5

Text Books:

1. D.P.Kothari & I.J.Nagrath, "Electric Machines", Tata Mc Graw Hill
2. Ashfaq Hussain"Electric Machines" Dhanpat Rai & Company

Reference Books:

1. P.S.Bimbhra, "Electrical Machines", Khanna Publisher
2. P.S. Bimbhra, " Generalized Theory of Electrical Machines", Khanna Publishers
3. M.G.Say, "Alternating Current Machines",Pitman & Sons
4. O.C. Taylor, "The performance & design of A.C. Commutator Motors", A.H.Wheeler & Co(P) Ltd.
5. Fitzerald,A.E.,Kingsley and S.D.Umans"Electric Machinery", MC Graw Hill.

TEE-502 Control System

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3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No.of Lectures
1	**The Control System:** Open loop & closed control; servomechanism, Physical examples. Transfer functions, Block diagram algebra, Signal flow graph, Mason's gain formula Reduction of parameter variation and effects of disturbance by using negative feedback	1, 2 1 1	1, 1 2 3	2-08, 6-7 46-83 93-102	1 5 1

2	**Time Response analysis:** Standard test signals, time response of first and second order systems, time response specifications, steady state errors and error constants Design specifications of second order systems: Derivative error, derivative output, integral error and PID compensations, design considerations for higher order systems, performance indices	1 1	5 5	194-214 215-226	3 5
3	**Control System Components:** Constructional and working concept of ac servomotor, synchros and stepper motor **Stability and Algebraic Criteria** concept of stability and necessary conditions, Routh-Hurwitz criteria and limitations **Root Locus Technique:** The root locus concepts, construction of root loci	1 1 1	4 6 7	138-142, 148-163 270-291 299-320	3 3 3
4	**Frequency response Analysis**: Frequency response, correlation between time and frequency responses, polar and inverse polar plots, Bode plots **Stability in Frequency Domain:** Nyquist stability criterion, assessment of relative stability: gain margin and phase margin, constant M&N circles	1 1	8 9	346-365 376-413	5 3
5	**Introduction to Design:** The design problem and preliminary considerations lead, lag and lead-lag networks, design of closed loop systems using compensation techniques in time domain and frequency domain. **Review of state variable technique**: Review of state variable technique, conversion of state variable model to transfer function model and vice-versa, diagonalization, Controllability and observability and their testing.	1 1	10 12	426-475 586-596, 599-504, 617-625	5 4

Text Book:

1. Nagrath & Gopal, "Control System Engineering", 4th Edition, New age International.
2. K. Ogata, "Modern Control Engineering", Prentice Hall of India.

Reference Books:

1. Norman S. Mise, Control System Engineering 4th edition, Wiley Publishing Co.
2. M.Gopal, "Control System; Principle and design", Tata McGraw Hill.
3. M.Gopal," Modern Control system**"**, Tata McGraw Hill.
4. D.Roy Choudhary, "Modern Control Engineering", Prentice Hall of India.

TEE - 503: Elements Of Power Systems

L T P
3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. of Lectures
1	**Power System Components:** Single line Diagram of Power system, Brief description of power system Elements: Synchronous machine, transformer, transmission line, bus bar , circuit breaker and isolator. **Supply System** Different kinds of supply system and their comparison, choice of transmission voltage **Transmission Lines:** Configurations, types of conductors, resistance of line, skin effect, Kelvin's law. Proximity effect	1 3 3	6 2 3,4	155-157 15-25 30-39, 66	2 3 3
2	**Over Head Transmission Lines** Calculation of inductance and capacitance of single phase, three phase, single circuit and double circuit transmission lines, Representation and performance of short, medium and long transmission lines, Ferranti effect. Surge impedance loading	2 3 2 3	2,3 7 4 9,10	13-52 126-164 55-91 194-228	 4 4
3	**Corona and Interference:** Phenomenon of corona, corona formation, calculation of potential gradient, corona loss, factors affecting corona, methods of reducing corona and interference. Electrostatic and electromagnetic interference with communication lines, **Overhead line Insulators:** Type of insulators and their applications, potential distribution over a string of insulators, methods of equalizing the potential, string efficiency.	 2 3 2 2 3	 6 22 6 8 9	 135-146 468-480 146-148 169-183 78 - 88	 3 1 3
4	**Mechanical Design of transmission line:** Catenary curve, calculation of sag & tension, effects of wind and ice loading, sag template, vibration dampers. **Insulated cables:** Type of cables and their construction, dielectric stress, grading of cables, insulation resistance, capacitance of single phase and three phase cables, dielectric loss, heating of cables.	 2 3 2 3	 7 6 9 4	 150-167 102-109 115-116 184-221 46-73	 4 4
5	**Neutral grounding:** Necessity of neutral grounding, various methods of neutral grounding, earthing transformer, grounding practices.	 3 2	 24 11	 499-505 246-256	 3

	Electrical Design of Transmission Lne: Design consideration of EHV transmission lines, choice of voltage, number of circuits, conductor configuration, insulation design, selection of ground wires. **EHV AC and HVDC Transmission:** Introduction to EHV AC and HVDC transmission and their comparison, use of bundle conductors, kinds of DC links, and incorporation of HVDC into AC system.	4 / 5 4	17 / 6 14,15	544-553 / 186-203 459-461, 478-483	3 3

Text Books

1. W. D. Stevenson, "Element of Power System Analysis", McGraw Hill, USA
2. C. L. Wadhwa, "Electrical Power Systems" New age international Ltd. Third Edition
3. Asfaq Hussain, "'Power System", CBS Publishers and Distributors, India
4. *B. R. Gupta, "Power System Analysis and Design" Third Edition, S. Chand & Co.*
5. *M. V. Deshpande, "Electrical Power System Design" Tata Mc Graw Hill.*

Reference Books

1. M. V. Deshpandey, "Elements of Power System Design", Tata McGraw Hill, India
2. 2.Soni, Gupta & Bhatnagar, "A Course in Electrical Power", Dhanpat Rai & Sons, India
3. S. L. Uppal, "Electric Power", Khanna Publishers, India
4. S.N.Singh, " Electric Power Generation, Transmission& distribution." PHI, New Delhi

TEC 507: Analog Integrated Electronics

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3 1 0

Unit No.	**Topic Name**	**Text Book**	**Chapter Nos**	**No. of Lectures**
1	**Frequency response & stability of an Op-Amp:** Frequency response, compensating Networks, Frequency response of internally compensated and uncompensated Op-Amps, High frequency Op-Amps. Equivalent circuit, stability in constant GBP Op-Amp. Circuits	2	6.2-6.6	07
2	**Op-Amp Circuits: Linear Applications** Current to voltage converters, V to I converters, current amplifier, difference Amplifiers, Instrumentation Amplifiers, Integrators & Differentiator.	1	2.1-2.6	07
3	**Active filters & Converters:** First and second order low pass & High pass filters, Band Pass & Band-Reject filters, All-Pass filter, Filter using MATLAB. Voltage to Frequency and Frequency to voltage Converters, Analog to Digital and Digital to Analog Converters.	2 2	8.2-8.10 9.10,9.11	05 03

4	**Non Linear Circuits & Regulators:** Voltage Comparators, Schmitt Triggers, Precision Rectifiers, Analog Switches Peak detectors, sample and Hold circuit, square and Triangular Wave Generators, Linear Regulators Switching Regulators.	1	9.1-9.7 11.4,11.6	09
5	**Non linear Amplifiers & Phase-Locked Loops:** Log/Antilog Amplifiers, Analog Multipliers, Operational Trans conductance Amplifiers (OTA), Phase-Locked Loops, Monolithic PLLs, Noise in Integrated Circuits.	1	13.1-13.5	09

Text Books:

1. Franco Sergio, "Design with Operational Amplifiers and Analog Integrated Circuits" Tata McGraw-Hill
2. Ramakant A. Gayakwad, "Op-Amps and Linear Integrated Circuits" Prentice Hall of India.

Reference Books :

1. James M.Fiore,"Op-Amps and Linear Integrated Circuits: Theory and Applications" Thomson Asia Pvt. Ltd. Singapore
2. Millman J.&Halkias C.C., "Integrated Electronics Analog and Digital Circuits & Systems" McGraw Hill.
3. Soclof,S.,"Application of Analog Integrated Circuits" Prentice Hall of India.
4. Bell, David A., "Operational Amplifiers & Linear ICS" Prentice Hall of India.

TEE – 551: Electro-mechanical Energy Conversion – II Laboratory

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Note: The minimum 8 experiments are to be performed from the following, out of which there should be at least two software based experiments.

1. To perform no load and blocked rotor tests on a three phase squirrel cage induction motor and determine equivalent circuit.
2. To perform load test on a three phase induction motor and draw:
   (i) Torque -speed characteristics
   (ii) Power factor-line current characteristics
3. To perform no load and blocked rotor tests on a single phase induction motor and determine equivalent circuit.
4. To study speed control of three phase induction motor by Keeping V/f ratio constant
5. To study speed control of three phase induction motor by varying supply voltage.
6. To perform open circuit and short circuit tests on a three phase alternator and determine voltage regulation at full load and at unity, 0.8 lagging and leading power factors by (i) EMF method (ii) MMF method.
7. To determine V-curves and inverted V-curves of a three phase synchronous motor.

8. To determine Xd and Xq of a three phase salient pole synchronous machine using the slip test and draw the power-angle curve.
9. To study synchronization of an alternator with the infinite bus by using:
   (i) dark lamp method (ii) two bright and one dark lamp method

Software based experiments (Develop Computer Program in 'C' language or use MATLAB or other commercial software)

10. To determine speed-torque characteristics of three phase slip ring induction motor and study the effect of including resistance, or capacitance in the rotor circuit.
11. To determine speed-torque characteristics of single phase induction motor and study the effect of voltage variation.
12. To determine speed-torque characteristics of a three phase induction motor by (i) keeping v/f ratio constant (ii) increasing frequency at the rated voltage.
13. Draw O.C. and S.C. characteristics of a three phase alternator from the experimental data and determine voltage regulation at full load, and unity, 0.8 lagging and leading power factors.
14. To determine steady state performance of a three phase induction motor using equivalent circuit.

TEE – 552: Control System Laboratory

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Note: The minimum of 10 experiments are to be performed from the following, out of which at least three should be software based.

1. To determine response of first order and second order systems for step input for various values of constant 'K' using linear simulator unit and compare theoretical and practical results.
2. To study P, PI and PID temperature controller for an oven and compare their performance.
3. To study and calibrate temperature using resistance temperature detector (RTD)
4. To design Lag, Lead and Lag-Lead compensators using Bode plot.
5. To study DC position control system
6. To study synchro-transmitter and receiver and obtain output V/S input characteristics
7. To determine speed-torque characteristics of an ac servomotor.
8. To study performance of servo voltage stabilizer at various loads using load bank.
9. To study behaviour of separately excited dc motor in open loop and closed loop conditions at various loads.
10. To study PID Controller for simulation proves like transportation lag.

Software based experiments (Use MATLAB, LABVIEW software etc.)

11. To determine time domain response of a second order system for step input and obtain performance parameters.
12. To convert transfer function of a system into state space form and vice-versa.

13. To plot root locus diagram of an open loop transfer function and determine range of gain 'k' fir stability.
14. To plot a Bode diagram of an open loop transfer function.
15. To draw a Nyquist plot of an open loop transfer function and examine the stability of the closed loop system.

Reference Books:

1. K.Ogata,"Modern Control Engineering" Prentice Hall of India.
2. Norman S.Nise, "Control System Engineering", John Wiley & Sons.
3. M.Gopal, "Control Systems: Principles & Design" Tata Mc Graw Hill.

TEC – 557: Electronics Lab. – II

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Note: The minimum of ten experiments are to be performed from the following:

1. To study biasing of common-emitter transistor using voltage divider method and determine dc quiescent operating point.
2. To study common-emitter amplifier and determine voltage gain, current gain, input impedance and output impedance.
3. To study R-C coupled two-stage common-emitter amplifier and determine voltage gain, current gain, input impedance and output impedance.
4. To study single stage RC-coupled FET amplifier.
5. To study transistor as a switch and determine load voltage and load power when the transistor is ON.
6. To study common-collector amplifier and determine voltage gain, current gain, input impedance and output impedance.
7. To study RC phase shift oscillator.
8. To study Wein bridge oscillator.
9. To determine CMRR of a differential amplifier.
10. To study op-amp based inverting and non-inverting amplifiers and the voltage comparator.
11. To study op-amp based Adder and integrator circuits.
12. To study an RC active filter.
13. To study Op-amp based triangular wave generator.
14. To study a PLL circuit and determine the free running frequency, capture range and lock range.

TEE - 601 : Power System Analysis

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Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. of Lectures

1	**Representation of Power System Components**: Synchronous machines, Transformers, Transmission lines, One line diagram, Impedance and reactance diagram, per unit System. **Symmetrical components**: Symmetrical Components of unbalanced phasors, power in terms of symmetrical components, sequence impedances and sequence networks. **Symmetrical fault analysis**: Transient in R-L series circuit, calculation of 3-phase short circuit current and reactance of synchronous machine, internal voltage of loaded machines under transient conditions.	1,3 1,2,3 1,2,3	6,4 11,13,10 10,12,09	127-162 95-124 275-302, 299-309, 369-392 248-260, 257-265, 327-343	2 3 2
2	**Unsymmetrical faults**: Analysis of single line to ground fault, line-to-line fault and Double Line to ground fault on an unloaded generators and power system network with and without fault impedance. Formation of Z_{bus} using singular transformation and algorithm, computer method for short circuit calculations.	1,2,3 5	12,1,11 3,4,6	305-333, 306-342, 397-415 40-44, 79-92, 167-184	5 5
3	**Load Flows**: Introduction, bus classifications, nodal admittance matrix (Y_{BUS}), development of load flow equations, load flow solution using Gauss Siedel and Newton-Raphson method, approximation to N-R method, line flow equations and fast decoupled method.	1,2,3	18,8,6	612-643, 193-222, 184-235	8
4	**Power System Stability**: Stability and Stability limit, Steady state stability study, derivation of Swing equation, transient stability studies by equal area criterion and step-by-step method. Factors affecting steady state and transient stability and methods of improvement.	1,2,3	14,17,12	373-420, 549-611, 433-505	8
5	**Traveling Waves**: Wave equation for uniform Transmission lines, velocity of propagation, surge impedance, reflection and transmission of traveling waves under different line loadings. Bewlay's lattice diagram, protection of equipments and line against traveling waves.	4	12,13,	762-776, 779-797	7

Text Books:

1. W.D. Stevenson, Jr. " Elements of Power System Analysis", Mc Graw Hill.
2. C.L. Wadhwa, "Electrical Power System", New Age International.

3. Kothari & Nagrath, “Modern Power System Analysis”, Tata Mc Graw Hill.
4. Chakraborthy, Soni,Gupta & Bhatnagar, “Power System Engineering”, Dhanpat Rai & Co.
5. Stagg and El-Abiad, “Computer Methods in Power System Analysis” Tata Mc Graw Hill

Reference Books:

1. L. P. Singh; “Advanced Power System Analysis & Dynamics”, New Age International
2. Hadi Sadat; “Power System Analysis”, Tata McGraw Hill.
3. A. R. Bergen and V. Vittal; “Power System Analysis”, Pearson Publication.

TEE – 603: Power Electronics

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3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. Of Lectures
1	**Power semiconductor Devices:**				
	Power semiconductor devices their symbols and static characteristics	1	1	5-12	1
	Characteristics and specifications of switches, types of power electronic	1	1	16-23	1
	circuits	1; 2	4; 10	123-137; 604-616	3
	BJTO operation steady state and switch characteristics, switching limits	1; 2	4; 10	137-150; 651-656 & 667-674	2
	Operation and steady state characteristics of MOSFET and IGBT	1;2	7; 1	304-311; 7-13& 19-21	2
	Thyristor – Operation V- I characteristics, two transistor model, methods of turn-on Operation of GTO, MCT and TRIAC	1; 2	7; 10	318- 321, 325-328; 684-686, 719-720, 590-595	
2	**Power Semiconductor Devices(Contd)**				
	Protection of devices.	1; 2	18; 11	803-817; 754-776	2
	Series and parallel operation of thyristors	2	3		2
	Commutation techniques of thyristor	2	1	110-116&120-127	
	DC-DC Converters:				
	Principles of step-down chopper, step down chopper with R-L load Principle of step-up chopper, and operation with RL load, classification of choppers	1; 2	5; 6	24-40 166-185; 387-419	3
3	**Phase Controlled Converters**				
	Single phase half wave controlled rectifier with resistive and inductive loads, effect of freewheeling diode.	2; 1	4; 10	134-141; 432-434	1
	Single phase fully controlled and half controlled bridge converters.	2; 1	4; 10	151-167; 434-	2

	Performance Parameters			438 & 467-472	
	Three phase half wave converters	2; 1	4; 10		2
	Three phase fully controlled and half controlled bridge converters, Effect of source impedance	2; 1	4; 10	187-144; 443-451&474-478	1
	Single phase and three phase dual converters	1	10	200-209; 492-493 440-443&453-455	2
4	**AC Voltage Controllers**				
	Principle of On-Off and phase controls	1; 2	11; 9	501-505; 537-538	1
	Single phase ac voltage controller with resistive and inductive loads	1; 2	11; 9	506-513; 538-548	2
	Three phase ac voltage controllers (various configurations and comparison)	2	9		1
	Single phase transformer tap changer.	1; 2	11; 9	555-561	1
	Cyclo Converters Basic principle of operation, single phase to single phase, three phase to single phase and three phase to three phase cyclo converters, output voltage equation	2; 1	7; 11	522-526; 549-553 476-490&494-496; 526-534	2
5	**Inverters**				
	Single phase series resonant inverter	1; 2	8; 5	353-358;267-276	1
	Single phase bridge inverters	1; 2	6; 5		1
	Three phase bridge inverters	1; 2	6; 5	227-236; 290-294	1
	Voltage control of inverters	1; 2	6; 5	237; 248; 315-327	2
	Harmonics reduction techniques	1; 2	6; 5		1
	Single phase and three phase current source inverters	1; 2	6; 5	248-256&264-270;329-339 280-284;340-349 285-288; 349-362	1

Text Books:

1. M.H. Rashid,"Power Electronics: Circuits, Devices & Applications", Prentice Hall of India Ltd. 3rd Edition,2004.
2. M.D. Singh and K.B.Khanchandani, "Power Electronics"Tata MC Graw Hill, 2005

Reference Books:

1. M.S. Jamil Asghar, "Power Electronics" Prentice Hall of India Ltd., 2004
2. A. Chakrabarti,rai & Co. "Fundamentals of Power Electronics &Drives"Chanpat Rai & Co.
3. K.Hari Babu , "Power Electronics" Switch Publications.

TEC – 605: Antenna & Wave Propagation

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3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. of Lectures
1	**Antenna Principles:** Potential Functions & Electromagnetic Field, Current Elements, Radiation from Monopole & Wave Dipole Network Theorems, Directional Properties of Dipole Antenna Antenna gain, effective area, antenna Terminal impedance, antenna as an opened out Transmission Line, Practical Antennas and Methods of Excitation, Transmission Loss between Antennas, Antenna Temperature and Signal to Noise Ratio.	1 1 1	10 11 11	311-333 345-356 374-416	3 1 4
2	**Antennas Arrays:** Two Element Array, Horizontal Patterns in Broadcast Arrays, Linear Arrays, Binomial Array Tchebyscheyff Distribution	1 1	11 12	359-373 438-442	6
3	**Wave Propagation:** Modes of Propagation, Plane Earth Reflection, Space wave and Surface Wave, Elevated Dipole Antennas above a Plane Earth, Wave Tilt of the Surface Wave, Spherical Earth Propagation. Tropospheric Wave. Ionosphere Propagation, Sky Wave Transmission Calculations, Effects of the Earth's Magnetic Field, Wave Propagation in the Ionosphere, Virtual Height, MUF/LUF, Skip Distance, Duct Propagation, Space wave	1 1	16 17	629-666 667-693	3 4
4	**Wave Guides:** Rectangular, Circular, Transmission Line Analogy for Wave guides, Dielectric Slab Wave guide	1	8	244-276	9
5	**Microwave Generation**: Conventional Vacuum Tubes, Klystrons; Reflex & Multicavity, TWT, Magnetrons, FWCFA,BWCFA & BWO, IMPATT, Parametric Devices, Gunn, InP,CdTe Diodes	2 2 2 2 2 2	9 10 8 8 7 7	338-397 427-465 309-313 320-330 269-272 293-296	8

Text Books :

3. Jordan Edwards C. and Balmain Keith G., "Electromagnetic Waves and Radiating Systems" Prentice Hall of India.
4. Liao,S.Y., "Microwave Devices & Circuits" Prentice Hall of India Third Edition.

Reference Books :

1. Kraus, John D. & Mashefka, Ronald J.,"Antennas: For All Applications" Tata McGraw Hill, Third Edition.
2. Prasad, K.D., "Antennas and Wave Propagation" Khanna Publications
3. Collin, R., "Antennas and Radio wave Propagation" Tata Mc Graw-Hill
4. Hayt Jr. William H.,"Engineering Electromagnetic" Tata McGraw-Hill
5. Das, Annaparna & Das, Sisir K, "Microwave Engineering" Tata McGraw Hill.
6. Roy, Sitesh Kumar & Mitra, Monojit, "Microwave Semiconductor Devices" Prentice Hall of India.

TCS:605 Object Oriented Systems and C++

L T P
3 1 0

Unit No.	Topic Name	Text Book No.	Chapter No.	Nos. of Lectures
I	Object & classes, Links and Associations, Generalization and Inheritance, Aggregation, Abstract classes, Generalization, Multiple Inheritance, Meta data.	1	3,4	7
II	Events and States, Operations and Methods, Nested state diagrams, Concurrency, Relation of Object and Dynamic Models.	1	5	6
III	Functional Models, Data flow diagrams, Specifying Operations, Constraints, OMT Methodologies, examples and case studies to demonstrate methodology	1	6,7	7
IV	Principles of object oriented programming, Tokens, Expressions , classes, Functions, Constructors, Destructors, , Functions overloading, Operator Overloading, I/O Operations. Real life applications, Inheritance Extended Classes, Pointer. Virtual functions, Polymorphisms, Working with files, Class templates, Function templates,Exception handling, String manipulation. Translating object oriented design into implementations. .	2	1 to 13 & 15	10
V	Introduction to Unix/Linux operating systems. Concept of file system, handling ordinary files,concept of shell, vi editor, Basic ile attributes, concept of process, Basic system administration.	3	1,5 to 8, 10,13,17	10

Text Books:

1. Rambaugh James etal, "Object Oriented Design and Modeling",PHI-1997
2. Balagurusamy E," Object Oriented Programming with C++", TMH,2001 '
3. Sumitabha Das “Unix concepts & application” TMH

Reference Books:

1. Dillon and Lee, "Object Oriented Conceptual Modeling", New Delhi PHI-1993
2. Lipman, Stanley B, Jonsce Lajoie, .. *C++* Primer Reading", AWL, 1999
3. Stephen R. Shah, "Introduction to Object Oriented Analysis and Design", TMH
4. Berzin Joseph, "Data Abstraction: the object oriented approach using *C++"*, McGraw Hill
5. Budd, Timothy, "An Introduction to Object Oriented Programming", Pearson 2000

TEC 606: Analog & Digital Communication Engineering

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3 1 0

Unit No.	Topic Name	Text Book Nos	Chapter Nos	Page Nos	No. of Lectures
1	**Elements of communication system and its limitations**	1	1	1-10	4
	Amplitude Modulation:				
	Amplitude modulation and detection,	1	2	90-92	4
	Generation and detection of DSB-SC, SSB and vestigial side band modulation, carrier	1	2	93-101	2
	acquisition	2	3,6	43-52	4
	AM transmitters and receivers, super hetrodyne			120-	
	receiver, IF amplifiers, AGC circuits	2	15	144	1
	Frequency Division multiplexing			564-566	
2	**Angle Modulation:**				
	Basic definitions	1	2	107-	1
	Narrow band and wideband frequency	1	2	109	2
	modulation, transmission bandwidth of FM			109-	
	signals	1	2	119	2
	Generation and detection of frequency				
	modulation	2	2	120-	2
	Noise :			124	
	External noise, internal noise	1	2		2
	Noise calculations, signal to noise ratio			15-25	
	Noise in AM and FM systems				
				132-147	
3	**Pulse Modulation:**	1	3	183-	3
	Introduction, sampling process Analog Pulse			193	
	Modulation Systems-Pulse Amplitude				
	Modulation, Pulse width modulation and Pulse				
	Position Modulation.				
	Waveform coding Techniques:	1	3		5
	Discretization in time and amplitude,			193-	
	Quantization process, quantization noise, Pulse			208,	

	code Modulation, Differential Pulse code Modulation, Delta Modulation and Adaptive Delta Modulation.			218-233	
4	**Digital Modulation Techniques:** Types of digital modulation, waveforms for amplitude, frequency and phase shift keying, methods of generation of coherent and non-coherent, ASK,FSK and PSK, comparison of above digital techniques.	3	5	172-215	7
5	**Time Division Multiplexing:** Fundamentals, Electronic Commutator, Bit/byte interleaving, TI carrier system, synchronization and signaling of TI, TDM and PCM hierarchy, synchronization techniques **Introduction to Information Theory:** Measure of information, Entropy & Information rate, channel capacity, Hartley Shannan law, Huffman coding, shannan Fano coding.	1 1	3 9	211-217 568-575, 578-580, 587-589	4 3

Text Books :

1. Simon Haykin," Communication Systems" John Wiley & Sons 4th Edition
2. G.Kennedy and B. Davis,"Electronic Communication Systems" 4th Edition, Tata McGraw Hill
3. Simon Haykin, "Digital Communications" John Wiley & Sons

Reference Books :

1. B.P. Lthi, "Modern Analog & Digital Communication Systems" Oxford University Press.
2. Taub & Schilling, "Communication System: Analog and Digital" Tata Mc Graw Hill
3. R.P.Singh & S.D. Sapre, "Communication Systems Analog and Digital" Tata McGraw Hill.

TEE-651: Power Electronics Laboratory

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Note: The minimum of 10 experiments is to be performed out of which at least three should be software based.

1. To study V-I characteristics of SCR and measure latching and holding currents.
2. To study UJT trigger circuit for half wave and full wave control.
3. To study single-phase half wave controlled rectified with (i) resistive load (ii) inductive load with and without free wheeling diode.
4. To study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and inductive loads.

5. To study three-phase fully/half controlled bridge rectifier with resistive and inductive loads.
6. To study single-phase ac voltage regulator with resistive and inductive loads.
7. To study single phase cyclo-converter
8. To study triggering of (i) IGBT (ii) MOSFET (iii) power transistor
9. To study operation of IGBT/MOSFET chopper circuit
10. To study MOSFET/IGBT based single-phase series-resonant inverter.
11. To study MOSFET/IGBT based single-phase bridge inverter.

Software based experiments:

1. To obtain PSPICE simulation of SCR and GTO thyristor.
2. To obtain PSPICE simulation of Power Transistor and IGBT.
3. To obtain PSPICE simulation of single phase fully controlled bridge rectifier and draw load voltage and load current waveform for inductive load.
4. To obtain PSPICE simulation of single phase full wave ac voltage controller and draw load voltage and load current waveforms for inductive load.
5. To obtain PSPICE simulation of step down dc chopper with L-C output filter for inductive load and determine steady-state values of output voltage ripples in out put voltage and load current.

References:

1. M.H.Rashid, "Power Electronics: Circuits, Devices and Applications", 3rd Edition, prentice Hall of India.
2. D.W. Hart, "Introduction to power Electronics" prentice hall Inc. 1997.

TCS:655 Object Oriented Systems & C++ Lab

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1. Programs to demonstrate arithmetic , relational operators, pointers & I/O functions of C++

2. Programs to demonstrate

   a. Constructors
   b. Destructors
   c. Inheritance
   d. Polymorphism
   e. Operator Overloading
   f. Function overloading

3. Program to demonstrate

   a.In-Line function
   b.Virtrual Function.
   c. Friend functions

4. Programs to demonstrate File operations in C++
5. Programs to demonstrate unix commands

TEC 656: Analog and Digital Communication Laboratory

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Note: The minimum 10 experiments are to be performed from the following:

1. To study amplitude modulation using a transistor and determine depth of modulation.
2. To study generation of DSB-SC signal using balanced modulator.
3. To study generation of SSB signal
4. To study envelope detector for demodulation of AM signal and observe diagonal peak clipping effect.
5. To study super heterodyne AM receiver and measurement of sensitivity, selectivity and fidelity.
6. To study frequency modulation using voltage controlled oscillator.
7. To detect FM signal using Phase Locked Loop.
8. To measure noise figure using a noise generator.
9. To study PAM, PWM and PPM.
10. To realize PCM signal using ADC and reconstruction using DAC and 4 bit/8bit system. Observe quantization noise in each case.
11. To study Delta Modulation and Adaptive Delta Modulation.
12. To study PSK-modulation system.
13. To study FSK-modulation system.
14. To study sampling through a Sample-Hold circuit and reconstruction of the sampled signal and observe the effect of sampling rate & the width of the sampling pulses.
15. To study functioning of colour television
16. Fabricate and test a PRBS generator
17. Realization of data in different forms, such as MRZ-L,NRZ - M&N,NRZ-S.
18. Manchester coding & decoding (Biphase L) of NRZ-L data.

U.P. TECHNICAL UNIVERSITY

LUCKNOW

Revised

Syllabus

of

B.Tech. Electrical & Electronics Engineering

3rd yr. (V & VI Semester)

(Effective from session 2006-07)