GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of ELECTRICAL & ELECTRONICS ENGINEERING

COURSE STRUCTURE

B. Tech. ELECTRICAL & ELECTRONICS ENGINEERING

III YEAR **I SEMESTER**

S.No.	Subject Code	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
			L	T	P		Int.	Ext.	Total
1	14129501	Managerial Economics and Financial Analysis	3	1	-	3	30	70	100
2	14120502	Control Systems*	3	1	-	3	30	70	100
3	14120503	Power Systems-II	3	1	-	3	30	70	100
4	14120504	Electrical Machines-III	3	1	-	3	30	70	100
5	14120505	Power Electronics	3	1	-	3	30	70	100
6	14120506	Linear & Digital IC Applications	3	1	-	3	30	70	100
7	14129597	Soft Skills - II	3	-	-	-	-	-	-
8	14120511	Electrical Machines-II Lab	--	-	3	2	50	50	100
9	14120512	Electrical Measurements Lab*	--	-	3	2	50	50	100
10	14120521	Mini Project - I	-	-	3	2	50	-	50
		Total	**21**	**6**	**9**	**24**	**330**	**520**	**850**

L- LECTURE T- TUTORIAL P – PRACTICAL Int. – INTERNAL Ext. – EXTERNAL C – CREDITS

III YEAR **II SEMESTER**

S. No.	Subject Code	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
			L	T	P		Int.	Ext.	Total
1	14120602	Switchgear and Protection	3	1	-	3	30	70	100
2	14124603	Microprocessors & Microcontrollers and its applications	3	1	-	3	30	70	100
3	14120604	Power System Analysis*	3	1	-	3	30	70	100
4	14120605	HVDC Transmission*	3	1	-	3	30	70	100
5	14120606	Power Semiconductor Drives	3	1	-	3	30	70	100
6	14129601	Management Science	3	1	-	3	30	70	100
7	14120611	Power Electronics Lab	--	--	3	2	50	50	100
8	14120612	Control Systems Lab*	--	--	3	2	50	50	100
9	14129697	IPR & Patents*	--	--	-	-	-	-	-
		Total	**21**	**6**	**6**	**22**	**280**	**520**	**800**

L- LECTURE T- TUTORIAL P – PRACTICAL Int. – INTERNAL Ext. – EXTERNAL C – CREDITS

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14129501	**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**		

Course Aim

The aim of this is to equip the students with fundamental concepts of economics, budgeting, management & accounting. It helps them to understand the intricacies of business units. The study of this subject strengthens them to start an enterprise on their own accord.

Course Outcomes:

Upon successful completion of the course, the student be familiar with and be able to:

- Know economic activities performed by the businessmen
- Aware the significance of demand, its analysis, measurement of demand and its forecasting
- Understand the different structures of market covering how price is determined under different market structures.
- Gain the knowledge how double entry book keeping will give an exposure to the maintenance of

books of records and allocation of profits in an enterprise?

- Know how all allocation of capital plays a vital role in a business organization?

Unit – I:

Objective: To understand the concept and nature of Managerial Economic s and its relationship with other disciplines, Concept of Demand and Demand forecasting for proper production planning

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement-Demand forecasting and its Methods.

Unit – II:

Objective: To understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions-Cobb-Douglas Production function-Economics of Scale-Cost Concepts-Opportunity Cost-Fixed Vs Variable Costs-Explicit Costs Vs Implicit Costs-Out of Pocket Costs Vs Imputed Costs-Cost Volume Profit analysis-Determination of Break-Even Point (Simple Problem).

Unit – III:

Objective: To understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, And Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

Unit – IV:

Objective: To know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company– State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

Unit – V:

Objective: To understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems, Preparation of Journal – Subsidiary Books- Ledger – Cash Book – Trail Balance – Preparation of Financial statements, Analysis if Financial statements through Ratio Analysis (Simple Problems)

Unit – VI:

Objective: To understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods.

Capital, Capital Budgeting:

Capital, Significance of Capital, Sources for finance (Capital) – Meaning of Capital Budgeting Need for Capital Budgeting – Techniques of Capital Budgeting – Traditional and Modern Methods.

TEXT BOOKS

1. Prof.J.V.Prabhakara Rao, Prof.P.Venkata Rao. "Managerial Economics and Financial Analysis" , Ravindra publication.
2. Dr.A.R.Aryasri- Managerial Economics and Financial Analysis – TMH Publications.
3. Dr.N.Appa Rao, Dr.P.Vijay Kumar 'managerial Financial Analysis', Cengage Publications New Delhi

REFERENCES:

1. Dr. B. Kuberudu and Dr. T. V. Ramana : Managerial Economics & Financial Analysis, Himalaya Publishing House
2. Dr.P.V.V.Satyanayana, "Managerial Economics & Financial Analysis" New Delhi

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14120502	**CONTROL SYSTEMS**		

Course Objective	Course Outcome
• To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function.	• Ability to derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
• To analyze the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers.	• Capability to determine time response specifications of second order systems and to determine error constants.
• To investigate the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.	• Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
• To present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.	• Capable to analyze the stability of LTI systems using frequency response methods.
• To discuss basic aspects of design and compensation of linear control systems using Bode plots.	• Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.
• Ability to formulate state models and analyze the systems. To present the concepts of Controllability and Observability.	• Ability to represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.

UNIT – I

Mathematical modeling of control systems: Introduction of control systems, Classification of control systems, Open Loop and closed loop control systems and their differences, Feed-Back Characteristics, transfer function of linear system, Differential equations of electrical networks, Translational and Rotational mechanical systems, Transfer Function of DC Servo motor - AC Servo motor- Synchro-transmitter and Receiver, Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-II

Time response analysis: Standard test signals - Time response of first order systems –Time response of second order systems - Time domain specifications - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – III

Stability and rootlocus technique: The concept of stability – Routh's stability criterion –limitations of Routh's stability – The root locus concept - construction of root loci (Simple problems).

UNIT–IV

Frequency response analysis: Introduction, Frequency domain specifications-Bode diagrams- transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Stability criterion.

UNIT–V

Classical control design techniques: Lag, Lead, Lag-Lead compensators, design of compensators – using Bode plots.

UNIT–VI

State space analysis of continuous systems: Concepts of state, state variables and state model, state space representation of transfer function, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India, 2nd Edition

REFERENCE BOOKS:

1. Control Systems, Manik Dhanesh N, Cengage publications .
2. Control Systems principles and design, M.Gopal, Tata Mc Graw Hill education Pvt Ltd., 4th Edition.
3. Control Systems Engineering, S.Palani, Tata Mc Graw Hill Publications.

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14120503	**POWER SYSTEMS–II**		

Course Objective	Course Outcome
• To compute inductance and capacitance of transmission lines and to understand the concepts of GMD, GMR.	• Able to understand parameters of various types of transmission lines for using calculation and behavior during different operating conditions.
• To study short and medium length transmission lines, their models and performance computation.	• Able to understand the insight into specific transmission lines short and medium type which would have application in medium and high voltage power transmission systems.
• To study the performance and modeling of long transmission lines.	• Student will be able to understand the surge propagation, reflection and refraction in transmission lines. such output will be useful in protecting transmission line insulators and designing level of insulation coordination at various high voltages.
• To study the transient on transmission lines.	• Able to utilize it for understanding the surge behaviour of transmission line for protection of connects equipments, viz. power transformer and system connected shunt reactors.
• To study the factors affecting the performance of transmission lines and power factor improvement methods.	• Able to understand various phenomenon related to charged line transmitting different level of power.
• To discuss sag and tension computation of transmission lines as well as to study the over head insulators.	• Able to understand physical and geometrical parameters of transmission line for safe and efficient performance during operating condition of voltage and power.

UNIT–I

Transmission Line Parameters: Types of conductors – Calculation of resistance for solid conductors – Calculation of inductance for single phase and three phase– Single and double circuit lines– Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition– Numerical Problems–Calculation of capacitance for 2 wire and 3 wire systems – Effect of ground on capacitance – Capacitance calculations for symmetrical and asymmetrical single and three phase–Single and double circuit lines–Numerical Problems.

UNIT–II

Performance of Short and Medium Length Transmission Lines: Classification of Transmission Lines – Short, medium, long line and their model representations –Nominal-T–Nominal-Pie and A, B, C, D Constants Mathematical Solutions to estimate regulation and efficiency of all types of lines – Numerical Problems.

UNIT–III

Performance of Long Transmission Lines: Long Transmission Line–Rigorous Solution – Evaluation of

A,B,C,D Constants–Interpretation of the Long Line Equations – Incident, Reflected and Refracted Waves –Surge Impedance and SIL of Long Lines–Wave Length and Velocity of Propagation of Waves – Representation of Long Lines – Equivalent-T and Equivalent Pie network models (Numerical Problems).

UNIT–IV

Various Factors Governing the Performance of Transmission line: Skin and Proximity effects – Description and effect on Resistance of Solid Conductors –Ferranti effect – Charging Current – Effect on Regulation of the Transmission Line

–Corona – Description of the phenomenon–Factors affecting corona–Critical voltages and power loss – Radio Interference- Shunt Compensation –Power factor improvement methods.

UNIT–V

Sag and Tension Calculations and Overhead Line Insulators: Sag and Tension calculations with equal and unequal heights of towers– Effect of Wind and Ice on weight of Conductor–Numerical Problems – Stringing chart and sag template and its applications–Types of Insulators – String efficiency and Methods for improvement–Numerical Problems – Voltage distribution–Calculation of string efficiency– Capacitance grading and Static Shielding.

UNIT – VI

Power System Transients: Types of System Transients – Travelling or Propagation of Surges – Attenuation–Distortion – Reflection and Refraction Coefficients – Termination of lines with different types of conditions – Open Circuited Line–Short Circuited Line – T-Junction– Lumped Reactive Junctions (Numerical Problems).

Text Books:

1. Electrical power systems – by C.L. Wadhwa, New Age International (P) Limited, Publishers, 1998.
2. Modern Power System Analysis by I.J. Nagarath and D.P.Kothari, Tata Mc Graw Hill, 2nd Edition.
3. Electrical Power Systems by P.S.R. Murthy, B.S. Publications.

Reference Books:

1. Power system Analysis–by John J Grainger William D Stevenson, TMC Companies, 4th edition
2. Power System Analysis and Design by B.R. Gupta, Wheeler Publishing.
3. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S. Bhatnagar A .Chakrabarthy, DhanpatRai & Co Pvt. Ltd.

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14120504	**ELECTRICAL MACHINES – III**		

Course Objective	**Course Outcome**
• To discuss e.m.f generation principle of synchronous generator and armature reaction effect.	• The structure of synchronous machines and design the windings.
• To study the effect of load at different power factors, methods of predetermination of regulation for non– salient and salient pole generators.	• Develop solutions for regulation of both non salient pole and salient pole synchronous generators.
• To study the parallel operation and the concepts of transfer of real and reactive powers.	• Able to known the role of synchronous generators operation when connected to an infinite bus or when operating in parallel.
• To understand the operation and performance of synchronous motor.	• Analyze the performance of synchronous motor for development of torque and power factor correction.
• To study the power circle diagrams and methods of starting of synchronous motor.	• Able to known hunting phenomenon and methods of starting of synchronous motor.
• To study the application of "Double revolving field" theory for single– phase induction motor and appreciate the function and application of a.c series motor	• To Analyze the performance of single phase induction and ac series motors.

UNIT–I

Construction and operation of Synchronous generator

Constructional features of non–salient and salient pole type – Armature windings –Distributed and concentrated windings – Distribution– Pitch and winding factors –E.M.F equation–Improvements of waveform and armature reaction– Numerical problems.

UNIT – II

Voltage regulation of synchronous generator

Voltage regulation by synchronous impedance method– MMFmethod and Potier triangle method–Phasor diagrams– Two reaction analysis of salient pole machines and phasor diagram– Numerical problems.

UNIT –III

Parallel operation of synchronous generators

Parallel operation with infinite bus and other alternators – Synchronizing power – Load sharing –Transfer of real and reactive power– Numerical problems.

UNIT–IV

Synchronous motor – operation

Synchronous Motor principle and theory of operation– Phasor diagram – Starting torque–Variation of current and power factor with excitation – Synchronous condenser – Mathematical analysis for power developed– Numerical problems.

UNIT – V

Starting methods and performance of Synchronous motor

Excitation and power circles – Hunting and its suppression – Methods of starting – Synchronous

induction motor.

UNIT – VI

Single Phase Motors

Introduction to Single phase induction motors – Constructional features and the problem of starting– Double revolving field theory–AC Series motor–Compensation.

Text Books:

1. Electrical Machines – by P.S. Bhimbra, Khanna Publishers.
2. The Performance and Design of AC Machines – by M.G.Say, ELBS and Ptiman & Sons.

Reference Books:

1. Electric Machinery – by A.E. Fitzgerald, C. Kingsley and S.Umans-by Mc Graw–Hill Companies, 5th edition, 1990.
2. Theory of Alternating Current Machinery by Langsdorf, Tata Mc Graw–Hill, 2nd edition.
3. Analysis of Electric Machinery and Drive systems – by Paul C. Krause, Oleg Wasynczuk and Scott D.Sudhoff, wiley publications, 2nd edition Publishers.

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14120505	**POWER ELECTRONICS**		

Course Objective	Course Outcome
• To design firing circuits for SCR, and to study the characteristics of various power semiconductor derive and analyze the operation of diode bridge rectifier.	• To study the characteristics of Power semi conductor devices & analyze the operation of diodes
• Triggering methods & Operation of single Phase controlled rectifiers	• To design firing circuits for SCR analyze the operation of single phase controlled rectifiers
• To understand the operation of single phase full–wave converters and analyze harmonics in the input current.	• To understand the operation of single phase semi converters and analyze harmonics in the input current.
• To study the operation of three phase full–wave converters and dual converter& AC-AC Converters.	• To understand the operation of three phase converters and analyze harmonics in the input current. and analyze the operation of AC voltage converters
• To analyze the operation of single phase cyclo converters and high frequency dc–dc converters.	• The operation of cycloconverter and DC – DC converters with low & high frequency
• To understand the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.	• To understand the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.

UNIT–I

Power Semi Conductor Devices: Introduction of Diodes and Diode reverse recovery characteristics Diode bridge rectifier with R–load and capacitive filter–Output voltage and input current waveforms. Thyristors–Silicon controlled rectifiers (SCR's) Basic theory of operation of SCR–Static characteristics– Turn on and turn off methods–Dynamic characteristics of SCR– Snubber circuit design–Numerical problems –Characteristics of power MOSFET and power IGBT—Diode bridge rectifier with R–load and capacitive filter–Output voltage and input current waveforms.

UNIT–II

Phase Controlled Converters –AC to DC Converters: Firing circuits for SCR– single phase Half wave converters with R,RL and RLE loads– Derivation of average load voltage and current– Effect of freewheeling diode for RL load. Single phase full converter Operation with R, RL and RLE loads– Derivation of average voltage and current – Effect of source Inductance.

UNIT–III

Semi Converters (Half Controlled): Operation with R, RL and RLE loads – Harmonic analysis for input current waveform in a system with a large load inductance –Calculation of input power factor.

UNIT–IV

Three Phase controlled Rectifiers & AC-AC Converters: Full converter with R and RL loads–Semi converter (Half Controlled) with R and RL loads– Derivation of load voltage–Line commutated Inverter

operation–Dual converters with non–circulating and circulating currents. Operation of AC voltage controller with R& RL Loads and operation of single phase stepup cyclo converters & operation of single phase stepdown cyclo converter

UNIT – V

DC–DC Converters: High frequency DC–DC converters**:** Buck Converter operation– Time ratio control and current limit control strategies–Voltage and current waveforms–Derivation of output voltage–Boost converter operation–Voltage and current waveforms–Derivation of output voltage – Buck-Boost converter operation –Voltage and current waveforms.

UNIT – VI

DC–AC Inverters: Single phase inverters– Unipolar and bipolar switching–Three phase Inverters (120^0 and 180^0 modes of operation) –PWM techniques–single PWM ,Multiple PWM Sinsoudial PWM Sine triangular PWM technique– amplitude and frequency modulation Indices –Harmonic analysis.

Text Books:

1. Power Electronics: Circuits, Devices and Applications – by M. H. Rashid, Prentice Hall of India, 2nd edition, 1998
2. Power Electronics: converters, applications & design -by Nedmohan, Tore M. Undeland, Robbins by Wiley India Pvt. Ltd.
3. Power Converter Circuits -by William Shepherd, Li zhang, CRC Taylor & Francis Group.

III YEAR – I SEMESTER	T	P	C
	3+1	0	3
Sub Code:14120506	**LINEAR & DIGITAL IC APPLICATIONS**		

Course Objective: The student will be able to

- **Draw a block diagram representing a typical op-amp with various definitions.**
- **Draw and explain the open-loop configuration and feedback configuration and can determine Voltage gain, the input resistance, the output resistance.**
- **Perform various mathematical Operations, Logarithmic Operations, and Instrumentation Amplifier with relevant Circuits.**
- **Design waveform generators (Astable, Monostable, Schmitt Trigger) using Single Op-Amp.**
- **Study of 555 timer & its applications using Astable and Monostable Operations.**
- **Study the operation & applications of PLL.**
- **Explain the operation of A/D and D/A Converters.**
- **Analyze various parameters of logic families.**

UNIT–I

Objective: To learn the concepts of integrated circuits and differential amplifiers.

Introduction to Operational Amplifier:

Block diagram of Typical Op–Amp With Various Stages– BJT Differential Amplifier With R_E DC Analysis– AC Analysis –BJT differential amplifier with constant current source – Analysis Different input/output configurations dual input balanced output–Dual input unbalanced output–Signal input balanced output–Signal input unbalanced output–AC analysis with r– parameters –Current repeater circuits–Current mirror circuits–Analysis– Level translator – Cascade differential amplifier– FET differential amplifier.

UNIT–II

Objective: To Study DC and AC characteristics of OP-AMP's and its effects on outputs and their compensation techniques.

OP–AMP Parameters:

Input offset voltage – Input off–set current–Input bias current–Differential input resistance–Common mode rejection ratio–Slew ratio–PSRR–Large signal voltage gain–Output voltage swing transient's response–definitions and explanations. Measurement of bias current–Measurement of offset currents–Measurement of offset voltage –Measurement of slew rate – Output offset voltage balancing circuits–Bias current compensations circuit–Dual power suppliers with shunt capacitance filter– Ideal operational amplifier properties–Ideal assumptions–Basic circuits such as non inverting type comparator–Inverting type comparator–Voltage follower– Inverting amplifier–Non–inverting amplifier.

UNIT–III

Objective: To Study the linear and non-linear applications of operational amplifiers.

Ideal Operational Amplifier Theory and Basic Circuits:

Summing amplifier– Non–inverting summing amplifier–sub-tractor– Differentiator–Integrator– Scale changer–Instrumentation amplifier– V to I and I to V convertors–Log and Anti–log amplifiers-Zero crossing detector– Schmitt-trigger peak detector– Half-wave and full-wave rectifiers– Precision diode–Non-ideal operational amplifier non–inverting amplifier– inverting amplifier– closed-loop gain–Input and output resistance equivalent circuits. Fix voltages Regulators 78XX–79XX sering and as currents sources– Dual power supply using 78XX and 79XX sering.

UNIT–IV

Objective: To Study IC 555 timer, PLL and VCO with their applications.

Wave form generation using op–amps and PLL:

Design of Astable multivibrator –Monostable multivibrator using signal op-amp–Trigring waveform generator 555 timer**:**Introduction– Pindiagram–Functional diagram for 8pin DIP–Design of Astable and monostable multi– Astable applicatio–Monostable applications– PLL**:** Introduction,basic blockdiagram– Furctions of each block–566 VCO– 565 PLL block diagram –Function of each block–Applications of PLL–Frequency multiplier role of each pin frequency transalation– AM–FM and FSK demodulators.

UNIT–V

Objective: To Study and understand different types of ADCs and DACs.

D to A and A to D Convertors:

Digital to Analog Convertors(D to A) – Introduction–Specifications–Basic DAC techniques– Weighted resistor DAC– R–2R ladder DAC–Invested R– 2R –Output expression for each type.

Analog to Digital Convertors

Introduction–Specifications–Parallel comparator type–Counter type–Dual slope–Successive approximation type ADCs– Merits and demerits of each type, Comparison of different types.

UNIT–VI

Objective: To learn the concepts of Digital Logic Families.

Digital Logic Families: Introduction to logic families, CMOS logic, CMOS steady state and dynamic electrical behavior, CMOS logic families. bipolar logic, transistor-transistor logic, TTL families.

Text Books:

1. OP–AMPS and liner integrator circuits by Ramakanth A Gayakwad (PHI).
2. Linear Integrated Circuits by D.Roy chowdary, New age international.
3. Op–amp and linear integrated circuits by sanjay sharma, S.K.Kataria & son's New Delhi.
4. Digital Design Principles & Practices – John F.Wakerly, PHI/ Pearson Education Asia, 3rd Edition, 2005

Reference Books:

1. Micro Electronics– Milliman Mc Graw Hill.
2. Analog Electronics– L.K.Maheswari, PHI.
3. Linear Integrated circuits by S.Salivahan, TMH.

III YEAR – I SEMESTER	T	P	C
	3	-	-
Sub Code: 14129597	**SOFT SKILLS-II**		

(Title: Professional Communication and Employability skills)

Course Objectives: To help the students

1. Participate in group discussions with confidence and to make effective presentations.
2. With- resume packaging, preparing and facing interviews.
3. Build an impressive personality through effective time management and goal setting, self-confidence and assertiveness.
4. Understand, what constitutes proper grooming and etiquette in a professional environment.

Unit-I

Communicative Competence: The Art of Communication, basic grammar, personal SWOT Analysis, Analyzing audience, role of emotions and body language in communication-Effective listening skills, using English in different situations

Unit-II

Group Discussion: dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence-Elements of effective presentation – Structure of presentation – Presentation tools

Unit-III

Interview Skills: Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-pre-interview planning, opening strategies, answering strategies, mock interviews

Unit-IV

Personality Development: Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Unit- V

Technical Communication: Report writing: Importance, structure, drafting of reports, Business Writing: Sales letters, claim and adjustment letters, Job Application letter, preparing a personal resume, notices, agenda and minutes of the meeting

Unit-VI

Development Of Occupational Competency

Leadership skills - Problem solving skills - Organising and Co-ordination skills - Critical thinking Decision Making

Course Outcomes: The students will be able to

1. Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.
2. Write resumes, prepare and face interviews confidently.
3. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
4. Make the transition smoothly from campus to corporate.

Suggested Reading:

1. Personality Development and Soft Skills-Barun.K.Mithra, Oxford Publications
2. Technical Communication –Principles and Practice-Meenakshi Raman,Sangeeta Sharma,Oxford Publications
3. Effective Technical Communication-Mc Grawhill-Ashraf Rizvi

III YEAR – I	T	P	C
SEMESTER	0	3	2
Sub Code:14120511	**ELECTRICAL MACHINES – II LAB**		

Learning objectives:

- To predetermine the efficiency and regulation of transformers and asses their performance.
- To predetermine the regulation of three–phase alternator by various methods, find X_d / X_q ratio of alternator and asses the performance of three–phase synchronous motor.
- To perform various tests on Induction motor for assessing its performance.

The following experiments are required to be conducted as compulsory experiments:

1. O.C. & S.C. Tests on Single phase Transformer
2. Sumpner's test on single phase transformers
3. No–load & Blocked rotor tests on three phase Induction motor
4. Brake test on three phase Induction Motor
5. Equivalent Circuit of a single phase induction motor
6. Regulation of a three –phase alternator by synchronous impedance & M.M.F. Methods.
7. V and Inverted V curves of a three—phase synchronous motor.
8. Determination of X_d and X_q of a salient pole synchronous machine

In addition to the above 8 experiments, at least any two of the following conducted from the following list:

9. Regulation of three–phase alternator by Potier triangle method.
10. Scott connection of transformers
11. Parallel operation of Single phase Transformers
12. Separation of core losses of a single phase transformer
13. Heat run test on a bank of 3 Nos. of single phase Delta connected transformers.
14. Efficiency of a three–phase alternator
15. Measurement of sequence impedance of a three–phase alternator.

III YEAR – I SEMESTER	T	P	C
	0	3	2
Sub Code:14120512	**ELECTRICAL MEASUREMENTS LAB**		

Learning Objectives:

- To understand the correct function of electrical parameters and calibration of voltage, current, single phase and three phase power and energy, and measurement of electrical characteristics of resistance, inductance and capacitance of a circuits through appropriate methods.
- To understand measurement of illumination of electrical lamps.
- To understand testing of transformer oil.
- To measure the parameters of choke coil.

Any 10 of the following experiments are to be conducted

Calibration:

1. Calibration and Testing of single phase energy Meter.
2. Calibration of dynamometer wattmeter using phantom loading UPF
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Calibration of LPF wattmeter – by direct loading.
5. LVDT and capacitance pickup – characteristics and Calibration
6. A.C. Potentiometer – Polar form/Cartesian form – Calibration of AC Voltmeter, Parameters of Choke.

Measurement:

7. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
8. Capacitance Measurement using Schering bridge.
9. Inductance Measurement using Anderson bridge.
10. Resistance strain gauge – strain measurements and Calibration
11. Polar curve using Lux meter, Measurement of intensity of illumination of fluorescent lamp.
12. Transformer turns ratio measurement using AC. bridge.
13. Parameters of choke coil.
14. Optical bench – Determination of polar curve measurement of MHCP of electrical lamp.

Power Measurement:

15. Measurement of 3 phase reactive power with single–phase wattmeter for balanced loading.
16. Measurement of complex power with Trivector meter and verification.

17. Measurement of 3 phase power with single watt meter and 2 No's of C.T.

18. Measurement of Power by 3 Voltmeter and 3 Ammeter methods.

Testing:

19. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given C.T. by Null method.

20. P.T. testing by comparison – V.G. as Null detector – Measurement of % ratio error and phase angle of the given P.T.

21. Dielectric oil testing using H.T. testing Kit

Learning Outcomes:

- To be able to measure accurately the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance.
- To be able to measure illumination of electrical lamps.
- To be able to test transformer oil for its effectiveness.
- To be able to measure the parameters of inductive coil.

III YEAR – I SEMESTER	T	P	C
	0	3	2
Sub Code:14120521	**MINI PROJECT - I**		

III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14120602	**SWITCHGEAR AND PROTECTION**		

Course Objective	Course Outcome
• The student will be able to provide the basic principles of arc interruption, circuit breaking principles, operation of various types of circuit breakers.	• To be able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF_6 gas type.
• The student will be able to study the classification, operation, construction and application of different types of electromagnetic protective relays.	• Ability to understand the working principle and constructional features of different types of electromagnetic protective relays.
• The student will be able to explain the principles and operations of different types of static relays.	• Generates understanding of different types of static relays with a view to application in the system.
• The student will be able to explain various types of faults in generators and transformers and different types of protective schemes.	• Students acquire in depth knowledge of faults that is observed to occur in high power generator and transformers and protective schemes used for all protections.
• The student will be able to impart knowledge of various protective schemes used for feeders and bus bars.	• Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
• The student will be able to study different types of over voltages in a power system and principles of different protective schemes for insulation co– ordination.	• To be able to understand the different types of over voltages appearing in the system, including existing protective schemes required for insulation co–ordination.

UNIT–I

Circuit Breakers: Elementary principles of arc interruption– Restrike Voltage and Recovery voltages– Restrike phenomenon– Average and Max. RRRV– Current chopping and Resistance switching– Miniature Circuit Breaker(MCB)– Introduction to oil circuit breakers– Description and operation of Air Blast, Vacuum and SF6 circuit breakers– CB ratings and specifications– Auto reclosing

UNIT–II

Electromagnetic Protection: Principle of operation and construction of attracted armature– Balanced beam– induction disc and induction cup relays– Relays classification– Instantaneous– DMT and IDMT types– Applications of relays**:** Over current/under voltage relays– Directional relays– Differential relays and percentage differential relays– Universal torque equation– Distance relays**:** Impedance– Reactance– Mho and offset mho relays– Characteristics of distance relays and comparison.

UNIT–III

Static and Digital Relays: Static relay components– Static over current relay– Static distance relay– Micro processor based digital relays.

UNIT–IV

Generator Protection: Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection– Numerical examples.

Transformer Protection: Protection of transformers**:** Percentage differential protection– Design of CT's ratio– Buchholz relay protection–Numerical examples.

UNIT–V

Feeder and Bus bar Protection: Over current– Carrier current and three zone distance relay using impedance relays–Translay relay–Protection of bus bars– Differential protection.

UNIT–VI

Protection against over voltage and grounding: Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc–Oxide lighting arresters– Insulation coordination– BIL– impulse ratio– Standard impulse test wave– volt~time characteristics– Grounded and ungrounded neutral systems–Effects of ungrounded neutral on system performance– Methods of neutral grounding**:** Solid–resistance–Reactance–Arcing grounds and grounding Practices.

Text Books:

1. Protection and SwitchGear by BhaveshBhalja, R.P. Maheshwari, NileshG. Chothani, Oxford University Press, 2013
2. Power system protection- Static Relays with microprocessor applications. by T.S. Madhava Rao, TMH
3. Electrical Power System Protection by C. CHRISTOPOULOS and A. Wright, Springer publications

Reference Books:

1. Power System Protection and Switchgear by Badari Ram, D.N Viswakarma, TMH Publications.
2. Fundamentals of Power System Protection by Paithankar and S.R. Bhide, PHI, 2003.
3. Art & Science of Protective Relaying – by C R Mason, Wiley Eastern Ltd.

III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14124603	**MICROPROCESSORS AND MICROCONTROLLERS AND ITS APPLICATIONS AND ITS APPLICATIOBS**		

COURSE OBEJECTIVES:

The student will

- Learn concepts of microprocessor, different addressing modes and programming of 8086.
- Understand interfacing of 8086, with memory and other peripherals.
- Learn concept of DMA, USART RS-232 and PIC controller.
- Study the features of advanced processors and Pentium processors.
- Study the features of 8051 microcontroller, its instruction set and also other controllers.

UNIT–I

Learning objective: To understand the organization and architecture of Micro Processor

Introduction to Microprocessor Architecture

Introduction and evolution of Microprocessors– Architecture of 8086– Register Organization of 8086– Memory organization of 8086– General bus operation of 8086–Introduction to 80286–80386 and 80486 and Pentium.

UNIT–II

Learning objective: To understand addressing modes to access memory

Minimum and Maximum Mode Operations

Instruction set, Addressing modes– Minimum and Maximum mode operations of 8086–8086 Control signal interfacing–Read and write cycle timing diagrams Assembly Directives–Macro's

UNIT–III

Learning objective: To understand the interfacing of MP with I/O as well as other devices.

I/O Interface

8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255– Interfacing A to D converters– Interfacing D to A converters– Stepper motor interfacing– Static memory interfacing with 8086– DMA controller (8257)–Architecture–Interfacing 8257 DMA controller– Programmable Interrupt Controller (8259)–Command words and operating modes of 8259– Interfacing of 8259–Keyboard/display controller (8279)– Architecture–Modes of operation–Command words of 8279– Interfacing of 8279.

UNIT–IV

Learning objective: To understand 8051 micro controller architecture

Introduction to 8051 Micro Controller

Overview of 8051 Micro Controller– Architecture– Register set–I/O ports and Memory Organization– Interrupts–Timers and Counters–Serial Communication.

UNIT-V

Learning objective: To understand the programming principles for 8086 and 8051

Assembly Language Programming

Algorithms for Implementation of FOR Loop–WHILE–REPEAT and IF-THEN-ELSE Features– Addressing modes and Instruction set of 8051–Assembly language programming of 8051– Development systems and tools.

UNIT-VI

Learning objective: To understand how to develop cyber physical systems

Cyber physical systems and industrial applications of 8051

Applications of Micro Controllers– Interfacing 8051 to LED's–Push button– Relay's and Latch Connections– Keyboard Interfacing– Interfacing Seven Segment Display–ADC and DAC Interfacing

Text Books:

1. Microprocessors and Interfacing, Dpouglas V Hall, Mc–Graw Hill, 2nd Edition.
2. Kenneth J Ayala, "The 8051 Micro Controller Architecture, Programming and Applications", Thomson Publishers, 2nd Edition.
3. Ray and Burchandi, "Advanced Micro Processors and Interfacing", Tata McGraw–Hill.

Reference Books:

1. R.S. Kaler, " A Text book of Microprocessors and Micro Controllers", I.K. International Publishing House Pvt. Ltd.
2. Ajay V. Deshmukh, "Microcontrollers – Theory and Applications", Tata McGraw–Hill Companies –2005.
3. Ajit Pal, "Microcontrollers – Principles and Applications", PHI Learning Pvt Ltd, 2011.
4. NPTEL online courses
5. MOOCS online course by jntuk.

III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14120604	**POWER SYSTEM ANALYSIS**		

Course Objective	Course Outcome
• The student will be able to study the development of impedance diagram and formation of Y_{bus}	• Able to draw an impedance diagram for a power system network. Able to form a Y_{bus} matrix for a power system network with or without mutual couplings.
• The student will be able to study the concept of the Z_{bus}building algorithm.	• Able to formulate the Z_{bus} for a power system network.
• The student will be able to known per unit quantities and study short circuit calculation for symmetrical faults.	• Able to find out the fault currents for all types faults with a view to provide data for the design of protective devices.
• The student will be able to study the Gauss Seidel, Newton raphson, decoupled and fast decoupled load flow methods.	• Able to find out the load flow solution of a power system network using different types of load flow methods.
• The student will be able to study the rotor angle stability analysis of power systems.	• Able to analyze the steady state, transient and dynamic stability concepts of a power system.

UNIT –I

Network Topology and Graph Theory: Single line diagram– Impedance diagram of a power system – Graph theory definition – Formation of element node incidence and bus incidence matrices – Primitive network representation – Formation of Y– bus matrix by singular transformation and direct inspection methods.

UNIT –II

Z–Bus formulation: Formation of Z–Bus**:** Partial network– Algorithm for the Modification of Z_{bus} Matrix for addition element for the following cases**:** Addition of element from a new bus to reference– Addition of element from a new bus to an old bus– Addition of element between an old bus to reference and Addition of element between two old busses (Derivations and Numerical Problems).– Modification of Z–Bus for the changes in network (Problems).

UNIT – III

Per unit analysis: Introduction to per unit representation and analysis

Symmetrical Fault Analysis: 3–Phase short circuit currents and reactances of synchronous machine– Short circuit MVA calculations.

UNIT –IV

Symmetrical Components & Unbalanced Fault analysis: Synthesis of unsymmetrical phasor from their symmetrical components– Symmetrical components of unsymmetrical phasor–Phase - shift of symmetrical components in Y–Power in terms of symmetrical components– Sequence networks – Positive, negative and zero sequence networks– Various types of faults LG– LL– LLG and LLL on unloaded alternator– unsymmetrical faults on power system.

UNIT –V

Power Flow Studies: Necessity of power flow studies – Derivation of static power flow equations– Power flow solution using Gauss-Seidel Method – Newton Raphson Method (Rectangular and polar coordinates form) –Decoupled and Fast Decoupled methods (Algorithmic approach) – Problems on 3–bus system only.

UNIT – VI

Power System Stability Analysis: Elementary concepts of Steady state– Dynamic and Transient Stabilities– Description of Steady State Stability Power Limit–Transfer Reactance– Synchronizing Power Coefficient –Power Angle Curve and Determination of Steady State Stability –Derivation of Swing Equation–Determination of Transient Stability by Equal Area Criterion–Application of Equal Area Criterion–Methods to improve steady state and transient stability.

Text Books:

1. Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.
2. Electrical Power Systems by P.S.R.Murthy, B.S.Publications
3. Modern Power system Analysis – by I.J.Nagrath&D.P.Kothari: Tata Mc Graw–Hill Publishing Company, 2nd edition.
4. Power System Analysis and Design by J.Duncan Glover, M.S.Sarma, T.J. Overbye – CengageLearning publications.

Reference Books:

1. Power System Analysis – by A.R.Bergen, Prentice Hall, Inc.
2. Power System Analysis by HadiSaadat – TMH Edition.
3. Power System Analysis by B.R.Gupta, Wheeler Publications.

III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14120605	**HVDC TRANSMISSION**		

Course Objective	**Course Outcome**
• The student will be able to learn about the fundamentals of HVDC and 6 & 12 Pulse Converters	• Able to understand basic 6 & 12 pulse Converter
• The student will be able to study about control of HVDC converters	• Able to analyze control of HVDC systems.
• The student will be able to learn about control strategies of reactive power.	• Able to understand control strategies of reactive power
• The student will be able to study about power flow in AC/DC systems.	• Able to known concepts of powerflow in AC/DC systems.
• The student will be able to known about converter faults and protection.	• Able to know about converter faults and protection.
• The student will be able to known about harmonics in HVDC system and their filters.	• Able to analyze harmonics and filters in HVDC system.

UNIT – I

Basic Concepts : Economics & Terminal equipment of HVDC transmission systems: Types of HVDC Links – Apparatus required for HVDC Systems – Comparison of AC &DC Transmission, Application of DC Transmission System – Planning & Modern trends in D.C. Transmission.

HVDC converters: Choice of Converter configuration – analysis of Graetz – characteristics of 6 Pulse & 12 Pulse converters – Cases of two 3 phase converters in star –star mode – their performance.

UNIT – II

Converter & HVDC System Control: Principal of DC Link Control – Converters Control Characteristics – Firing angle control – Current and extinction angle control – Effect of source inductance on the system; Starting and stopping of DC link; Power Control.

UNIT-III

Reactive Power Control In HVDC: Reactive Power Requirements in steady state-Conventional control strategies-Alternate control strategies sources of reactive power-AC Filters – shunt capacitors-synchronous condensers.

UNIT –IV

Power Flow Analysis in AC/DC Systems : Modelling of DC Links-DC Network-DC Converter-Controller Equations-Solution of DC loadflow – P.U. System for d.c. quantities-solution of AC-DC Power flow-Simultaneous method-Sequential method.

UNIT-V

Converter Fault & Protection: Converter faults – protection against over current and over voltage in converter station – surge arresters – smoothing reactors – DC breakers –Audible noise-space charge field-corona effects on DC lines-Radio interference

UNIT – VI

Harmonics and Filters: Generation of Harmonics –Characteristics harmonics, calculation of AC Harmonics, Non- Characteristics harmonics, adverse effects of harmonics – Calculation of voltage & Current harmonics – Effect of Pulse number on harmonics. Types of AC filters, Design of Single tuned filters –Design of High pass filters.

TEXT BOOKS:

1. HVDC Power Transmission Systems: Technology and system Interactions – by K.R.Padiyar, New Age International (P) Limited, and Publishers. 2. EHVAC and HVDC Transmission Engineering and Practice – S.Rao.

REFERENCE BOOKS:

1. HVDC Transmission – J.Arrillaga.
2. Direct Current Transmission – by E.W.Kimbark, John Wiley & Sons.
3. Power Transmission by Direct Current – by E.Uhlmann, B.S.Publications.

III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14120606	**POWER SEMICONDUCTOR DRIVES**		

Course Objective	**Course Outcome**
• The student will be able to learn the fundamentals of electric drive and different electric braking methods.	• The fundamentals of electric drive and different electric braking methods.
• The student will be able to analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters.	• Analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters.
• The student will be able to discuss the converter control of dc motors in various quadrants.	• The converter control of dc motors in various quadrants.
• The student will be able to understand the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.	• The concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
• The student will be able to learn the principles of static rotor resistance control and various slip power recovery schemes.	• The principles of static rotor resistance control and various slip power recovery schemes.
• The student will be able to understand the speed control mechanism of synchronous motors	• The speed control mechanism of synchronous motors

UNIT–I

Fundamentals of Electric Drives: Electric drive – Fundamental torque equation – Load torque components – Nature and classification of load torques – Steady state stability – Load equalization– Four quadrant operation of drive (hoist control) – Braking methods**:** Dynamic – Plugging – Regenerative methods.

UNIT–II

Three phase converter controlled DC motor drives: Revision of speed control techniques – Separately excited and series motors controlled by full converters – Output voltage and current waveforms – Speed-torque expressions – Speed-torque characteristics – Numerical problems – Four quadrant operation using dual converters.

UNIT–III

DC-DC converters Controlled DC motor drives: Single quadrant – Two quadrant and four quadrant chopper fed separately excited and series excited motors – Continuous current operation– Output voltage and current waveforms – Speed–torque expressions – Speed–torque characteristics –Four quadrant operations – Closed loop operation (Block diagrams only).

UNIT–IV

Control of Induction motor drives – Stator side: Variable voltage characteristics–Control of Induction Motor by AC Voltage Controllers – Waveforms –Speed torque characteristics– Variable Voltage Variable Frequency control of induction motor by voltage source inverter – PWM control – Closed loop operation of induction motor drives (Block Diagram Only).

UNIT–V

Control of Induction motor drives – Rotor side: Static rotor resistance control – Slip power recovery schemes – Static Scherbius drive – Static Kramer drive – Performance and speed torque characteristics – Advantages –Applications.

UNIT–VI

Control of Synchronous Motor drives: Separate control &self control of synchronous motors – Operation of self controlled synchronous motors by VSI– Closed Loop control operation of synchronous motor drives (Block Diagram Only) –Variable frequency control–Pulse width modulation.

Text Books:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Semiconductor Drives, by S.B. Dewan, G.R.Slemon, A.Straughen, Wiley-India Edition.

Reference Books:

1. Electric Motors and Drives Fundamentals, Types and Apllications, by Austin Hughes and Bill Drury, Newnes.
2. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
3. Power Electronic Circuits, Devices and applications by M.H. Rashid, PHI.
4. Power Electronics handbook by Muhammad H.Rashid, Elsevier.

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III YEAR – II SEMESTER	T	P	C
	3+1	0	3
Sub Code: 14129601	**MANAGEMENT SCIENCE**		

UNIT I:

(The learning objective of this is to understand the concept and nature Management, Evolution of Management theories, Motivation and leadership Styles)

Introduction to Management

Concept –Nature and importance of Management, Functions – Evaluation of Management, Motivation – Theories – Leadership Styles – Decision Making Process – Designing Organization structure – Principles and types of Organization.

(The leaner is able to understand the concept and functions of management and theories to Motivation, Styles of Leadership)

UNIT II:

(The learning objective of this Unit is to Equip with the concepts of Operations and – Inventory control)

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and Cchart). Simple problems.

Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, and FSN analysis).

(The learner is able to understand te main idea of inspection and scrutinize te different methods of inspection, the concept of inventory management and control of inventory pricing)

UNIT III:

(The objective of this unit is to understand the main functional areas of organization i.e., Financial Management, Production management, Marketing management and Human Resource Management and product life cycle and channels Distribution)

Functional Management: Concept and Functions of Finance,HR, Production and marketing,functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing strategies based on product Life Cycle, Channels of distributions.

(At the end of this chapter the leaner is able to understand the different functional areas in an organization and their responsibilities – Product life cycles of distribution)

UNIT IV:

(The learning objective of this unit is to understand drawing the net work diagrams and crashing the projects)

Project Management

(PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).

(The learner is able to understand PERT and Identifying Critical path and reduce the project duration with Crashing)

UNIT V:

(The objective of this unit isto equip with the concept and practical issues relating to Strategic Management)

Strategic Management
Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis-Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

(The learner is able to familiar with the meaning of Vision, Mission, Goals and strategies of the organization and to implement successfully)

UNIT VI:

(The learning objective of this unit is to equip with the contemporary management practices, i.e., MIS, MPR, JIT and ERP etc.,)

Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time (JIT) system, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levies, Supply Chain Management,Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

(The learner is able to understand the various contemporary issues in management practices like TQM and BPO etc.,)

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, 'introduction to *Management Science'* Cengage, Delhi,.
2. Dr. A. R. Aryasri, *Management Science'* TMH 2011.

References

1. Koontz & Weihrich: 'Essentials of management' TMH 2011.
2. Seth & Rastogi: Global Management Systems, Cengage learning, Delhi, 2011.
3. Robbins: Organizational Behavior, Pearson publications, 2011.
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011.
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson publications.
6. Biswajit Patnaik: Human Resource Management, PHI, 2011.
7. Management shapers, Universities Press.
8. Dr.P.V.V.Satyanarayana: Strategic Human Resource Publishing House, New Delhi.

III YEAR – II SEMESTER	T	P	C
	0	3	2
Sub Code:14120611	**POWER ELECTRONICS LAB**		

Learning objectives:

- To study the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR.
- To analyze the performance of single–phase and three–phase full– wave bridge converters, single–phase dual converter with both resistive and inductive loads.
- To understand the operation of AC voltage controller and cyclo converter with resistive and inductive loads.
- To understand the working of Buck converter, Boost converter, single–phase bridge inverter and PWM inverter.

Any 10 of the Following Experiments are to be conducted

1. To obtain the input output Characteristics of SCR, MOSFET & IGBT
2. To Study different types of Gate firing circuits for SCR's
3. Study of Single -Phase Half controlled converter with R and RL load
4. Study of Single -Phase fully controlled bridge converter with R and RL loads
5. Study of Single -Phase AC Voltage Controller with R and RL Loads
6. Study of Single -Phase Cyclo–converter with R and RL loads
7. Study of Single -Phase Bridge Inverter with R and RL Loads
8. Study of Single -Phase dual converter with RL loads
9. Study of Three -Phase half controlled bridge converter with RL load.
10. Study of Three- Phase full converter with RL–load.
11. Study of DC–DC buck converter.
12. Study of DC–DC boost converter.
13. Study of Single -phase PWM inverter.

III YEAR – II SEMESTER	T	P	C
	0	3	2
Sub Code:14120612	**CONTROL SYSTEMS LAB**		

Learning Objectives:

- To impart hands on experience to understand the performance of basic control system components such as magnetic amplifiers, D.C. servo motors, A.C. Servo motors, stepper motor and potentiometer.
- To understand time and frequency responses of control system with and without controllers and compensators.

Any 10 of the following experiments are to be conducted:

1. Time response of Second order system
2. Lag and lead compensation – Magnitude and phase plot
3. Potentiometer as an error detector
4. To study Characteristics of magnetic amplifiers
5. Study of DC position control system
6. Effect of P, PD, PI, PID Controller on a second order systems
7. Study the Temperature controller using PID
8. Experimentally determine Transfer function of DC motor
9. To study Characteristics of DC servo motor
10. Study the effect of feedback on DC servo motor
11. To study the characteristics of AC servo motor
12. To study the characteristics of Synchros
13. Programmable logic controller – characteristics of stepper motor
14. Frequency response of second order system

III YEAR – II SEMESTER	T	P	C
	-	-	-
Sub Code: 14129697	**INTELLECTUAL PROPERTY RIGHTS AND PATENTS**		

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Regulatory – Over use or Misuse of Intellectual Property Rights - Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers **–** Copyright Formalities and Registration– Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security– Employee Access Limitation – Employee Confidentiality Agreement –Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

UNIT VI

Introduction to Cyber Law – Information Technology Act - Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy - International aspects of Computer and Online Crime.

REFERENCE BOOKS:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M. Ashok Kumar and Mohd. Iqbal Ali: “Intellectual Property Right” Serials Pub.