Government College of Engineering, Karad

(An Autonomous Institute of Government of Maharashtra)

Programme: Electrical Engineering

Curriculum for
Third year of B. Tech

Government College of Engineering, Karad
Third Year B. Tech.
EE501: Electromagnetics

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorials	1 Hr/week	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 To become familiar with vector notation of field quantities
2 To formulate and analyze problems of electrostatics and steady magnetic field
3 To understand the interaction between time varying electric and magnetic fields

Note for Instructor

- The tutorials shall be on practical aspects of the principles of electromagnetic
- Students shall be made familiar with the functioning of spectrum analyzer
- EMI detection and methods of its mitigation shall be the part of tutorials

Course Contents		**Hours**
Unit I	Vector Algebra and calculus, Cartesian, Cylindrical and Spherical Co-ordinate System. Transformation of Variables from Cartesian to Cylindrical and Spherical Coordinate System and Vice-Versa	**07**
Unit II	Coulomb's Law, Electric Field Intensity, Field of 'N' Point Charges, Field of Line and Sheet of Charge, Electric Flux Density, Gauss's Law and Its Applications, Divergence and Divergence Theorem	**07**
Unit III	Definition of Potential Difference and Potential, Potential of Point Charge and System of Charges Potential Gradient, Energy Density in Electrostatic Field. Poisson's and Laplace's Equations, Current and Current Density, Continuity of Current Capacitance, Dielectrics.	**07**
Unit IV	Biot-Savart, Amperes Circuital Laws and their Applications, Curl, Stoke's Theorem, Magnetic Flux Density, Scalar and Vector Magnetic Potential, Maxwell's Equations in Steady Electric and Magnetic Fields	**07**
Unit V	Force on Moving Charge and Differential Current Element, Force and Torque on a Closed Circuit. Time Varying Fields and Maxwell's Equations.	**07**
Unit VI	Uniform Plane Waves, Wave Motion in Free Space, Perfect Dielectric, Lossy Dielectric and Good Conductor, Skin Effect, Pointing Vector and Power Considerations. Reflection of Uniform Plane Waves, Standing Ratio	**07**
Tutorials	Minimum two tutorials based on each Unit.	

Course Outcomes

After completing this course students will be

1 able to formulate the field distribution
2 able to obtain field distribution for given geometry and given boundary conditions
3 understand the phenomena of electromagnetic waves
4 apply theoretical knowledge to low frequency electromagnetic devices

Text Books

1 "Engineering Electromagnetic", William Hayt and J. A. Buck, 8th edition, The McGraw Hill education Pvt. Ltd.
2 "Principles of Electromagnetics", S. V. Kulkarni and Matthew N. O. Sadiku,6th Asian edition, Oxford University press India

References

1 "Electromagnetics", Schaum's outline series, J A Edminister, 2nd edition, The Tata Mcgraw Hill Publishing company Ltd.
2 "Electromagnetic Engineering", Nathan Ida, 5th edition, Thomson Learning

Useful Links

1 www.nptel.iitm.ac.in (Video courses engg maths-2 and 3)
NPTEL video course by Prof. Shevgaonkar, (IIT Bombay)
NPTEL video course by Prof. Harishankaran,(IIT Chennai)
NPTEL video course by Prof. D. K. Ghosh (IIT Bombay)
NPTEL video course by Prof. Harbola (IIT Kanpur)

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO1 1	PO 12	PSO 1	PSO 2
CO1	√	√	√	√					√			√		
CO2	√	√	√	√					√		√	√	√	
CO3	√	√	√	√	√	√			√			√		√
CO4	√	√	√	√	√	√			√	√		√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	1	1	1	6
Understand	4	4	4	18
Apply	3	3	2	12
Analyze	4	4	4	15
Evaluate	2	2	1	09
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE502: Power Systems-II

Teaching Scheme		**Examination Scheme**	
Lectures	4 Hrs/week	**CT1**	15
Tutorials	--	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1. To analyze symmetrical and unsymmetrical faults on power system.
2. To understand power flow in power system.
3. To understand concept of power system operation and control.

Course Contents		**Hours**
Unit I	**Symmetrical Components and Sequence Networks**- Synthesis of Unsymmetrical Phasors,Symmetrical Components of Unsymmetrical Phasors, Power in Terms of Symmetrical Components, Sequence Circuits of a Symmetrical Transmission Line, Sequence Circuits of the Synchronous Machine, Sequence Circuits of Transformers,Unsymmetrical Series Impedances	**10**
Unit II	**Unsymmetrical Faults**- Unsymmetrical Faults on Power Systems, Single Line-to-Ground Faults, Line-to-Line Faults, Double Line-to-Ground Faults, Open-Conductor Faults.	**08**
Unit III	**Power-Flow Analysis**- Power flow equations and solution techniques. Gauss-Seidal method, Newton-Raphson method, decoupled and fast decoupled methods, comparison of power flow methods, power flow simulation software.	**08**
Unit IV	**Power System Stability**-Steady-state and transient stability concepts, rotor dynamics and swing equation, equal area criterion, step by step solution of swing curve, multi-machine stability, factors affecting transient stability.	**08**
Unit V	**Load Frequency control**-Importance of load frequency control, frequency in multi-machine system, determination of frequency in steady state, frequency dependence of loads, speed governors, governor characteristics, A.G.C.: objectives and implementation.	**08**
Unit VI	**Reactive power compensation** - Production & absorption of reactive power, special compensation equipment: shunt capacitors, reactors, tap changing transformers, static VAR compensators.	**08**

Course Outcomes

After completing this course students will be

1. able to analyze symmetrical and unsymmetrical faults on power system.
2. able to understand power flow in power system.
3. able to understand concept of power system operation and control.

Text Books

1 "Power System Analysis", Grainger John J and W D Stevenson Jr,Mc-Graw Hill, 2003 Edition

2 "Modern Power System Analysis", I. J. Nagrath, D. P. Kothari, (3rd Edition), Tata McGraw Hill Publishing Co. Ltd., 2003.

References

1 "Power System Analysis and Design ",J. D. Glover and M. Sarma(5th Edition), Brooks/ Cole Publishing

2 "Electric energy systems theory: An introduction",O. I. Elgerd, Tata McGraw Hill, 4th edition.

3 "Power system analysis",HadiSaadat,3rd edition, McGraw Hill International publication,2016.

4 "Power system analysis", A. R. Bergen and Vijay Vittal, (2nd edition), Pearson Education Asia, 2001.

Useful Links

1 www.nptel.iitm.ac.in (NPTEL video Course Power system operation and control By A. N. Kulkarni IIT Bombay)

2 www.nptel.iitd.ac.in (NPTEL video Course Power system stability and control by Prof. M.L. Kothari, IIT Delhi)

Mapping of CO and PO

	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PO11 0	PO11 1	PO11 2	PSO 1	PSO 2
CO1	√	√	√	√					√			√	√	
CO2	√		√	√					√			√		
CO3	√	√	√	√	√	√			√			√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE 503: Control Systems-I

Teaching Scheme		**Examination Scheme**	
Lectures	**3Hrs/week**	**CT1**	15
Tutorials	**--**	**CT2**	15
Total Credits	**3**	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 To study Mathematical modeling of Physical system
2 To study control system in time domain and frequency domain
3 To study modern control system techniques

Course Contents		**Hours**
Unit I	**Modeling and representation of Control System and Transfer Function:** History of control system, Laplace transform review, Transfer function of electrical, mechanical, thermal, hydraulic system, Electrical circuits analogs, Block dia. Representation and reduction, types of feedback systems, signal flow graph, Mason's gain rule, SFG.	**07**
Unit II	**Time Domain Analysis and Stability Concept:** Response of first and second order system, general second order system, response with additional pole and zeros, steady state error for unity feedback system, static error constants and systems type, steady state error specifications, Concept of stability for linear systems, Absolute and relative stability, Routh stability criterion and its application in special cases.	**07**
Unit III	**Servo Components:** Error detectors,Potentiometer, Synchros, optical rotary encoders, DC and AC Servomotors, stepper motor, gear trains, AC and DC tacho-generators, Transfer function and applications of these.	**07**
Unit IV	**Root Locus:** Definition of root locus, Rules for plotting root loci, Root contour, stability analysis using root locus, effect of addition of pole and zero.	**06**
Unit V	**Frequency Domain Techniques:** Frequency domain specification, Correlation between time and Frequency domain specifications, Bode plot, Nyquist criterion, stability, gain margin, phase margin by Nyquist diagram and bode plot, Effect of gain variation and addition of poles and zeros on Bode plot.	**07**
Unit VI	**Feedback control systems:** Feedback control system characteristics, Objectives, Different types of controllers, P,I,D, PI, PD and PID Controllers, Effects of these controllers on system performance, Tuning of controllers, Ziegler-Nichols methods for controller tuning, Modifications of PID control scheme	**08**

Course Outcomes

After completing this course students will be able to

1 Formulate mathematical model of physical system

2 Analyze control system in time domain and frequency domain.
3 Use modern control techniques

Text Books

1 "Control System Engineering", Norman S. Nise,John willey and Sons, 6th Edition, 2015.
2 "Control System Engineering",I.J. Nagrath and M. Gopal,New age International publication, 5th Edition, 2014.

References

1 "Modern Control Engineering", Katsuhiko Ogata,Prentice Hall of India Pvt Ltd, 5th edition.

2 "Automatic Control System", Benjamin C. Kuo, Prentice Hall of India Pvt Ltd, Wiley publication, 9th edition.
3 "Control Systems-Principles and Design", M.Gopal, Tata McGraw-Hill Education Pvt. Ltd, 4th edition, 2014.

Useful Links

1 http://nptel.ac.in/courses/108102043/ (Control Engineering by Prof. M. Gopal)
2 http://nptel.ac.in/courses/108101037/(Control Engineering by Prof. S.D. Agashe)

Mapping of CO and PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√	√	√		√			√	√		√	√	√	
CO2	√	√	√		√			√	√		√	√		
CO3	√	√	√		√			√	√		√	√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering Karad
Third Year B. Tech.
EE504: Electrical Machines -II

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorials	2 Hrs/week	**CT2**	15
Total Credits	5	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1. To familiarize students with the concept of AC machines and their industrial applications.
2. To set a firm and solid foundation in Electrical machines with strong analytical skills and conceptual understanding of analytical methods in A.C. Machines.
3. To make students aware of protective system with industry oriented learning.

Course Contents		**Hours**
Unit I	Construction & types of 3 ph. Induction motors, torque equation, starting torque, running torque, condition of maximum torque ,torque slip characteristics, Need of starters for 3 phase Induction motors, types of starters, Speed control methods from stator side (Stator voltage control ,Stator Frequency control, Pole changing) & rotor side (rotor resistance control), Applications of 3 ph. Induction motors.	**08**
Unit II	Losses & efficiency of 3 phase induction motor, power flow diagram with numerical treatment, No load & blocked rotor test, equivalent circuit of 3 phase induction motor, Phasor diagram of 3 phase induction motor, performance of 3 phase induction motor using circle diagram, Cogging & crawling of 3 phase induction motor.	**07**
Unit III	Construction, Working and types of single phase induction motors (Split phase, capacitor start/run, shaded pole motors), Double field revolving theory, Characteristics & Applications.	**06**
Unit IV	Construction, principle of operation of three phase alternator, emf equation, parameters of armature winding, armature reaction, concept of synchronous reactance and synchronous impedance. Equivalent circuit of 3 phase alternator, alternator on load (resistive, inductive & capacitive)	**08**
Unit V	OC test & SC test on 3 Phase alternator, short circuit ratio, voltage regulation methods (emf, mmf, zero power factor and direct loading method) with numerical treatment, Losses and efficiency, power flow diagram, need of parallel operation, conditions for parallel operation, synchronizing procedures, hunting and oscillations in alternators.	**07**
Unit VI	Synchronous motor, staring methods, Phasor Diagram, Effect of excitation on power factor and armature current, V and inverted V Curves, Operation of Synchronous motor as Synchronous Condenser, Applications of three phase synchronous motor. Permanent Magnet Machines, Principle, operation and applications of Brushless motors	**07**

Tutorials Minimum three tutorials to solve problems on Unit no. 1,2,4,5 and6

Course Outcomes

After completing this course student will be able to

1 understand principles and application of AC machines.
2 observe performance and carry out testing of Machines.
3 select appropriate machine for Industrial application

Text Books

1 "Electrical Machines", S. K. Bhattacharya, 3rd edition, Tata Mc-Graw-Hill publication.
2 "Electrical Machines", I. J. Nagrath, D. P. Kothari, 4th edition, Tata McGraw Hill publication

References

1 "Electric Machinery",A. E. Fitzgerald, Mc-Graw Hill publications
2 "Theory of AC machines", A. S. Langsdrof, Mc-Graw Hill publications.
3 "Design of Brushless Permanent Magnet motors",J. R. Hendershot and T. J. E. Miller,Magna Physics Publishing and Clarendon press. 1994 edition.
4 "Brushless Permanent Magnet Motor Design", Daune C. Hanselman, Mc Graw- Hill Inc.

Useful Links

1 www.nptel.iitm.ac.in (Video courses on Electrical Machines by Prof. S K Bhatacharya, IIT Khargapur)

Mapping of CO and PO

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	√	√	√	√	√				√	√	√		√	
CO2	√	√		√	√	√			√	√	√		√	√
CO3		√	√	√	√				√	√	√			√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE505: Computational Techniques

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorials	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 To solve linear system of equations
2 To solve differential equations numerically
3 To carryout numerical differentiation and integration
4 To use SCILAB/MATLAB for computing.

Course Contents		**Hours**
Unit I	**Computation and Error Analysis**: Accuracy and precision; Truncation and round-off errors; Binary Number System; Error propagation.	**06**
Unit II	**Linear Systems and Equations:** Matrix representation; Cramer's rule; Gauss Elimination; Matrix Inversion; LU Decomposition; Iterative Methods; Relaxation Methods	**08**
Unit III	**Algebraic Equations**: Bracketing methods, Bisection, Reguli-Falsi; Open methods: Secant, Fixed point iteration, Newton-Raphson; Multivariate Newton's method	**07**
Unit IV	**Regression and Curve Fitting**: Linear regression; Least squares; Total Least Squares; Interpolation; Newton's Difference Formulae; Cubic Splines	**08**
Unit V	**Numerical Differentiation**: Numerical differentiation; higher order formulae **Integration and Integral Equations**: Trapezoidal rules; Simpson's rules.Numerical solution of Laplace equation by Liebmann's method	**06**
Unit VI	**ODEs:** Euler's method - Euler's modified method - Taylor's method and Runge-Kutta method for simultaneous equations and 2^{nd} order equations - Multistep methods - Milne's and Adams' methods	**07**

Course Outcomes

After completing this course student will be

1 able to assess the approximation techniques to formulate and apply appropriate strategy to solve real world problems.
2 aware of the use of numerical methods in modern scientific computing.
3 familiar with numerical solution of integration, linear equations, ordinary differential equations, interpolations

Text Books

1 "Numerical Methods for Engineers", Chapra S.C. and Canale R.P. 5^{th}Ed; McGraw Hill publication.

References

1 "Numerical Methods for Engineers",Faires and Burden 5th edition, Thomson Learning

2 "Numerical Methods for Engineers using MATLAB",Lauren Fousset4th edition, John Willey

Useful Links

1 www.nptel.iitd.ac.in (Video course Numerical Methods and Computation Prof. S.R.K. Iyengar, IIT Delhi)

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√		√	√					√			√	√	
CO2	√	√	√	√					√		√	√		√
CO3	√	√	√	√	√	√			√			√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE506: Control Systems-I Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	50
		ESE	50
Total Credits	1	**Total**	100

Course Objectives

1 To develop the mathematical model of different components of linear feedback control system using simulation and experiments.
2 To analyze the transient characteristics of different first order and second order systems using simulation and experiments.
3 To determine the performance of system using root locus

Course Contents

Experiment1	Study of Control System Components like Servomotors, Actuators, Sensors, Displays.
Experiment 2	Determination of transfer functions of dc motor.
Experiment 3	Stability Analysis of First, Second and higher order systems using MATLAB.
Experiment 4	Study of rotary position control system
Experiment 5	Plotting of root locus using MATLAB.
Experiment 6	Plotting of Bode and Nyquist plot using MATLAB.
Experiment 7	Determination of transfer function of dc motor using Simulink.
Experiment 8	Study the effect PID controller parameters on transient response of given system.
Experiment 9	Study of Tuning of a PID controller using MATLAB/Simulink.
Experiment 10	Study of Temperature Controller

Submission

Minimum 8 experiments to be performed and evaluated in journal.

ESE

Student will perform, write details and face oral examination on one experiment from above list, randomly selected at the time of ESE.

Course Outcomes

After completing this course students will

1 understand basics knowledge of control system
2 understand Response of first and second order system.
3 understand root locus technique & its application in MATLAB.
4 understand & apply frequency domain techniques using MATLAB.

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√	√	√	√	√	√	√					√		
CO2	√	√	√	√	√	√			√	√	√	√	√	
CO3	√	√	√	√	√	√			√	√	√	√		
CO4	√	√	√	√	√	√			√	√	√	√	√	√

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Avg
Task I	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	
CA									

Government College of Engineering, Karad
Third Year B. Tech.
EE507: Electrical Machines-II Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	50
		ESE	50
Total Credits	1	**Total**	100

Course Objectives

1 To make students aware of ac concepts of AC machines
2 To make students aware of solving numerical related AC machines circuits.
3 To make students aware of calculation of regulation and efficiency of single and three phase machines
4 To make students understand working and applications of various AC machines

Course Contents

Experiment1	Determination of efficiency & speed regulation of 3 phase induction motor by direct loading method
Experiment 2	Determination of circle diagram parameters of 3 Phase induction motor by conducting No Load &Blocked Rotor Test.
Experiment 3	Study of starters for 3 Phase induction motors.
Experiment 4	Speed control methods of 3 Ph.IM. (Stator Side).
Experiment 5	Speed control methods of 3 Ph.IM. (Rotor Side).
Experiment 6	Determination of efficiency & speed regulation of 1-phIM.
Experiment 7	Determination of Voltage regulation of an alternator by EMF method.
Experiment 8	Determination of Voltage regulation of an alternator by MMF method
Experiment 9	Determination of Voltage regulation of an alternator by ZPF method.
Experiment 10	Determination of Xd and Xqof an Alternator by Slip test
Experiment 11	Performance of synchronous generator connected to infinite bus-Using Synchronizing methods.
Experiment 12	Determination of V and Inverted V curves of a synchronous motor.
Experiment 13	Determination of efficiency of synchronous motor by direct loading method
Experiment 14	Determination of efficiency and regulation of Alternator by direct loading method

Submission

Minimum 8 experiments to be performed and evaluated in journal.

ESE

Student will perform, write details and face oral examination on one experiment from above list, randomly selected at the time of ESE.

Course Outcomes

After completing this course students will be

1 able to understand concepts of AC machines.
2 able to acquire knowledge of AC machine and its testing.
3 able to understand AC machine fundamentals and various test preformed.

Mapping of CO and PO

	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√		√	√	√				√	√	√	√		√
CO2	√	√		√	√	√			√	√	√	√	√	√
CO3	√	√	√	√	√	√			√	√	√		√	

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Avg
Task I	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	
CA									

Government College of Engineering, Karad
Third Year B. Tech.
EE508:Computational Techniques Lab

Laboratory Scheme
Practical 2 Hrs/week

Total Credits 1

Examination Scheme
CA 25
ESE 25
Total 50

Course Objectives

1 To become familiar with writing program in SCILAB / MATLAB to solve problems
2 To implement SCILAB / MATLAB software environment for implementation and application of numerical methods.
3 To use effectively SCILAB/ MATLAB to solve numerical solutions of various problems.

Course Contents

Experiments There will be minimum 14 Programming problems (based on contents of EE505) to be solved using SCILAB/MATLAB. (Each student will solve different problem of same pattern).

Course Outcomes

After completing this course students will

1 be familiar with to write program in SCILAB / MATLAB to solve problems.
2 learn to implement SCILAB / MATLAB software environment for implementation and application of numerical methods.
3 learn to use effectively SCILAB/ MATLAB to solve numerical solutions of various problems.

Submission

Printouts of programs and results.

ESE

Student will write program, execute to verify results and face oral examination on any program related to the contents of the course.

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√	√	√	√	√	√	√					√		√
CO2	√	√	√	√	√	√			√	√	√	√	√	
CO3	√	√	√	√	√	√			√	√	√	√	√	√

Assessment Pattern

Skill Level (as per CAS sheet)	Prg 1	Prg 2	Prg 3	Prg 4	Prg 5	Prg 6	Prg 7	Prg 8	Prg 9	Prg 10	Prg 11	Prg 12	Prg 13	Prg 14	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	05	05	05	
CA															

Government College of Engineering Karad.
Third Year B. Tech
HS003 – General proficiency III

Teaching Scheme		**Examination Scheme**	
Lectures	02 Hrs./week	**CA**	50
Practical	02 Hrs./week		
Total Credits	03		

Course Objectives

1 To understand the different components of selection process i.e. written test, GD & PI.

2 To equip the students with the ability to clear NACTECH, AMCAT & ELITMUS.

3 To develop a thorough understanding of these components through strong conceptual understanding, logical approach with various short cuts & practical techniques for manage speed and accuracy to clear the written test & participation in GD & PI

Course Contents

Hours

Unit I **Soft skills** **10**

The moduleCorporate Recruitment Training has four different topics that are**:**

- JAM
- Basics of Group Discussion
- Effective Resume' Writing
- Basics of Interview Skills

Unit II **Basic concept 4** **8**

The modulebasic concept 4 has the following topic**:**

- Ratios & proportions
- Partnerships
- Problems on ages
- SI & CI
- Averages
- Clocks & Calendars

Unit III **Logical Reasoning** **8**

The modulereasoning has the following topic**:**

- Venn diagrams
- Cubes
- Logical deductions
- Letter series
- Number series
- Odd man out

Unit IV **Basic concepts 5** **6**

The modulebasic concepts 5 has the following topic**:**

- Number system
- Mensurations
- Probability
- Permutations & combinations

Unit V **Reasoning** **10**

- Reasoning 3
- Reasoning 4
- Data interpretation
- Data sufficiency

Unit VI **Verbal Aptitude Skills** **10**

The moduleverbal aptitude has the following topics**:**

- Introduction to verbal aptitude & verbal pattern
- Synonyms & antonyms
- Spotting errors & Sentence correction
- Reading comprehension & sentence rearrangement

Note **Delivery Methodology to be followed fully depends on the Skill sets as detailed below.**

Language Skills

- A new methodology of acquiring language which integrates LSRW through emotional connect & experiences in one's life.
- The integrated approach coupled with lot of interaction, group work & effective facilitation leads to overall improvement of one's communication skills

Soft Skills

- Pre & post assessment for each topic
- Comprehensive pre & post assessment capsule wise.
- Explanation of the concept
- Self-assessment inventory
- Activities for experiential learning
- Case studies for better understanding of the concept
- PPTs and videos

Aptitude Skills

- Pre & post assessment
- Explaining the concept
- Multiple approaches to the given problem
- PPTs

Verbal Aptitude Skills

- Pre & post assessment for each topic
- Comprehensive pre & post assessment capsule wise.
- Explanation of the concept
- Work sheet for each topic

References:

1. Understanding organizational Behavior by Uday Parek
2. Training instruments on HRD & OD by Uday Parek & Dr. Surabhipurohit
3. Language Instinct by Steven Pinker
4. Freedom from Imperial Shakels by Dr. K. N. Anandan
5. Quantitative Aptitude by R.S. Agarwal
6. Quicker Maths by Tyra & khundan
7. Quantitative Aptitude by Abhijeet Guh

Course Outcomes :

After completing this course students will be able

- To understand different components of campus recruitment drive.
- To effectively present oneself &ideas in JAM ,GD& interview
- To draft a resume effectively and practice the questions asked from resume'
- To learn & practice different components of verbal topics
- To learn different methods in vocabulary building & contextually use them.
- To learn various bridges in analogies
- To learn different techniques & to spot the errors pertaining to various grammatical rules & structures.
- To explaining concepts and sharing different logics for faster computations in different topics of Aptitude and Reasoning.
- The students will be able to identify and use formula as a strategy for solving problems.
- Faster computations
- Identifying most commonly made mistakes and thereby improving upon their accuracy.

Government College of Engineering, Karad
Third Year B. Tech.
OE631: Industrial Electrical Systems (Open Elective)

Teaching Scheme		**Examination Scheme**	
Lectures	2Hrs/week	**TA**	50
Practical	2Hrs/week	**ESE**	50
Total Credits	3	**Total**	100

Course Objectives:

1 To make students aware of electrical safety and IE rules
2 To increase interest towards Electrical Installation
3 To understand electrical estimation and costing
4 To learn about tenders and contracts

Note for Instructor

- Analyze electrical estimation & design of small & medium Industrial consumers.
- Design layout of electrical Installation of college campus.
- Prepare notice inviting tender

Course Contents		**Hours**
Unit I	**Electrical installations and IE rules** General requirements of electrical installation, electrical engineering symbols, schematic, understanding of wiring diagram and its single line representation, IE rules related to electrical installation,	**04**
Unit II	**Service connection** Methods for service connection, Concept of service connection, Types of service connections and their features, Differentiate between underground and overhead service connection,	**04**
Unit III	**Electrical safety** Types and meaning of safety signs, causes and effects of electrical accidents, safety against electric shocks, personal protective equipment, need for electrical isolations, Earthing / Grounding, Necessity, types of Earthing, Lightning arresters, types and use of lightening arresters.	**04**
Unit IV	**Electrification of Residential and Commercial installations** General rules and guidelines for installation of residential electrification and positioning of equipment, Calculation of total electrical load in the residential installation, Method of drawing single line diagram, Difference between residential and commercial installation.	**04**
Unit V	**Industrial installation** Industrial load, Design considerations of electrical installation in small industry/factory/workshop, selection of size for wires , cables required for the machines and its controlling unit, length and size of cable required for the every industrial load, ratings of wiring accessories, main switch, bus bar MCB, ELCB etc. for industrial load, methods of earthing for industrial installation, list of material for industrial installation with their costing.	**06**
Unit VI	**Contracts, Tenders and Execution** Tenders: types, drafting, Tender notice billing, submission and opening of tenders Contracts: Types of contracts and contractors, Comparative statements for selection of contractors	**02**

List of Experiments

1 Drawing of Electric symbols
2 Single line diagram of Domestic wiring (of one House)
3 Electrical load calculation of single house / apartment.
4 Operation of MCB and ELCB
5 Study of different methods of Earthing.
6 Study of electrical installation in small industry/factory/workshop
7 Preparation of Tender / Quotation
8 Preparation of Comparative statement
9 One visit to understand Electrical wiring and Installation.

Submission

Minimum 8 experiments to be performed and evaluated in journal

ESE

It will be of 50 marks practical examination.

Course Outcomes

After completing this course student will be able to

1 read and interprets Electrical Installation drawings
2 understand and apply IE rules.
3 be aware of electrical safety
4 make use of data tables & specification of wire, cables, LT lines & Distribution Transformer, MCCB, ELCB.

Text Books

1 "Estimating design and costing", Allasappan and Ekambarm, 1st Edition, Tata McGraw hill

References

1 ISO, IS, BS standards, Data Sheets, IE Rules Handbook
IS/International code: IS5909, 7733, 2174, 732, 464
2 "Estimating Design & Costing", Raina Bhattachraya, 5th Edition, New Age International Publication, 2014
3 "Electrical Engineering Drawing", Surjit Singh, Part I, 1st Edirion, Ktson books.

Useful Links

1 http://www.bestestimatepro.com/
2 http://indiacatalog.com/web_directory/electrical/electrical.html

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√	√	√	√	√		√					√		√
CO2	√		√		√				√			√	√	√
CO3	√	√		√		√		√			√	√	√	
CO4	√	√	√	√	√					√		√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	10
Understand	3	3	2	10
Apply	3	3	2	10
Analyze	3	3	2	10
Evaluate	3	3	2	10
Total	15	15	10	50
CA				

Government College of Engineering, Karad
Third Year B. Tech.
EE602: Optimization Techniques

Teaching Scheme		**Examination Scheme**	
Lectures	**3 Hrs/week**	**CT1**	15
Tutorials	**--**	**CT2**	15
Total Credits	**3**	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1. To introduce the fundamental concepts of Optimization Techniques;
2. To make the learners aware of the importance of optimizations in real scenarios;
3. To provide the concepts of various classical and modern methods of for constrained and unconstrained problems in both single and multivariable.

Course Contents		**Hours**
Unit I	**Introduction** Introduction to optimization, terminology, design variables , design surface, constraints, objective function, calculus method, classical methods, Introduction to MATLAB/SCILAB optimization toolbox	**08**
Unit II	**Linear Programming Problem** Formulation of LPP, Geometry of LPP and Graphical Solution of LPP, Solution of LPP: Simplex Method, Solution of LPP using MATLAB/SCILAB.	**08**
Unit III	**Linear Programming Problem** Big - M Method, Two - Phase Method, Special Cases in Simple Applications, Introduction to Duality Theory, Dual Simplex Method,	**06**
Unit IV	Classical optimization techniques : Single variable Optimization, Unconstrained multivariable optimization, Nonlinear programming with equality constraint, Nonlinear programming KKT conditions	**08**
Unit V	Numerical optimization : Region elimination techniques, Fibonacci Method, Golden Section Methods, Interpolation Methods	**06**
Unit VI	Unconstrained optimization techniques : Direct search Method, Unconstrained optimization techniques : Indirect search method, Nonlinear programming : constrained optimization techniques, Interior and Exterior Penalty Function Method,	**08**

Course Outcomes

After completion of the course students will able to

1. formulate optimization problems
2. understand and apply the concept of optimality criteria for various types of optimization problems
3. solve single variable and multivariable optimization constrained / unconstrained problems
4. apply optimization methods in real life situations

Text Books

1. "Engineering Optimization Theory and Practice", S. S. Rao, 4th Edition ,John Wiley

References

1 "Optimization for Engineering Design", Kalyanmoy Deb, 2nd Edition, Prentice Hall of India.

2 "Optimization G.V. Reklaites", A. Ravindran and K.M. Rogsdeth, 3rd Edition, Wiley, New York.

Useful Links

1 http://nptel.ac.in/courses/111105039/(NPTEL COURSE by Prof. Devyani Chaterjee IIT KHARAGPUR)

Mapping of CO and PO

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√	√	√	√	√			√	√		√	√		
CO2	√	√	√	√	√			√	√	√	√	√		
CO3	√	√	√		√			√	√		√	√	√	√
CO4	√	√	√		√			√	√		√	√	√	

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	10
Understand	3	3	2	10
Apply	3	3	2	10
Analyze	3	3	2	10
Evaluate	3	3	2	10
Total	15	15	10	50
CA				

Government College of Engineering, Karad
Third Year B. Tech.
EE603: Power Electronics

Teaching Scheme		**Examination Scheme**	
Lectures	04 Hrs/week	**CT 1**	15
Tutorials	01 Hr./week	**CT 2**	15
Total Credits	05	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 To identify various power devices and understand their coding, characteristics, data-sheets useful for various industrial applications.
2 To illustrate the need and functions of various types of converters with applications.
3 Analyze Power Electronics based circuits applying fundamentals of mathematics, Basic Electrical knowledge and Network theory.
4 To prepare students to get admission for higher study or employment in core Electrical/Electronics industry.

Course Contents		**Hours**
Unit I	Power semiconductor devices & their characteristics : Characteristics and operation of power diodes, thyristors, power transistors, (BJTs, MOSFETs, IGBTs, SITs, diac, triac etc), Ratings of power semiconductor devices, application areas of power semiconductor devices Introduction to types of power electronic circuits: AC-DC converters, AC-AC converters, DC-DC converters, DC-AC converters	08
Unit II	Turn on and Turn off circuits for power semiconductor devices; BJT base drive requirements and drive circuit, MOSFET & IGBT gate drive circuits; Isolation of gate/base drives: Pulse transformers, optocouplers, thyristor firing schemes, gate drive ICs	08
Unit III	(a) Uncontrolled AC-DC converters (Diode Rectifiers) : Diode Rectifiers: Single phase half wave, full wave rectifiers with R and R-L load, Three phase rectifier with R and R-L load, (circuit operation, various waveforms, derivation of fundamental equations and numerical) (b) AC-DC converters (Controlled Rectifiers) : Principle of phase controlled rectification, single phase semi and full converter with R and R-L load, power factor improvement in controlled rectifiers, three phase semi and full converter with R and R-L load, (circuit operation, various waveforms, derivation of fundamental equations and numerical) (c) Dual Converters : 1-ph and 3-ph dual converter, operation, waveforms, circulating current inductance and its function/use in dual converters (d) Effect of source inductance on converter performance, applications of AC-DC	16

converters

Unit IV	AC voltage controllers (AC-AC converters) : Principle of on-off control, principle of phase control in single phase and three phase circuits; Cycloconverters: single phase cycloconverters & operation, three phase cycloconverters & operation (types, circuit diagram, operation, various waveforms), applications of cycloconverters	06
Unit V	DC-DC converters : Classification of DC-DC converters, Buck converter, Boost converter, Buck-Boost converter, Cuk converter; their operation in different modes with various waveforms, required derivations, and numerical, applications of DC-DC converters	10
Unit VI	DC-AC converters: Principle of operation and performance parameters, 1-ph half/full bridge inverter, 3-ph inverters: 180 degree and 120 degree conduction modes of operation, PWM techniques of DC-AC converters, modulation index (amplitude and frequency), (Optional: introduction to multilevel inverters), applications of inverters. Resonant Converters: Introduction to resonant converters, principle of operation, types of resonant converters, applications	06

Tutorial Two tutorials based on each Unit. Total 12 tutorials.

Course Outcomes

After Completion of the course student will be able to

1. Describe the characteristics of power semiconductor devices and identify suitable switch choices for a given application.
2. Design Power Converter for required application.
3. Apply knowledge of mathematics, network theory to solve/design converter based problems.
4. Nurture for research or to become entrepreneur in the field of Power Electronics applications

Text Books

1. "Power Electronics: Circuits Devices and Applications", M. H. Rashid, 3rd edition, Pearson/Prentice Hall Publications,
2. "Power Electronics Converters, Applications and Design", Ned Mohan, 3rd edition, Jonh Wiley and Sons.

References

1. "Power Electronics: Principles and Applications", Joseph Vithayathil, McGraw Hill Publication, 2010
2. "Power Electronics", Cyril W. Lander, 3rd Edition McGraw Hill publication.
3. "Modern Power Electronics and Drives", B. K. Bose, Prentice Hall PTR, 2002.

Useful Links

1. http://nptel.ac.in/courses/108101038/, "Power Electronics" (video lecture series by Prof. B. G. Fernandes, IIT Bombay)

Mapping of CO and PO

	PO1	PO 2	PO3	PO 4	PO 5	PO6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√	√	√	√					√			√		
CO2	√	√	√	√					√			√		
CO3	√	√	√	√	√	√			√			√		
CO4	√	√	√	√	√			√	√	√	√	√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE 604: Control Systems -II

Teaching Scheme		**Examination Scheme**	
Lectures	4 Hrs/week	**CT1**	15
Tutorials	2 Hrs/week	**CT2**	15
Total Credits	6	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 Understand state-space technique and representation of systems in state-space.
2 Study and Design Compensators in time domain and frequency domain.
3 State space design using pole placement and state observer.

Course Contents		**Hours**
Unit I	**State Space Concept:** State space representation, phase variable form, state equations of linear time- invariant and continuous data system. Matrix representation of state equation, Conversion of state variable model to transfer function and vice versa, Canonical form, companion form, Jordan Canonical form, Solution of state equations. Concept of controllability and observability, eigen values and stability.	**08**
Unit II	**Control System Design & Analysis by Root Locus method:** Review of Root Locus, Cascade Lead compensation, cascade Lag compensation, cascade Lead- Lag compensation, Series and parallel compensation, Effect of addition of poles and zeros, Design of Lead compensation based on Root Locus approach, Design of Lag compensation based on Root Locus approach, Design of Lead-Lag compensation based on Root Locus approach, Root Locus of system with dead time.	**10**
Unit III	**Control System Design & Analysis by Bode Plot method:** Review of Bode Plot, Stability of system from Bode Plot, Cascade Lead compensation, cascade Lag compensation, cascade Lead-Lag compensation, Design of Lead compensation based on Bode Plot, Design of Lag compensation based on Bode Plot, Design of Lead-Lag compensation based on Bode Plot.	**08**
Unit IV	**State Space Design using pole placement:** Review of State Space, Controllability, Observability (Kalman's test & Gilbert's test), Pole placement technique for controller design, State Feedback Law, Pole placement technique by Transformation method, Direct Substitution Method and by Ackermann's formula.	**08**
Unit V	**State Space Design using State Observer:** State Observers, Full Order State Observer, Transformation method, Direct Substitution method, and Ackermann's formula to Obtain Observer gain Matrix, Effect of addition of Observer on a Closed Loop System, transfer function of Observer based Controller, Design of Control System with Observer.	**08**
Unit VI	**Digital and Advanced Control Systems:** Introduction, Spectrum Analysis of Sampling Process, Signal Reconstruction, Difference Equation, The Z-transform, The Z- Transfer Function, The Z-transform Analysis of Sampled Data Control System, Z and S domain	**08**

Tutorial Minimum 12 tutorials based on course contents, preferably to solve problems.

Course Outcomes

After completing this course the students will able to

1 Represent systems in state-space and its various forms.
2 design lag controller, lead controller, lag-lead controller.
3 analyze state space design using pole placement and state observer.
4 use modern control techniques for design.

Text Books

1 "Control Systems-Principles and Design", M. Gopal, Tata McGraw-Hill Education Pvt. Ltd, 4th edition, 2014.
2 "Modern Control Engineering", K. Ogata, Eastern Economy, 5th edition 2011

References

1 "Control System Engineering", I.J. Nagrath and M. Gopal, Anshan Publishers, 5th edition, 2008.
2 "Control System Engineering", Norman S. Nise, John wiley and Sons, 6th edition, 2014.
3 "Digital Control and State Variable Methods", M. Gopal, Tata McGraw Hill, 4th edition, 2012.

Useful Links

1 http://nptel.ac.in/courses/108103007/, (Advanced Control Systems by Prof. Somanath Majhi, IIT Guwahati)
2 http://www.nptelvideos.in/2012/11/advanced-control-system-design_27.html (Advanced Control System Design by Dr. Radhakant Padhi, IISc Bangalore)

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√	√	√		√			√	√		√	√	√	
CO2	√	√	√	√	√			√	√		√	√	√	√
CO3	√	√	√	√	√			√	√		√	√		√
CO4			√		√			√	√		√	√		

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	12
Understand	3	3	2	12
Apply	3	3	2	12
Analyze	3	3	2	12
Evaluate	3	3	2	12
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech
EE605: Communication Engineering

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorials	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60
		Duration of ESE	2Hrs.30 Min.

Course Objectives

1 To understand the basics of different communication systems
2 To become familiar with advanced communication systems
3 To understand the wave propagation over a transmission line

Note for Instructor

- It is expected that the instructor will make students familiar with different communication techniques. Expect for Units I and V rigorous mathematical treatment is not expected
- Tutorials consists of industrial visits to Telephone exchange, Mobile tower, Data centers, study of institute LAN

Course Contents		**Hours**
Unit I	Elements of Communication systems, Noise in communication, Radio Frequency circuits, Spectrum Analyzers, Frequency synthesizers, Amplitude Modulation, Angle Modulation, Transmitters and Receivers	**07**
Unit II	Pulse modulation, PCM, Delta modulation, Line codes, TDM, Vocoders and data compression.	**07**
Unit III	PSTN, FDM, Digital transmission, Telephone network signaling, Digital local loops, Data coding, Asynchronous transmission, Synchronous transmission, Error detection and correction, Data Compression and encryption	**07**
Unit IV	LAN topologies, Ethernet wiring, WAN structures, Protocols, TCP-IP networks, Internet and intranet FSK, PSK, Quadrature AM, Telephone Modems, Modem to computer connection, FDM/FDMA, TDM/TDMA, Spread spectrum systems, CDMA	**07**
Unit V	Electrical model of transmission line, Step and Pulse response of transmission lines, Wave propagation of lines Characteristic impedance, Propagation constant, VSWR, Smith chart and Stub matching, Transmission line measurements	**07**
Unit VI	Introduction to Advanced Mobile Phone Systems, AMPS control system, Security and privacy, Cell site equipment OFC, Optical couplers and switches, Optical emitters and Detectors, Basic optical fiber system	**07**

Course Outcomes

After completing this course students will

1 be able to understand different communication systems
2 Have knowledge of different advanced communication systems like Telephone, LAN, WAN, Mobile and Optical fiber
3 analyze the wave propagation over a transmission line

Text Books

1 Roy Black, "Electronic Communication Systems", 2nd Indian edition, Cengage Learning

References

1 Louis E. Frenzel ,"Principles of Electronic Communication System",

2 B.P. Lathi ,"Modern and digital communication system".

Useful Links

1 www.nptel.iitm.ac.in (Video courses principles of communication by Surendra Prasad, IIT Delhi)

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	√	√	√	√					√		√	√	√	
CO2	√	√	√	√					√			√	√	√
CO3	√	√	√	√	√	√			√			√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	16
Understand	3	3	3	16
Apply	3	3	2	08
Analyze	3	3	2	12
Evaluate	1	1	0	08
Total	15	15	10	60

Government College of Engineering, Karad
Third Year B. Tech.
EE606: Power Electronics Lab

Teaching Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
		ESE	50
Total Credits	1	**Total**	75

Course Objectives

1 To identify various power devices and understand their coding, characteristics, data-sheets useful for various industrial applications.
2 To illustrate the need and functions of various types of converters with applications.
3 Analyze Power Electronics based circuits applying fundamentals of mathematics, Basic Electrical knowledge and Network theory.

List of Experiments

Experiment 1 Study of constructional details of power devices, R-L-C code identification, study of data-sheets of various device.

Experiment 2 Characteristics of various power devices a) Diode b) MoSFET c) IGBT.

Experiment 3 Study of gate drive circuits for various power devices.

Experiment 4 Performance study of 1-ph half-wave uncontrolled (Diode) rectifiers with R-load, R-L load.

Experiment 5 Performance study of 1-ph full-wave uncontrolled (Diode) rectifiers with R-load, R-L load.

Experiment 6 Performance study of 3-ph half-wave uncontrolled (Diode) rectifiers with R-load, R-L load.

Experiment 7 Performance study of 3-ph full-wave uncontrolled (Diode) rectifiers with R-load, R-L load.

Experiment 8 Performance study of 1-ph half-wave controlled rectifiers with R-load, R-L load.

Experiment 9 Performance study of 1-ph full-wave controlled rectifiers with R-load, R-L load.

Experiment 10 Performance study of 3-ph half-wave controlled rectifiers with R-load, R-L load.

Experiment 11 Performance study of 1-ph full-wave controlled rectifiers with R-load, R-L load.

Experiment 12 Performance study of 3-ph half-wave controlled rectifiers with R-load, R-L load.

Experiment 13 Study of cycloconverters (a) 1-ph (3) 3-ph.

Experiment 14 Study of various PWM techniques for control of inverters.

Experiment 15 Study of 1-ph inverters.

Experiment 16 Study of 3-ph inverters.

Experiment 17 Study of resonant converters.

Experiment 18 Study of Buck Converter.

Experiment 19 Study of Boost Converter.

Submission

Minimum 8-10 experiments has to be performed and evaluated in journal.

ESE Student has to perform, write details and face oral examination on one experiment from above list, randomly selected at the time of ESE.

Course Outcomes

After completion of the course students will be

1 able to understand characteristics of power semiconductor devices and identify suitable switch choices for a given application.
2 design preliminary Power Converter for required application.
3 apply knowledge of mathematics, network theory to solve/design converter based problems.
4 to become entrepreneur in the field of Power Electronics applications / apply knowledge for research.

Mapping of CO and PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√	√	√	√	√	√	√					√	√	
CO2	√	√	√	√	√	√			√	√	√	√	√	√
CO3	√	√	√	√	√	√			√	√	√	√		√
CO4	√	√	√	√	√	√			√	√	√	√		

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Avg
Task I	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	
CA									

Government College of Engineering, Karad
Third Year B. Tech.
EE607: Control Systems-II Lab

Teaching Scheme		**Examination Scheme**	
Practical	2 Hrs./Week	**CA**	25
		ESE	50
Total Credits	1	**Total**	75

Course Objectives

1 Representation of systems in state-space and its various forms.
2 Design lag-lead controller &State Space Design
3 Use modern control techniques for design.

List of Experiments (Representative list)

Experiment1 Modeling and representation of given system in state-space and its various forms.

Experiment 2 To study effect of variation of gain on system design specification.

Experiment 3 To study effect of variation of pole location of added pole on system design specification.

Experiment 4 To study effect of variation of zero location of added zero on system design specification.

Experiment 5 To design compensator for the given design specification using SISO tool in time domain.

Experiment 6 To design compensator for the given design specification using SISO tool in frequency domain.

Experiment 7 To study uncompensated and compensated system performance using hardware implementation.

Experiment 8 To analyze effect of nonlinearities such as relay, backlash on phase plot.

Experiment 9 To design state feedback controller to get the desired performance.

Experiment 10 To design state observer for a given system.

Submission

Minimum 08 experiments to be performed and evaluated in journal

ESE Student has to perform, write details and face oral examination on one experiment from above list, randomly selected at the time of ESE.

Course Outcomes

1 Student will able to represent systems in state-space and its various forms.
2 Student will able to design lag-lead controller & State Space Design.
3 Student will able to use modern control techniques for design of control system.

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	√	√	√	√	√	√	√					√	√	
CO2	√	√	√	√	√	√			√	√	√	√		
CO3	√	√	√	√	√	√			√	√	√	√		√

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp1	Exp2	Exp3	Exp4	Exp5	Exp6	Exp7	Exp8	Exp9	Exp10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech.
EE608: Communication Engineering Lab

Teaching Scheme		**Examination Scheme**	
Practical	2Hrs./Week	**CA**	50
		ESE	-
Total Credits	1	**Total**	50

Course Objectives

1 To perform experiments on modulation techniques
2 To perform experiments on digital communication techniques
3 To understand equipment and assemblies in data centre, Telephone exchange, cellular tower.

List of Experiments

Experiment 1 Amplitude modulation transmitter and receiver

Experiment 2 Frequency modulation transmitter receiver.

Experiment 3 Demonstration of PCM

Experiment 4 Error detection and correction

Experiment 5 Time division multiplexing

Experiment 6 Frequency division multiplexing

Experiment 7 Telephone exchange Visit – To understand communication techniques and instruments used in practice. Write visit report.

Experiment 8 Data center visit – To understand various softwares used and MIS in use. Write visit report.

Experiment 9 Cellular mobile tower - To see infrastructure and understand use of mobile tower and instruments used in practice. Write visit report.

Experiment 10 Understanding connection of PC to internet; wiring color code types of connector hands on

Submission

Minimum 8 experiments to be performed and evaluated in journal

ESE Student has to perform, write details and face oral examination on one experiment from above list, randomly selected at the time of ESE.

Course Outcomes

1 Able to perform experiment on different analog communication systems
2 Knowledge of different advanced communication systems like Telephone, LAN, WAN, Mobile and Optical fiber

Mapping of CO and PO

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	√	√	√	√	√	√	√					√		
CO2	√	√	√	√	√	√			√	√	√	√		

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp1	Exp2	Exp3	Exp4	Exp5	Exp6	Exp7	Exp8	Exp9	Exp10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech.
EE609: Minor Project

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**TA/CA**	50
Total Credits	2	**ESE**	50

Course Objectives:

The main aim of this course is to demonstrate the important attributes like critical thinking, creativity, collaborative efforts and communication skills in students. The aim is also to make students aware with the process involved in making product from idea. Not more than two students may carry out the minor project together. One supervisor from the department shall be assigned five project batches of the minor project.

The steps involved for completion of minor project includes, but not limited to:

1. Conceptualization of innovative idea through literature and market survey; sight visits; interaction with community or industry, socio-economic survey etc.
2. Design of product, processes, methods and systems using multidisciplinary knowledge
3. Fabrication of product, development of software, measurement methods etc.
4. Deployment, implementation and demonstration of project.
5. Presentation of project

(For purchase of consumables required for completion of project, every project batch shall receive funding from institute with maximum limit decided by BOM)

List of Submission

1 Working model of the project
2 Project Report
3 Presentation and demonstration of project in exhibition

Course Outcome(CO):

1 Ability to understand community needs
2 Ability to covert idea in to product
3 Ability to work in group
4 Ability to communicate effectively.

Mapping of CO and PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		√	√	√	√	√	√					√	√	
CO2	√	√	√	√	√	√	√	√	√	√	√	√	√	√
CO3	√	√	√	√	√	√	√	√	√	√	√	√		√
CO4	√	√	√	√	√	√	√	√	√	√	√	√		

Assessment pattern

The continuous assessment shall be done by the supervisor based on attributes like critical thinking, creativity, collaborative efforts and communication skills in students. The end semester assessment shall be done by external referee one week before the term end. The department shall arrange exhibition (all department will arrange the exhibition on same day) of the minor projects done by students and the referee will judge the project work in accordance with the outcomes of the course by interacting with students and marks will be awarded to individual student. This exhibition will remain open for all students, parents, and other citizens visiting the exhibition.

Teaching Load

One supervisor from the department shall be assigned five project batches of the minor project. The weekly load for the supervisor is 2Hr/week