Electrical & Electronics Engineering

L: Lecture, T: Tutorial, P: Practical, C: Credit

SEMESTER V

CODE	SUBJECT	L	T	P	C
EEE3113	Control Systems	3	1	0	4
EEE3114	Electrical Machines- II	3	1	0	4
EEE3115	Linear Integrated Circuits	3	0	0	3
EEE3116	Power Systems-II	3	0	0	3
EEE3117	Control System Lab	0	0	3	2
EEE3118	Electrical Machines- II Lab	0	0	3	2
EEE3119	Linear Integrated Circuits Lab	0	0	3	2
EEE3120	Industrial Training & Seminar	0	0	2	1
HSS3103	Humanities & Social Sciences	1	0	0	1
PFD3105	Professional Development	0	0	1	1
TOTAL		**13**	**2**	**12**	**23**

SEMESTER VI

CODE	SUBJECT	L	T	P	C
EEE3221	Power Systems Protection and Switchgear	3	1	0	4
EEE3222	Power Electronics	3	1	0	4
EEE3223	Digital Signal Processing	3	1	0	4
EEE3224(1-5)	Professional Elective –I (**EEE Annexure – I**)	3	1	0	4
EEE3225	Power Systems Protection and Switchgear Lab	0	0	3	2
EEE3226	Power Electronics Lab	0	0	3	2
EEE3227	Digital Signal Processing Lab	0	0	3	2
PFD3206	Professional Development	0	0	1	1
TOTAL		**12**	**4**	**10**	**23**

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Electrical and Electronics Engineering

(Detailed Syllabus of 5th Semester)

L: Lecture, T: Tutorial, P: Practical, C: Credit

SEMESTER V

S.No.	Subject Code	Board of Study	SUBJECT	Periods per week			Scheme of Examination and Marks				Credits L+(T +P)/2
				L	T	P	PRE***		ESE*	Total Marks	
							Mid Sem	TA**			
01	EEE3113	EEE	Control Systems	3	1	0	30	20	50	100	4
02	EEE3114	EEE	Electrical Machines- II	3	1	0	30	20	50	100	4
03	EEE3115	EEE	Linear Integrated Circuits	3	0	0	30	20	50	100	3
04	EEE3116	EEE	Power Systems-II	3	0	0	30	20	50	100	3
05	EEE3117	EEE	Control System Lab	0	0	3	0	30	20	50	2
06	EEE3118	EEE	Electrical Machines- II Lab	0	0	3	0	30	20	50	2
07	EEE3119	EEE	Linear Integrated Circuits Lab	0	0	3	0	30	20	50	2
08	EEE3120	EEE	Industrial Training & Seminar	0	0	2	0	15	10	25	1
09	HSS3103	Humanities	Humanities & Social Sciences	1	0	0	0	15	10	25	1
08	PFD3105	Humanities	Professional Development	0	0	1	0	15	10	25	1
			TOTAL	**13**	**2**	**12**	**120**	**215**	**290**	**625**	**23**

* End Semester Examination
** Teacher Assessment
*** Progress Review Examination

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Semester: V **Branch: Electrical and Electronics Engg.**
Subject: Control System **Code: EEE3113**

Course Description:

This course is an exploratory, it will help them to develop some new skills and analytical tools required to analyze and design methods for the control of linear systems. The focus of the course is to impart useful skills on the students in order to enhance their system analysis capability. Hence, the course is designed to provide students with fundamental knowledge on system circuit analysis. This is one of the foundation courses which are required to understand the concepts of advanced courses. This course is intended to introduce the students to mathematical foundations of Control Theory.

Course Objectives:

1. Introduce different methods involving analysis of linear systems.
2. Provide basic information to design compensators and controllers.
3. Provide required knowledge on how to determine system stability using different stability criteria.
4. Introduce state space analysis for stability determination.

Syllabus:

UNIT-1: Introduction to control system

Classification of control systems, concepts of control systems, open loop and closed control systems and their differences examples of control systems, feed-back characteristics: effects of feedback, stability, steady state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness, mathematical models, differential equations– translational and rotational mechanical systems.

UNIT-2: Control hardware and models

Block diagram representation of systems, block diagram algebra, representation by signal flow graph, reduction using block diagram and Mason's gain formula. Transfer function of dc servo motor, ac servo motor, synchro-transmitter and receiver, pneumatic actuators, electro-pneumatic valves, concept and use of transfer function.

UNIT-3: Time domain analysis of control systems

Introduction, typical test signals, time domain indices, steady state error constants,

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error series, absolute stability, Routh-Hurwitz criterion, effect of P, PI and PID controllers.
Root Locus techniques: introduction, root loci theory, application to system stability studies, illustration of the effect of addition of a zero and a pole.

UNIT-4: Frequency domain analysis of control systems

Introduction, polar plots, Nyquist stability criterion, frequency domain indices (gain margin, phase margin, bandwidth), Bode plots, application of Bode plots, Nichols charts, application of Nichols charts.

UNIT-5: State variable analysis and design

Concept of states, state variables and state model, state model for linear continuous time systems (electrical and mechanical), determination of transfer function from state matrices, solution of state equations, Eigen values, concept of controllability and observability.

Text Books:

1. Control Systems Engineering: I.J. Nagarath and M. Gopal, New Age Pub. Co.
2. Modern Control Engineering: K. Ogata, PHI.

Reference Books:

1. Automatic Control Systems: B.C. Kuo, Prentice Hall of India.
2. Control System Engineering: K. Bhattacharya, Pearson.
3. Automatic Control Systems: Benjamin C. Kuo, Prentice Hall of India.

Course Outcomes:

Student completing the course will be able to:

1. Analyze the behavior of steady state and dynamic behavior of control system components.
2. Convert electrical and mechanical systems into graph and to analyze their behavior.
3. Understand the basics and applications of signal flow graphs.
4. Analyze both linear and non-linear networks using different methods.

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5. Identify poles and zeros in system transfer functions; their impact on the stability of the system.

6. Demonstrate the different plots and their applications.

7. Explain and analyze the different state space systems.

8. Understand the different parameters of state space analysis and classification of the system.

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Semester: V **Branch: Electrical and Electronics Engg.**
Subject: Electrical Machine-II **Subject code: EEE3114**

Course Description:

This course examines the basic theory, characteristics, construction operation and application of AC Machine and rotating electrical machines. It includes the study of slip-ring induction motor, squirrel cage induction motor, synchronous machines and alternating current generators.

Course Objectives:

1. To impart knowledge on Construction and performance of salient and non-salient type synchronous generators, synchronous motor and all kinds of induction machines.
2. To impart knowledge on Starting and speed control of three-phase induction motors and synchronous motors.
3. To provide knowledge of different methods of excitation of alternator.

Syllabus:

UNIT-1: Synchronous generator

Constructional details, types of rotor, winding factor, EMF equation, synchronous reactance, armature reaction, phasor diagrams of non salient pole synchronous generator connected to infinite bus, synchronizing and parallel operation, synchronizing torque, change of excitation and mechanical input, voltage regulation, EMF, MMF, ZPF and A.S.A methods, steady state power-angle characteristics, two reaction theory, slip test, short circuit transients.

UNIT-2: Synchronous motor

Principle of operation, torque equation, operation on infinite bus bars, V and inverted V curves, power input and power developed equations, starting methods, current loci for constant power input, constant excitation and constant power developed, hunting, natural frequency of oscillations, damper windings, synchronous condenser.

UNIT-3: Three phase induction motor

Constructional details, types of rotor, principle of operation, slip, cogging and crawling, equivalent circuit, torque-slip characteristics, condition for maximum torque, losses and efficiency, load test, no load and blocked rotor tests, circle diagram, separation of losses, double cage induction motors, induction generators, synchronous

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induction motor.

UNIT-4: Starting and speed control of three phase induction motor

Need for starting, types of starters, DOL, rotor resistance, autotransformer and star-delta starters, speed control, voltage control, frequency control and pole changing, cascaded connection, V/f control, slip power recovery scheme, braking of three phase induction motor: plugging, dynamic braking and regenerative braking.

UNIT-5: Single phase induction motors and special machines

Constructional details of single phase induction motor, double field revolving theory and operation, equivalent circuit, no load and blocked rotor test, performance analysis, starting methods of single, phase induction motors, capacitor start capacitor run induction motor, shaded pole induction motor, linear induction motor, repulsion motor, hysteresis motor, AC series motor, servo motors, stepper motors, introduction to magnetic levitation systems.

Text Books:

1. Electrical Machinery: P. S. Bhimbhra, Khanna Publications.
2. Electrical Machines: B. R. Gupta, New Age International Publications.
3. Electric Machinery: Ashfaq Husain, Dhanpat Rai & Co.

Reference Books:

1. Electric Machines: Nagrath and Kothari, TMH Publications.
2. Performance and Design of AC Machines: M. G. Say, CBS Publication.
3. Electric Machines: P. K. Mukherjee and S. Chakravarti, Dhanpat Rai Publication.
4. Electric Machines: Stephen Umans, A Fitzgerald, Charles Kingsley, McGraw-Hill.

Course Outcomes:

At the end of this course the student will be able to:

1. Understand the construction, working principles of synchronous and three-phase induction machines
2. Draw the equivalent circuit diagrams under various load conditions.

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3. Analyze the load profile, voltage regulations and efficiency in various operating conditions.

4. Analyze the characteristics of different types of machine.

5. Select a particular type of motor suitable for different type of load.

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Semester: V **Branch: Electrical and Electronics Engineering**
Subject: Linear Integrated Circuits **Subject Code: EEE3115**

Course Description:

Linear integrated circuit course has the design and applications of operational amplifiers and other important analog ICs. It introduces basic Op-amp concepts, its internal design and applications of Op-amp IC in electronics design. Much attention is given to basic Op-amp configurations, linear and non-linear applications of Op-amp and active filter synthesis. It also deals with oscillators, waveform generators and data converters and Regulator IC with their applications in electronics design.

Course Objectives:

1. An understanding of working, manufacturing and usage of linear analog ICs.
2. The capability to use abstractions to analyze and design simple electronic circuits.
3. The ability to formulate and solve frequency and phase response of circuits containing Op-amp and other analog ICs.
4. Understandings of analog ICs are configured for different signal processing operations in electronics designs.
5. The capability to design and construct large application circuits.
6. Measure circuit behavior and performance; compare with predicted circuit models and explain discrepancies.

Syllabus:

UNIT-1: Operational amplifier characteristics

Basic building blocks of linear ICs: manufacturing process of analog ICs. Op-amp characteristics, terminals, packages and specifications, ideal Op-amp and practical Op-amp, open loop and closed loop configurations. DC and AC performance characteristics of Op-amp, frequency compensation, noise, differential amplifiers, general description, manufacturer's specification/datasheet, electrical characteristics and internal schematic of 741 Op-amps.

UNIT-2: Op–amp applications

Basic Op-amp circuits: inverting and non-inverting voltage amplifiers, voltage follower, summing, scaling and averaging amplifiers.

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Linear applications: instrumentation amplifiers, V to I and I to V converters, differentiators and integrators.
Non-linear applications: precision rectifier, wave shaping circuits (clipper and clamper), log and antilog amplifiers, analog voltage multiplier circuit and its applications, operational trans-conductance amplifier (OTA), comparators and its applications, sample and hold circuit.

UNIT-3: Waveform generators and PLL

Waveform Generators: Sine-wave generators, square, triangle, saw-tooth wave generators.
IC 555 Timer: Monostable operation and its applications, astable operation and its applications.
PLL: Operation of basic PLL, closed loop analysis of PLL, voltage controlled oscillator, PLL applications.

UNIT-4: Active filters and voltage regulator

Filters: Comparison between passive and active networks, active network design, filter approximations, design of LPF, HPF, BPF and band reject filters, state variable filters, all pass filters, switched capacitor filters.
Voltage regulators: Basics of voltage regulator, linear voltage regulators using Op-amp, IC regulators (78xx, 79xx, LM 317, LM 337, 723), switching regulators.

UNIT-5: Data conversion devices

Digital to Analog conversion: DAC specifications, DAC circuits, weighted resistor DAC, R-2R ladder DAC, inverted R-2R ladder DAC, monolithic DAC.
Analog-to-Digital conversion: ADC specifications, ADC circuits: ramp type ADC, successive approximation ADC, dual slope ADC, flash type ADC, monolithic ADC.

Text Books:

1. Linear Integrated Circuits: Roy Choudhury and Shail Jain, 2nd Edition, New Age International Publishers, 2003.
2. Linear Integrated Circuits: K R Botkar, Khanna Publisher.
3. Op-amps and Linear Integrated Circuits: Ramakant A.Gayakwad, 4th Edition, Prentice Hall, 2000.

Reference Books:

1. Operational-Amplifiers and Linear Integrated Circuits: Robert F. Coughlin, Frederick F. Driscoll, 6th Edition, Prentice Hall, 2001.

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2. Design with operational amplifier and analog integrated circuits: Sergio Franco, McGraw Hill, 1997

3. Simulation Problems: OrCAD Pspice and Capture is used to facilitate analysis and design of circuits.

Course Outcomes:

At the end of this course the student will be able to:

1. Understand the role of analog ICs and basic components in electronic circuits.

2. Model, analyze and design Op-amp circuits to perform operations such as integration, differentiation and filtering on electronic signals.

3. Design; analyze timing circuits using special application IC 555 and general purpose Op-amp.

4. Classify and comprehend the working principle of data converters.

5. Define the function of application specific ICs such as voltage regulators, PLL and its application in communication.

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Semester: 5th Semester **Branch: Electrical and Electronics Engg.**
Subject: Power System-II **Code: EEE3116**

Course Description:

This course is lean-to electrical power systems. It discussed about the theory of single line diagram (SLD), transmission line modelling and their performances analysis techniques. It provides the essential detailed study of power systems symmetrical components, stability analysis, load flow studies and economic considerations.

Course Objectives:

1. To provide knowledge about the single line diagram.
2. Ability to understand and analyze power system operation, fault calculations and stability.
3. Ability to handle the engineering aspects of electrical energy utilization.
4. To equip with required skills for understanding power system faults and its calculations.
5. Ability to understand economic operations of power plants.

Syllabus:

UNIT-1: Representation of power system

One line diagram, impedance diagram, reactance diagram, equivalent impedance of three phase transformer, per unit quantities, P.U. impedance of three phase transformer, positive sequence impedance diagram in per unit system, expression for three phase power in P.U.

UNIT-2: Symmetrical components

Expression for positive, negative and zero sequence components, existence of sequence components of current and voltages for three phase circuit, sequence impedance of alternator and transmission line, sequence network of unloaded generator, zero sequence network of three phase transformers, phase shift transformer.

UNIT-3: Faults in electrical systems

All kinds of symmetrical and unsymmetrical faults on power systems, faults through impedance, open conductor faults, three phase short circuit on synchronous machine,

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three phase short circuit on power systems, calculation of different current ratings and interrupting capacity of circuit breakers.

UNIT-4: Economic operation & load flow studies

Economic Operation of Power Systems: Input output curves, criteria for economical distribution of power between generating units in a plant, expression for transmission line loss in terms of loss formula coefficients, criteria for economical distribution of power between generating plants.
Load Flow Studies: Bus admittance matrix, formation of load flow equation, Gauss-Seidel method, Newton-Raphson method.

UNIT-5: Power system stability

The stability problem, steady-state stability, transient stability, factors affecting the stability, swing equation, equal area criterion of stability, application of equal area criterion, critical clearing angle.

Text Books:

1. Elements of Power System Analysis: W.D. Stevenson, 4th Ed. McGraw-Hill.
2. Power System Engg.: I.J. Nagrath and Kothari, Tata McGraw-Hill.
3. Electrical Power System: Subir Ray, Prentice Hall.
4. A Course In Power Systems: J.B. Gupta ,S. K. Kataria & Sons publications.

Reference Books:

1. Power System Analysis and Design: B.R. Gupta, 3rd Ed S. Chand
2. Power System Engg.: A. Chakrabarti, M.L. Soni, P.V.Gupta, V.S.Bhatnager, 6th Ed Dhanpat Rai and Co.
3. Electrical Power System: Ashfaq Hussain, 4th Ed. CBS Pub. and Dist.
4. Power Systems Analysis: A.R. Bergen and V. Vittal, 2nd Edition, Pearson Education.
5. Power systems Stability: E.W.Kimbark, Wiley India.
6. Computer Modelling of Electrical Power systems: J. Arrillaga and N.R. Watson, Second edition, John Wiley and Sons, Ltd.

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Course Outcomes:

At the end of this course the student will be able to:

1. Make a one line representation of Power System.
2. Evaluate fault currents for different faults at different locations in Power System.
3. Identify cases of stable and unstable Power Systems.
4. Understand of Power systems Load flow.
5. Understanding of tariff.

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Semester: V **Branch: Electrical and Electronics Engg.**

Subject: Control Systems Lab **Code: EEE3117**

Course Description:

The purpose of the course is to provide students with an understanding of how to analyze, build, and troubleshoot control systems circuits. Student should become proficient in using oscilloscopes, signal analyzers, and similar equipment to test digital circuits. In addition students must learn to write well-organized reports.

Course Objectives:

The main objective of this lab is to give the students many opportunities to put the controller design principles to develop controllers for a set of interesting electromechanical hardware and software based applications. They gain experience in computer-based implementation of feedback controllers. They practice iterating on their initial design which involves debugging software, troubleshooting, and redesign until satisfactory performance is obtained.

Syllabus:

List of Experiments:

1. Determine the gain of an open loop and closed loop system.
2. To study the effect of disturbance on an open loop and closed loop system.
3. Analysis of LVDT Characteristics.
4. Analysis Characteristics of synchro-transmitter and receiver pair.
5. To study a potentiometer as an error detector
6. To Study the time response of a first and second order system.
7. To Study of P, I controller on second order system.
8. To Study PI, PD controller on second order system.
9. Study of PID controller on second order system.
10. Study of bode plot of a Type 0, Type I and Type II systems.
11. To study the lag compensator and lead compensator.

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12. To study the lag-lead compensator.

13. To determine the transfer function of a DC servomotor.

14. Determination of transfer functions of an AC servomotor.

15. Simulation of transfer function using Op-amp.

Equipments/Machine/Software required:

Control system components, Power supply, CRO, Function generator, LVDT, DC servomotor, AC servomotor, synchro-transmitter and receiver pair kit, P, I, PI, PD and PID controllers trainer kit, R-L or R-C Circuits, Bread board, CRO, Multi-meters, Function Generator. Lag Compensator, Lead Compensator, Lag-Lead Compensator kits, MATLAB.

Reference Books & Manuals:

1. MATLAB Control Systems Engineering: Lopez, Cesar, springer.

2. Matlab for Control System Engineers: Rao V. Dukkipati (Author),new academic science

3. Linear Control Systems: Kisačanin, Branislav, Agarwal, Gyan C., springer

Course Outcomes:

Student will able to:

1. Demonstrate the ability to apply Laplace transform, transfer functions, modeling RLC circuit, block diagrams for simulation and control.

2. Able to analyze the physical systems represented in transfer function.

3. Able to apply the control components like ac servo motor, synchro and magnetic amplifier.

4. Able to understand the stability of an Electrical, mechanical and other physical systems.

5. Able to Design controllers, compensators using MATLAB software.

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Semester: B.E. V Sem. **Branch: Electrical and Electronics Engg.**
Subject: Electrical Machines-II Lab. **Code: EEE3118**

Course Description:

This course examines the basic principles, characteristics, construction operation and application of AC machine and rotating electrical machines. It includes the study of slip-ring induction motor, squirrel cage induction motor, synchronous machines and alternating current generators.

Course Objectives:

1. To impart knowledge on Construction and performance of salient and non-salient type synchronous generators, synchronous motor and all kinds of induction machines.
2. To impart knowledge on Starting and speed control of three-phase induction motors and synchronous motors.

Syllabus:

List of Experiments: (Minimum 10 Experiments)

1. To perform Load test on a three-phase induction motor.
2. Determination of Speed control of a three-phase slip-ring induction motor.
3. To perform No Load test on a three-phase induction motor.
4. To perform Blocked rotor test on a three-phase induction motor.
5. Study of Synchronous motor starting methods.
6. To plot V and inverse V curves of a Synchronous motor.
7. To conduct OC and SC tests on three-phase Alternator.
8. To perform the synchronization of an alternator with the grid.
9. Determination of X_d and X_q of a salient pole synchronous machine by Slip test.
10. Study of negative and zero sequence reactance of synchronous generator.
11. To perform parallel operation of alternators.

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12. Determination of vector group of three-phase transformer.
13. Study of Parallel operation of three-phase transformers.
14. To perform single-phase motor starting methods.

Equipments/Machine/Software required:

Wound Rotor Induction motor, DC Generator, Squirrel cage Induction motor, Synchronous motor, Synchronous induction motor, Alternator, DC Power supply source.

Reference Books & Manuals:

1. A textbook of laboratory course in electrical engineering - S. G. Tarnekar- S. Chand Publisher

Course Outcomes:

At the end of this course the student will be able to:

1. Understand the construction, working principles of synchronous and three-phase induction machines.
2. Draw the equivalent circuit diagrams under various load conditions
3. Analyze the load profile, voltage regulations and efficiency in various operating conditions.

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Semester: V **Branch: Electrical and Electronics Engg.**
Subject: Linear Integrated Circuits **Lab Code: EEE3119**

Course Description:

A course in Linear Integrated Circuits is an essential part of a well-rounded electrical engineering technology curriculum. With hands-on experiments significantly improving the understanding and visualization of complex subject matters, a series of laboratory experiments have been developed in order to enhance the teaching and learning processes of Linear Integrated Circuits. The main aim of this lab is to teach the linear and non-linear applications of operational amplifiers (741). Students are made familiar with theory and applications of 555 timers. Students are made to Design combinational logic circuits using digital ICs.

Course Objectives:

This laboratory course enables students to design of elements in bipolar- and CMOS-based op amps, feedback, power supplies, linear and non-linear applications circuits with the op amp as the basic building block, This course provides sufficient basic knowledge for the undergraduate to understand the design of op amps and their applications as well as the design of filters, power supply circuits.

Syllabus:

List of Experiments:

1. Design and Study differential amplifier by using Op-amp and determine the different ac and dc parameters of IC741
2. Study the characteristics of negative feedback amplifier. Design the following amplifiers:
   a. Unity gain amplifier
   b. non-inverting amplifier with a gain of 'A'
   c. Inverting amplifier with a gain of 'A' Apply a square wave of fixed amplitude and study the effect of slew rate on the three types of amplifiers.
3. Design of an instrumentation amplifier of a differential mode gain of 'A' using three amplifiers.
4. Design the nonlinear applications by using Op-amp
5. Design and study comparator circuits
6. To design and setup a Schmitt trigger, plot the input output and measure VUT

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and VLT.

7. Study the characteristics of regenerative feedback system with extension to design an astable multivibrator.
8. Design a second order Butterworth band-pass filter for the given higher and lower cut-off frequencies.
9. Design and test a notch filter to eliminate the 50Hz power line frequency.
10. Design of waveform generation circuits To design and construct a monostable multivibrator using 555 IC for the time delay
11. To Design PWM generator
12. Design of Applications by using VCO: To set up voltage controlled oscillator using IC566 and plot the waveforms
13. Study the PLL circuit and simulate the frequency synthesis application

Equipments/Machine/Software required:

CRO, Function generator, OP-AMP-ICs, Timer ICs, Multimeters, MATLAB.

Reference Books & Manuals:

1. Integrated Circuits: Analysis and Design, 3rd Edition, McGraw-Hill 2005.
2. Analysis and Design of Analog Integrated Circuits: Gray Paul R and Meyer Robert G, 4th Edition, John Wiley, 2001.
3. Amplifiers and Analog Integrated Circuits: Franco Sergio, Design with Operational, 3rd Edition, McGraw-Hill, 2002.

Course Outcomes:

Students will able to:

1. Demonstrate analyze and design Op-amp for specific analog applications.
2. Determine the performance parameters of Op-amp ICs and other linear ICs
3. Simulate the PSpice / Simulink model for a given linear applications
4. Troubleshoot the analog circuit having ICs and discrete components

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Semester: V **Branch: Electrical and Electronics Engg.**
Subject: Humanities & Social Sciences

Code: HSS3103

Course Description:

Industrial Psychology and Organizational Behaviour' course will provide an Introduction to Industrial Psychology and Organizational Behaviour, a discipline that studies human behavior in the workplace. The course focuses on different aspects of human behaviour in and related to the workplace to advance knowledge on the economic well-being of work organizations. The course content will emphasize the application of psychological principles relating to human dynamics, motivation, teams, power and organization culture. Through the lectures and class discussions, students will learn the scientific basis of human behavior at work and how they relate to processes of hiring, developing, managing and supporting employees.

Course Objectives:

The objectives of this course are to provide students of engineering with:

1. general psychological knowledge from the areas of personality, assessment, cognitive and social psychology which can be applied and further developed in multilevel organizational contexts;
2. study the human behaviour and to suggest various ways and means lo improve the efficiency of workers in industries;
3. to advance understanding regarding behavioural aspects of productivity in industries;
4. knowledge of applying psychological principles in industries and organizations;
5. theories of motivation to workplace behavior; and
6. the policies employed by organizations to reduce work-life conflict.

Syllabus:

UNIT-1: Introduction to Industrial Psychology

Definitions & Scope. Major influences on Industrial Psychology - Scientific Management and Human relations schools, Hawthorne Experiments, Role of Industrial Psychology, Implications of Industrial Psychology on Modern Industries.

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UNIT -2: Organizational Culture:

Organizational culture, Functions of organizational culture, Organizational Socialization, Assessing Cultural Values, Cross Cultural issues.

UNIT-3: Individual in Workplace

Motivation & work behavior. (Need Theory, Herzberg's Two Factor Theory), Cultural Differences in Motivation, Motivation and Job satisfaction, Stress management.

UNIT-4: Work Environment & Engineering Psychology

Work environment -Fatigue, Monotony, Boredom, Accidents and Safety; Job Analysis, Recruitment, Selection and Interview – Reliability & Validity of recruitment tests.

UNIT-5: Training And Learning

Learning Objectives, Need Identification, Psychological Factors in Learning, Training Methods and Effective Training Programmes.

Text Books:

1. Industrial Psychology and Organisational Behaviour: Mohanty, Girishbala. Kalyani Publishers.
2. Industrial Psychology: Its Theoretical and Social Foundations: Naylor & Blum, UBSPD.
3. Organizational Behavior: Luthans, Fred, McGraw Hill 2008
4. Understanding Organizational Behavior: Udai Pareek, Oxford University Press

Reference Books:

1. Psychology & Work Today: An Introduction to Industrial and Organizational Psychology: Schultz, D. & Schultz, S. E., 10th Ed., New Jersy: Prentice Hall, 2009.
2. Century: An Introduction to Industrial and Organizational Psychology: Landy, F. J. & Conte, J. M., New York: Wiley- Blackwell, 2009.
3. Organizational Behaviour: Robins, S. P. & Judge, T. A., 14th Ed., New Jersey, Prentice Hall, 2010.
4. Spirituality at Work: 10 Ways to Balance Your Life on the Job: Pierce G.F, 1ST Ed., Illinois, Loyola Press, 2005.

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5. Industrial/Organizational Psychology: Miner J.B. (1992). N Y: McGraw Hill.

6. Industrial/Organizational Psychology: An Applied Approach: Aamodt, M.G. (2007) (5th edition) Wadsworth/Thompson: Belmont, C.A.

7. Human Resource Management: Aswathappa K.: Tata McGraw Hill.

8. ORGB: An innovative approach to learning and teaching Organizational Behaviour: Nelson, Quick and Khandelwal,. A South Asian Perspective, Cengage Learning, 2012

9. Organizational Behavior: Robbins, Stephen, Prentice Hall, India.

Course Outcomes:

After completion of the course, students will be able to:

1. use knowledge of major concepts in psychology as relevant to cognitive, behavioral, biological, socio-cultural, and spiritual perspectives on human nature;

2. apply psychological principles to practical issues (including personal, social, and/or organizational issues;

3. understand the way theory and research in Industrial Psychology applies to real-world issues and challenges; and

4. apply psychological knowledge, skills, and values to various occupations/careers.

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Semester: V **Branch: Electrical and Electronics Engg.**
Subject: Professional Development **Code: PFD3105**

Course Description:

Leadership, delegation, motivation, communication, and vision are key components that make up an effective and successful shipboard leader. As a leader, a large part of the responsibility is anticipating issues and implementing directives and standard operating practices. Managerial Skills course is designed to blend theoretical and practical skills necessary to be an effective shipboard leader. Students will learn tools and management techniques to manage workload and resources, assess situations and manage risk within a team environment. This course covers self-awareness, communication theory, listening and nonverbal, interpersonal problem-solving, stress and stress management, persuasion and influence, oral presentations, and meetings and interviews.

Course Objectives:

The objectives of this course are:

1. To facilitate students' understanding of their own managerial skills;
2. To explain the basic concepts and processes of management;
3. To expose students to the managerial skills;
4. To expose students to several models of leadership and team building;
5. To explain the organizational culture and the complexity of managing in a global world;
6. To develop an ability to work with moral and ethical dilemmas and make decisions using critical thinking; and
7. To facilitate students' understanding of time management, empowerment and delegation.

Syllabus:

UNIT-1: Management And Managerial Skills

Management- Meaning, Nature and Concept of Management, Function of Management- Planning, Organizing, Staffing and Controlling, Importance of

Management, Role of Managers in Organization, Managerial Skills.

UNIT-2: Leadership And Decision-Making Skills

Leadership, Qualities of a Good Leader, Leadership Styles, Concept of Decision making-Importance of Decision making, Decision making Process, Decision making Techniques.

UNIT-3: Problem-Solving Skills

Problem-solving, Concept of Problem-solving, Process of Problem-Solving, Techniques for Problem-Solving, Challenges in Generating Creative Ideas.

UNIT–4: Team Building And Time Management

Team building, Developing Teams and Team Work, Leading Team, Team Membership, Time Management, Steps and Techniques of Time Management, Importance of Time Management.

UNIT-5: Empowerment And Delegation

Empowering and Delegating: Meaning of Empowerment, Dimensions of Empowerment, How to Develop, Empowerment, Inhibitors of Empowerment, Delegating Works.

Text Books:

1. Leadership and Self-Deception: Arbinger Institute, Berrett-Koehler Publishers; Second Edition, 2010, ISBN: 978-1576759776
2. Basic Managerial skills for all: E.H. McGrawth, Prentice Hall India Pvt Ltd,2006
3. How to develop a pleasing personality: Atul John Rego, Better yourself bools, Mumbai,2006

Reference Books:

1. The powerful Personality: Dr. Ujjawal Patni & Dr. Pratap Deshmukh, Fusion Books, 2006
2. On Becoming a Leader: Bennis, Warren. . Rev. ed. Cambridge, Mass. Perseus, 2003.
3. A Workbook on Becoming a Leader Learning to Lead: Bennis, Warren, and Joan Goldsmith. 3d ed. Cambridge, Mass. Perseus, 2003.
4. Getting Things Done When You Are Not in Charge: Bellman, Geoffrey

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M., Berrett-Koehler Publishers, 2001

5. Handbook of leadership and management development: Jeff Gold, Richard Thorpe, and Alan Mumford, Gower

Course Outcomes:

After completion of the course, students will be able to:

1. Distinguish between leadership and management;
2. Recognize their own leadership style;
3. Identify and understand various approaches in leading others;
4. Employ key competencies of visioning, aligning, delegation, motivating and inspiring others;
5. Recognize the need for collective problem solving and apply appropriate techniques;
6. Understand time pressures and the need for time management; and
7. Apply core management skills and techniques to deliver results.

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