Course of Study
Choice Based Credit System
S. Y. B. Tech. (Electrical Engineering)
(Effective from Academic Year 2018-19 Only)

Department of Electrical Engineering,
SGGS Institute of Engineering and Technology, Vishnupuri,
Nanded-431606 (MS), India
(An autonomous institute established by Govt. of Maharashtra)

SGGS Institute of Engineering and Technology, Vishnupuri, Nanded
Department of Electrical Engineering
Choice Based Credit System
S. Y. B. Tech. (Electrical Engineering)
For Academic Year 2018-19 only
STRUCTURE

Semester-III					
Course Code	Name of the Course	Lectures	Tutorials	Practical	Credits
MA203	Mathematics – III (Differential Equation)	4	-	-	4
EE203	Analog Electronic Circuits	3	1	2	5
EE205	Electrical Machine-I	3	-	2	4
EE207	Circuit Theory	3	-	2	4
EE209	Numerical Method using MATLAB	2	-	2	3
HS221	Professional Communication	2	-	2	3
Sub Total		**17**	**1**	**10**	**23**
Semester-IV					
Course Code	Name of the Course	Lectures	Tutorials	Practical	Credits
MA202A	Mathematics – IV (Complex Analysis)	4	-	-	4
EE204	Electrical Machine-II	3	-	2	4
EE206	Digital Electronics and Logic Design	3	1	2	5
EE208	Electrical and Electronics Measurements	3	-	2	4
EE210	Signals and System	3	1	-	4
EE212	CAD Lab	-	-	2	1
HS222	Human Values and Professional Ethics	2	-	-	2
Sub Total		**18**	**2**	**08**	**24**
	Total	**35**	**3**	**18**	**47**

Elective I-
MA 202A- Complex Analysis
MA 202B- Statistics and Probability
MA 202C- Discrete Mathematics
MA 202D- Transforms and Z- Transform

Attendance Criteria: Students have to maintain 75% attendance in all the registered courses in a semester to be eligible for appearing examinations.

SEMESTER-III

MA203Mathematics – III (Differential Equation)

L	T	P	Credits(Th)	Credits(P)	Total Credits
4	-	-	4	0	4

Prerequisite:

1. Knowledge of differentiation and integration.
2. Basic Knowledge of quadratic equation.

Course objectives:

To acquaint student with:

1. The basic concepts of ordinary differential equations, partial differential equations.
2. Mathematical Modelling in physical problems, Initial and boundary value problems.
3. To motivate students to use critical thinking skill to solve practical problems.

Course outcomes:

At the end of the course the student is expected to understand.

1. Importance of differential equation i.e. ODE and PDE in physical problems.
2. Able to solve IVP in electrical and mechanical problems.
3. Analysing physical phenomenon in engineering and technology by using this theory.

Syllabus:

Unit 1:

Basic Concepts & Ideas, Geometric Meaning of y= f(x, y) , direction field , exact equations, Integrating factors, Linear differential equation, Bernoulli's equations, orthogonal trajectories, applications to electrical circuits.

Unit 2:

Second Order Differential equations, Homogeneous linear differential equation for real & complex roots, Euler Cauchy equation, existence & uniqueness theorem (Without proof) &Wronskian.

Unit 3:

Non homogeneous equation, solutions by undetermined coefficients & Variation of parameter methods, modeling, forced oscillation, resonance & electrical circuits, system of differential equations.

Unit 4:

Fourier series, Periodic function, Fourier theorem Euler's formulae for the Fourier coefficients, convergence of Fourier series, change of interval, even & odd function functions, half range Fourier series.

Unit 5:
Partial differential equations, Separation of Variables,Vibrations of string, one dimensional equation.

Text/Reference books:

- Advanced Engineering Mathematics – R.K Jain & S.R.K Iyenger
- Advanced Engineering Mathematics- Erwin Kreyszig
- Elementary Differential Equation(eighth edition) W.E Boyce & R. Diprima (John Wiley 2005)
- Fourier series & boundary Valued Problems., R.V Churchill & JW Brown(Seventh edition) McGraw Hill(2006).

.

EE203Analog Electronic Circuits

L	T	P	Credits(Th)	Credits(P)	Total Credits
4	-	2	4	1	5

Prerequisite:

1. Knowledge regarding Physics
2. Knowledge about Basic Electronics

Course objectives:

1. Introduce students to the concepts and use of feedback and feedback (amplifier) design.
2. Extend student knowledge of the theory and applications of operational amplifier integrated circuits.
3. To introduce the basic building blocks of linear integrated circuits.
4. To teach the linear and non-linear applications of operational amplifiers
5. To teach the theory of ADC and DAC

Course outcomes:

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

1. Understand the characteristics of transistors.
2. Design and analyse various rectifier and amplifier circuits.
3. Design sinusoidal and non-sinusoidal oscillators.
4. Understand the functioning of OP-AMP and design OP-AMP based circuits

Syllabus:

Unit1: Diode circuits (4 Hours)

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clipping circuits.

Unit2: BJT circuits (8 Hours)

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and commoncollector amplifiers; Small signal equivalent circuits, high-frequency equivalent circuits

Unit3: MOSFET circuits (8 Hours)

MOSFET structure and I-V characteristics.MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits - gain, input and output impedances, trans conductance,
high frequency equivalent circuit.

Module 4: Differential, multi-stage and operational amplifiers (8 Hours)

Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)

Unit5: Linear applications of op-amp (8 Hours)
Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, P, PI and PID controllers and lead/lag compensator using an op-amp, voltage regulator, oscillators (Wein bridge and phase shift).
Analog to Digital Conversion.

Unit6: Nonlinear applications of op-amp (6 Hours)
Hysteretic Comparator, Zero Crossing Detector, Square-wave and triangular-wave generators. Precision rectifier, peak detector.Monoshot.

Text/Reference Books:

1. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", Eighth edition, PHI publishers, 2004.
2. J. Millman and C. C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, Tata McGraw-Hill Publishing Company, 1988.
3. R.A. Gayakwad, Op-Amps & Linear Integrated Circuits, PHI, Fourth Edition, 2012
4. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford UniversityPress, 1998.
5. J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.

Term work:
It will consist of a record of at least eight experiments from the following list based on the prescribed syllabus.

1. IV Characteristics of Diode , BJT and MOSFET
2. Measurement of op-amp parameters and comparison with op-amp data sheets.
3. Assembling of op-amp inverting, non-inverting and differential circuit to measure an input inthe range of mill volts to few volts.
4. Transistor amplifiers: frequency response of BJT, multistage BJT amplifier and FET amplifier.
5. Op-amp as square, sine and triangular wave generator.
6. Op-amp as ZCD, Comparator and Schmitt trigger.
7. Study of active filters- Low pass and high pass filters.

Practical Examination:
The examination will be of three hours duration and will consist of an experimentbased on term-work and followed by an oral based on above syllabus.

EE205 Electrical Machines-I

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	-	2	3	1	4

Prerequisite:

1.Fundamentals of Electrical Engineering.

2. Basics of Electromagnetism.

Course objective:

1. Introduce basic fundamentals of different electrical machines and transformers.
2. Introduce the characteristics of different D.C. machines
3. Analysis and investigation of the major performance characteristics of different types of motors.
4. Investigation of motors' starting problems.
5. Allow the students to gain the proficiency to differentiate between the different types of motors, with the capability to select the proper motor for the proper application.
6. Provide the students with the proficiency to conduct and benefit from the testing procedures of electric motors with the ability to analyse data and to obtain the major characteristics.

Course outcome:

Upon successful completion of this course, a student should be able to:

1. Design and conduct experiments as well as analyse the parameter of DC machine & transformer.
2. Develop understanding of professional & ethical responsibility of DC machine & transformer.
3. Find out specific rating of Transformer & DC machines for installation as per requirement.
4. Analysis of different operating parameters under load and no load condition.
5. Detection and diagnosis of fault.
6. Get information about proper application of machines.

Syllabus:

Unit 1: Single Phase Transformer (8 Hours)

Transformer construction and practical consideration, Transformer reactance's and equivalent circuits, Engineering aspects of transformer analysis, effect of load on power factor, phasor diagrams, per unit quantities, Excitation phenomenon in transformers-Switching transients, Testing-Polarity test, Open Circuit Test (O.C.) Short Circuit Test (S.C.), Sumpner's Test, Variable frequency transformer, Instrument Transformer-Current transformer, Potential transformer, Pulse transformer and applications.

Unit 2: Three Phase Transformers (6 Hours)

Special constructional features, three phase transformers connections, Labelling of transformers Terminals, Star/Star connection, Delta/Delta Connection, Star/Delta, Delta/Star connection, Delta/Zigzag Star, Star/Zigzag Star, Phase groups, Choice of transformers connections, Harmonics, Parallel operation of transformers, Three winding transformers and its equivalent circuits, Stabilization by Tertiary winding, Phase conversion/Open Delta connection, Three/Two phase conversion (Scott connection), Three/Six conversion, Three/One conversion, On-Off Load Tap changing transformers, cooling methodology, Types and Routing tests according to ISI.

Unit 3: Electromechanical Energy Conversion Principles (6 Hours)

Forces and torques in magnetic field systems Energy balance, Energy in Singly-Excited magnetic field systems, Determination of magnetic force and torque from energy, Determination of magnetic force and torque from co-energy, Multiply-Excited magnetic field systems, Forcesand torques in systems with permanent magnets, Energy Conversion via electrical field, Electrified energy, Dynamic equations of electromechanical systems and Analytical Techniques.

Unit 4: DC Generators (8 Hours)

Construction of armature and field systems, Basic Principle of working, Emf equation, Types, armature windings, Characteristics and applications of different types of DC Generators, Building of emf in DC Shunt Generator and causes of failure, Armature reaction-Demagnetizing and Cross magnetizing mmf's and their estimations; Remedies to overcome the armature reaction; Commutation Process, Straight line commutation, Commutation with variable current density, under and over commutation, Causes of bad commutation and remedies; inter-poles, Compensating windings.

Unit 5: D.C. Motors (6 Hours)

Principles of working, Significance of Back emf, Torque Equation, Types, methods of excitation-Steady State Motor Circuit equation, Characteristics and Selection of DC Motors for variousapplications, Starting of DC Motors, Speed Control of DC Shunt and Series Motors, Braking of DCMotors- Plugging, Dynamic Braking, Regenerative Braking; Losses and Efficiency, Condition forMaximum Efficiency, Effect of saturation and armature reaction on losses; Permanent Magnet DCMotors, Types and Routing tests according to ISI Specifications.

Unit 6: Variable-Reluctance Machines and Stepping Motors (6 Hours)

Basic VRM Analysis, Practical VRM analysis, Current waveform for torque production, Non-LinearAnalysis, Stepping Motors.

Text/Reference Books :

1. B.L.Theraja, A.K. Theraja, A Textbook of Electrical Technology, Vol-II, S.Chand& Co., New Delhi,2005.
2. I J Nagrath, D P Kothari; "Electric Machines," Tata McGraw Hill Publication. Second Edition (Reprint) 2003.
3. A.E.Fitzgerald, C.Kingsley, S.D.Umans. "Electrical Machinery" Tata McGraw Hill.Sixth Edition2002.
4. Nasser Syed.A "Electrical Machines and Transformers," New York, Macmillon 1984.
5. Langsdorf "DC Machines".
6. J. B. Gupta, "Electrical Machines", SK Kataria and Sons, New Delhi
7.SK Bhattacharya, "Electrical Machines", Tata McGraw Hill, New Delhi.

Term work:

It will consist of a record of at least eight of the following experiments based on the prescribed syllabus.

1. To perform open circuit and short circuit test on single phase transformer to find its core loss, full loadcopper loss and constants of its equivalent circuit.
2. To operate two single-phase transformers in parallel and how they share a load under various conditions of their voltage ratios and leakage impedances.
3. To study V-connection of identical single-phase transformers for obtaining three phase transformation.
4. To study Scott-connection of single-phase transformer.
5. Performance of Sumpner's Test.
6. Study of no load current waveform of single-phase transformer.
7. Determination of magnetization, external and internal characteristics of a D.C. shunt generator,
8. Speed variation of a D.C. Shunt machine by- (i) armature voltage control & (ii) field currentcontrol method.
9. To study the performances of a D.C. shunt motor by Load/ Brake test.
10. To find efficiency of a D.C. shunt / compound machine by performing Swinburn's test.
11. To separate the losses in a D.C. shunt machines by performing the Retardation test.
12. Field test on two identical series machines to separate various losses and determine the efficiencyof machines.
13. Performance of Hopkinson's Test.
14. Study of traditional and modern starters for DC motors

Practical Examination:

The examination will be of three hours duration and will consist of an experiment based on term-work andfollowed by an oral based on above syllabus.

EE207 Circuit Theory

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	-	2	3	1	4

Prerequisite:

1. Knowledge of Basic Electrical Engineering
2. Knowledge of Complex Number
3. Knowledge of Matrices.

Course objectives:

1. To develop problem solving skills and understanding of circuit theory through the application of techniques and principles of electrical circuit analysis to common circuit problems.
2. To develop an understanding of the fundamental laws and elements of electric circuits.
3. To understand waveforms, signals, and transient, and steady-state responses of RLC circuits.
4. To develop the ability to apply circuit analysis to DC and AC circuits.
5. To understand advanced mathematical methods such as Laplace and Fourier transforms along with linear algebra and differential equations techniques for solving problems.

Course outcomes:

1. To remember basic concepts and principles of electrical circuits.
2. To explain network theorems and their applications.
3. To solve network problems using mesh current and node voltage equations.
4. To investigate initial conditions and obtain circuit response using Laplace Transform.
5. To evaluate network functions and two port parameters for electrical networks.
6. To analyse electrical circuits using network theorems.

Unit 1: Development of Circuit Concepts

Charge, current, voltage, energy, introduction to basic passive circuit parameters.

Unit 2: Conventions for describing networks

Reference direction for current and voltage, active element convention, source transformation, dot convention for coupled circuits, Topological description of networks.

Unit 3:Network equations

Kirchoff's laws, number of network equations, loop variable analysis, node variable analysis, duality, formation of network equation in matrix form, network solution by Laplace Transformation technique.

Unit 4:Initial conditions in networks

Use and study of initial conditions in various elements, a procedure for evaluating initial conditions.

Unit 5: Transform of other signal waveform
Shifted unit step function, ramp and impulse function, waveform synthesis, initial and final valve theorem, convolution integral, convolution as a summation locations for driving point functions and transfer functions, Time domain behavior from pole and zero-plot.

Unit 6: Impedance functions and network theorems
Concept of complex frequency, transform impedance and transform circuits, series and parallel combination of elements, Thevenin's, Superposition, Millman's, Tellegen's, Reciprocity, Norton and Maximum power transfer theorems.

Unit 7: Network functions
Network functions for one port and two-port network, calculation of network functions, Ladder networks, general networks. Poles and zeros of network functions, restriction on poles and zeros locations for driving point functions and transfer functions, Time domain behavior from pole and zero plot.

Unit 8: Two-port parameters
Relationship of two port variables, short circuit admittance parameters, opens circuit impedance parameters, transmission parameters, hybrid parameters, relationship between parameters sets, and parallel connection of two port networks.

Unit 9: Sinusoidal steady-state analysis
Sinusoidal steady-state, the sinusoid and solution using $e^{\pm\omega t}$, phasors and phasor diagrams.

Term Work:
Term work shall consist of minimum eight experiments from the list given below
1. Verification of Maximum power transfer theorem.
2. Verification of Thevenin theorem.
3. Verification of Superposition theorem.
4. Plotting of behavior of RC circuit for step input.
5. Plotting of behavior of RL circuit for step input.
6. Plotting of behavior of RLC circuit for step input.
7. Determination of hybrid and impedance parameters of a given network.
8. Sinusoidal study of RC and RL series networks.

Practical Examination:
Practical examination shall consist of performance of the experiment carried out at the time of examination and viva- voce based on the term work submitted by the student for the subject.

Reference Books:
1. M. E. Van Valkenberg, Networtk analysis, Third Edition, Prentice Hall of India Publication, 1996.
2. C. P. Kuriakose, Circuit Theory: Continuous and Discrete Time Systems, Elements of Network Synthesis, Prentice Hall of India Publication, New Delhi, 2005.
3. L. P. Huelsman, Basic Circuit Theory, Third Edition, Prentice Hall of India, New Delhi, 2002.

4. W. H. Hayt. Jr. and J. E. Kemmerly, Engineering Circuit Analysis, Fifth Edition, Tata-McGraw HillEdition, 2000

EE209 Numerical Methods using MATLAB

L	T	P	Credits(Th)	Credits(P)	Total Credits
2	-	2	2	1	3

Prerequisite:

1. Basic Knowledge of Engineering Mathematics.
2. Knowledge regarding Calculus.

Course objectives:

The following aspects are to be considered while dealing with topic from Numerical Methods.

1. Study of various methods of numerical analysis of linear and non-linear problems
2. Use of method for solving the problems in engineering
3. Developing algorithm, flow-chart and computer program in any language

Course outcomes :

After completing this course student will be able to:

1. Solve various methods of numerical analysis of linear and non-linear problems in MATLAB by writing program.
2. Develop algorithm, flow chart and computer program for solution of linear and non linear problems

Syllabus:

Unit 1: Computer Arithmetic: (3 Hours)

Floating Point representation,Arithmetic operations with normalized floating point numbers, errors in numbers, Truncation error, round off error, inherent error, absolute and relative error.

Unit 2: Solution of Non-linear equations: (6 Hours)

Bisection method, false position method, Newton-Raphson method,Method of successive approximation, rate of convergence.

Unit 3: Interpolation: (4 Hours)

Lagrange's interpolation, difference table, Newton's Interpolation, iterated linear interpolation technique.

Unit 4: Solution of simultaneous algebraic equations: (4 Hours)

Gauss elimination method, Iterative methods and their convergence Ill-condition equation.

Unit 5: Numerical Integration AndSolution of Solution of Ordinary differential equation (7 Hours)

Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Romberg integration, Newton's cote's integrationformula, error in these formulae. Taylor series method, Picard's method, Euler method, Runge-Kutta method second and fourth order,predictor corrector method.

Unit 6: Numerical solution of partial differential equation And Least square approximation of functions: (6 Hours)

Finite difference,approximation to derivatives. Laplaceequation, Iterative methods for the solution of equations.Linear regression,Polynomial regression, fitting exponential and trigonometric functions.

Text/Reference Books:

1. V. Rajaraman - Computer Oriented Numerical Method- Prentice Hall of India.
2. S.S. Shastry- Introductory methods of numerical analysis., Prentice Hall of India
3. Thomas Richard Mecalla- Introduction to numerical Methods and FORTRAN programming- WilleyInternational Edition.
4. Steven C. Chapra and Raymond P. Canale, Numerical methods for Engineers, Mc-Graw-Hill Publication,2007.
5. B.S. Grewal- Numerical Methods in Engineering & Science, Khanna Publishers.
6. Steve Otto and James P. Denier - An Introduction to Programming and Numerical Methods in MATLAB- Springer
7. RudraPratap - Getting Started With Matlab 7 - Oxford University publications

Term work:

Practical examination shall be of 3 hours duration. The students have to write an algorithm, flow chart for theproblem given by an examiner. He should develop program and execute it on the computer system and get itsprintout and face the oral based on above syllabus.

List of Experiments:

1. Introduction to MATLAB
2. Solution of Non-linear equations using Bi-section methods in MATLAB
3. Solution of Non-linear equations using False position methods in MATLAB
4. Solution of Non-linear equations using Newton-Raphson method in MATLAB
5. Solution of Non-linear equations using Iteration Method in MATLAB
6. Study of Newton Forward Interpolation method in MATLAB
7. Solution of simultaneous algebraic equations using Gauss Elimination method in MATLAB
8. Solution of simultaneous algebraic equations using Gauss Seidal method in MATLAB
9. Numerical Integration using Trapezoidal rule in MATLAB
10. Numerical Integration using Simpson's 1/3 Rule in MATLAB

HS221Professional Communication

L	T	P	Credits(Th)	Credits(P)	Total Credits
2	-	2	2	1	3

Objectives of the course:

1. To enable students to speak and write English with a good level of proficiency
2. To build confidence in students to face interview, deliver speech, make presentation and participate in meeting and discussion
3. To lay a strong foundation on the subject by revising and correcting the basics .

Syllabus:

Unit 1: Functional Grammar (10 Hours)

Building of a sentence and its components, Tense- the time sense: Present, Past and Future tense with uses and applications, Verbs, Noun, Pronoun, Adjective, Adverb, Prepositions and Conjunctions: classification, identifications, uses and applications Active & Passive voice, direct and indirect speech, clause, principles of effective communication.

Unit 2: Listening Skills (3 Hours)

Requirements of listening skill, Phonetics and phonology, Articulation of consonants and vowels, Syllables, Weak form stress, Rhythm and intonation, Face to face conversation, Telephonic conversation.

Unit 3: Reading Skills (2 Hours)

Requirements of reading skill**,** Reading poetry, Reading prose, Reading article from standard news paper/ magazine

Unit 4: Writing Skill (5 Hours)

Paragraph, Resumes, Letters- formal and informal, Circular, Notice, Agendas, Minutes, Reports, E-mail and Blog writing

Unit 5: Speaking Skills (3 Hours)

Requirement of speaking skills, Grammatical difficulties, Practice of public speaking, Conversation between /among students or groups on given situations

Unit 6: Integration of skills (5 Hours)

Group discussion, Personal interview, Debate and Quiz competition, ppt Presentation,

Practicals and Assignments:

1. Practice of building of sentences and identification of components
2. Practice the uses and applications of tense
3. Identification of parts of speech and form changes- use in sentences
4. Identification of various clauses and their use in sentences
5. **Listening Skills:** Listen few BBC / Voice of America/ NDTV 24*7 or similar standard Television channel / Radio or any standard talk/discussion available in CD/DVD and answer the given questions/ write the summery
6. **Reading Skills:** Read few articles from standard news paper The Hindu/ The Times of India / magazine /books and answer the given questions /write the summery
7. **Writing Skills: (Assignments)**
    a. Write your own CV
    b. Write an E-mail
    c. Write a blog on current topic of discussion
    d. Write a technical report
    e. Write a letter
    f. Comprehension Tests
8. **Speaking and Integration of Skills:**
    a. Converse on few given situations
    b. Group Discussions on a given topic
    c. Debate competition on a given topic
    d. Quiz competition among few groups of students
    e. ppt presentation

Suggested Readings:

1. Essential English Grammar, Raymond Murphy, Cambridge University Press, 1 December, 2007
2. Oxford English Grammar Course: Advanced, Michael Swan and Catherine Walter, Oxford, 24 February, 2012
3. Advanced English Grammar, Martin Hewings, Cambridge University Press, 1 December, 2007
4. *Developing Communication Skills*, **Krishna Mohan** and **Meera Banerjee,** Macmillan India Ltd, New Delhi, 2nd Edition, 2009
5. Oxford Advanced Learner's Dictionary, 8th Edition

SEMESTER-IV

MA202 Engineering Mathematics- IV (Elective I)

L	T	P	Credits(Th)	Credits(P)	Total Credits
4	-	-	4	0	4

MA202A Complex Analysis:

Course objectives:

To acquaint student with: the basic concepts of complex variables and the function of complex variables. Motivate students to use critical thinking skill to solve practical problems in Engineering and technology.

Syllabus:

Unit-1

Introduction to Complex Variables.

Unit-2

Function of complex variables, limit , continuity , differentiability , Analytic function & its properties, Cauchy-Riemann equation , Harmonic functions, elementary functions.

Unit-3

Line Integral, Cauchy's theorem & Cauchy's Integral formula & its Applications.

Unit-4

Taylors &Laurent's Series expansions.

Unit-5

Residues, Cauchy's Residue Theorem.

Unit-6

Evaluation of Improper Integrals, Conformal mappings.

- Text/Reference Books:
- Function Of Complex Variables Dr.A.R.Shastri
- Advanced Engineering Mathematics – R.K Jain& S.R.K Iyenger
- Advanced Engineering Mathematics- Erwin Kreyszig
- Complex Variables & application R.V Churchill ,JW Brown(seventh edition),McGraw Hill(2003)

Course Outcomes: At the end of the course the student is expected to understand:

1.Importance of complex variables in finding roots of algebraic equations.

2. complex function can be described Fluid flow and mechanical problems In two dimensional potential theory.

3. Properties of the Analytic functions in Engineering field.

4. This theory is useful in finding the value of Improper and some real integrals.

5. To Design and study images under conformal transformations.

UMA202B - Statistics and probability:

Course objectives: To acquaint students with: the basic concepts of Statistics and Probability. Theory and its methods so that it will help the students in decision making.

1. **Review of statistics**: Sample data, population dada, measures of central tendencies (mean, mode, median, measures of dispersions, S.D. and variance of sample data and population data), Skewness, Quart sis and moments.
2. **Probability**: basic concepts, fundamental theorem, conditional probability, independent events, Bay's Theorem.

3. **Random variable and probability distribution**: discrete and random variable, probability mass function, its mean variance, cumulative distribution function, Binomial, Poisson distributions, Geometric distribution, negative Binomial distribution.

4. **Continuous random Variable:** probability density function, mean and variance, moments, uniform continuous random variable, normal continuous random variable,standard normal random variable.

5. **Joint probability Distribution**: Probability mass function of discrete random variables X, Y. marginal distribution of X , Y. probability density function of random variables, marginal distribution of random variables X , Y. Conditional distribution of discrete/ continuous random variables X, Y.

Course Outcomes: At the end of the course the students is expected to understand:

Basic concepts of Statistics and Probability & its importance in engineering. By acquiring the Knowledge of these theories, the students are well equipped with the tools of statistics and probabilities. They can apply these techniques to solve the Engineering problems.

Reference boobs:

1. Prem S. Mann , "Introduction of statistics".

2. Erwin Kreyzig , " Advanced engineering mathematics".

3. Ronald E. walpole, et-al "Probability and statistics".

4. William W. Hines, Douglas c. Montgomery, David M. Goldman, Connie m. Borror.

" Probability and statistics in engineering".

MA202C -Discrete mathematics:

Course objectives: To introduce a number of Discrete Mathematical Structures (DMS) found to be serving as tools even today in the development of theoretical computer science. Course focuses on of how Discrete Structures actually help computer engineers to solve problems occurred in the development of programming languages.

1. **Set and propositions**: Introduction, combinations of sets, finite, infinite and uncountable infinite sets, mathematical induction, principle of inclusion and exclusion, multi sets.

2. **Relation and Function**: Introduction, properties of binary relations, equivalence relation and partition, partial ordering relations and lattics. job scheduling problems, functions. pigeon hole principle.

3. **Graph and Planer Graph** : Basic terminology, multi-graph and weighted graphs, path and circuits , short path in weighted graphs. Eulerian path and circuits, Hamiltonian path and circuits.Factor's of a graph, planer graph.

4. **Trees and Cut-** : Trees, rooted trees, path lengths in rooted trees, pre-fixed codes, binary search trees, spanning trees and cut sets, minimum spanning trees. Transport net-work.

5. **Discrete numeric functions and generating function**: Introduction, manipulation of numeric functions, Asymtotic-behaviour of numeric functions, generating function.

6. **Recurrence Relations and Recursive Algorithms**: Introduction, recurrence relations, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions, total solution. Solution by the method of generating functions.

7. **Boolean Algebra:** lattices and Algebraic systems, principle of duality, basic properties of algebraic system defined by lattices, Boolean lattices and Boolean algebra.

Course Out comes A complete knowledge on various discrete structures available in literature. Realization of some satisfaction of having learnt that discrete structures are indeed useful in computer science and engineering. Gaining of some confidence on how to deal with problems which may arrive in computer science and engineering in near future.

Reference books:

1. C.L. Liu, " Elements of Discret Mathematics". 2. Kennet H. Rosen, " Discrete Mathematics

3. Erwin Kreyzig , " Advanced engineering mathematics". 4. J. K. Truss, " Discrete mathematics for computer Scientists".

MA202D -Transforms and Z- transform:

Course objectives: To acquaint students with : the basic concepts of Laplace transforms, Fourier Transforms, Linear Difference Equations and Z- transforms. To motivate the students to use critical thinking to solve the practical problems.

Laplace transformation: Introduction, basic properties of Laplace transforms, Laplace Transform of derivatives, Laplace Transform Solution of Initial value problems , Laplace transforms of integrals, differentiation of Laplace Transform, Integration of Laplace transform, Convolution Theorem. Unit step function, second shifting theorem, Laplace Transform of Dirac-delta function and Laplace transform of periodic functions.

Fourier Integral, Fourier Transforms and Integral transforms: Fourier Integral Theorem, Fourier transform, Convolution, Finite Fourier Sine and Cosine Transforms, Parseval's Identity for Fourier Transforms. solution of partial differential equations using Fourier transform.

Linear Difference Equations and Z- transforms: Introduction, Z-Transforms, standard Z-transforms. properties of Z- transform, Inverse Z-transform, Convolution theorem. Solution of difference equations.

Course outcome : At the end of the course the students is expected to understand and to solve 1. Initial value problems by Laplace transform method. 2. partial differential equation by Fourier Transform method. 3. Difference equations by Z- Transform method.

Reference books: 1. R.K.Jain ,S.R.K.Iyengar, "advanced engineering mathematics".
2. Erwin Kreyszig , " advanced engineering mathematics".
3. W.E. Boyace, R. Diprima "Elementary Differential Equation"
4. B. V. Ramana" Higher Engineering Mathematics".
5. Koneru S. Rao, " Engineering Mathematics".

EE204 Electrical Machines- II

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	-	2	3	1	4

Prerequisite:

1. Fundamentals of Electrical Engineering.
2. Basics of Electromagnetism.

Course objectives:

1. To introduce fundamentals, physical concepts, and operating principles of AC machinesand special machines.
2. This course aims at building a strong foundation of student in synchronous machines and induction motors with their advantages and disadvantages.
3. To help students in understanding performances of machines under different operating conditions and their testing methodology.
4. To teach students different speed control methods of AC machines.

Course outcome:

Upon successful completion of this course, a student should be able to:
1. Implement various testing methods to detect fault.
2.Work out in research and development related to ACmachines.
3. Save power by improving efficiency and voltage regulation.
4. Implement erection and commissioning of AC & special purpose machines according to application.

Syllabus:

Unit 1: Synchronous Generators or Alternators (6 Hours)

Classification of A.C. Machines, Ferraris Principle, Production of 2- phase and 3-phase rotating magnetic fields, principle of operation and constructional (salient and non-salient pole) features of synchronous generators. Production of sinusoidal alternating EMF and its frequency, armature winding, winding factor, EMF equation.Harmonics in voltage waveform, leakage reactance, armature reaction. Short circuit ratio, synchronous reactance, synchronous impedance, determination of voltage regulation (by Potier, EMF, MMF methods), power developed by synchronous generators, phasor diagrams, transient conditions, losses and efficiency.

Unit 2: Parallel Operation of Alternators (6 Hours)

Conditions for parallel operation, Load sharing between two alternators in parallel, Parallel-Generator theorem Process of synchronizing an alternator with infinite bus-bars by lamp methods & by use of synchroscope, Synchronizing torque, power and current.

Unit 3: Synchronous Motors (8 Hours)

Construction & principle of operation, various methods of starting, phenomenon of hunting or phase – swinging – its remedies. Operation of 3-phase Synchronous motor with constant excitation & variable load. Significance of torque angle, load characteristics Phasor diagram on the basis of synchronous impedance. Power flow chart, losses, Operation of 3-phase synchronous motor with a constant mechanical load on its shaft & variable excitation. ' V' Curves &'Inverted V' (pf) curves.Merits and demerits of synchronous motors & its application.

Unit 4: Three Phase Induction Motors (8 Hours)

Construction & principle of operation, types of I.M, slip, frequency of rotor current, rotor EMF, current, pf and torque. Phasor diagrams, different torque equations and relation between them. Torque-Slip, current-speed and Torque- Speed Characteristics, Losses and efficiency. Circle diagrams, starters. I.M tests, cogging and crawling, speed control, deep bar/ double cage rotor, induction generator. Applications, advantages and disadvantages of I.M.

Unit 5: Single Phase Induction Motors (6 Hours)

Introduction, single phase induction motors, double revolving field theory, circuit model ofsingle phase induction motor, determination of circuit parameters and types of single phase I.M.Torque-slip characteristics & applications. Comparison of 1-phase induction motor with 3-phase induction motor.

Unit 6: Special Purpose Motors (6 Hours)

Construction, principle of working, characteristics, ratings & applications of Brushless DC motors, Permanent Magnet motor, linear induction motors, AC series motors, universal motors, repulsion type motors, Schrage motor, servo motors, hysteresis motor.

Text/Reference Books:

1. I J Nagrath, D P Kothari; "Electric Machines," Tata McGraw Hill Publication. SecondEdition (Reprint) 2003.
2. A.E.Fitzgerald, C.Kingsley, S.D.Umans. "Electrical Machinery" Tata McGraw Hill.Sixth Edition 2002.
3. B.L.Theraja, A.K. Theraja, A Textbook of Electrical Technology, Vol-II, S.Chand&Co.New Delhi,2005.
4. Say.M.G - Performance & Design of Alternating Current Machine.(English LanguageBook Society), CBS Publisher (2002).
5. Ashfaq Hussein - Electrical Machines, DhanpatRai Publication (2012).
6. Bhimbra.P.S – Electrical Machines), Khanna Publication (2011).
7. J.B. Gupta – Electrical Machines, SK Kataria& Sons Publication (2010).

Term work:
It will consist of a record of at least eight experiments from the following list based on the Prescribed syllabus.

1. O.C. and S.C. test on Alternator: Determination of its regulation by the EMF methodand MMF method.
2. Direct loading test on three phase Alternator.
3. Determination of axis reactance's of salient pole synchronous machine- Slip Test.
4. Zero power factor test on alternator: Regulation by Potier method and A.S.A. method
5. Synchronizing of alternators: Lamp Methods and use of synchroscope.
6. Load test on three phase squirrel cage induction motor.
7. Determination of Squirrel cage induction motor performance from Circle diagram.
8. Load test on three phase Slip ring induction motor.
9. Effect of rotor resistance on starting torque and maximum torque for three phase Slipring induction motor.
10. Load test on single phase induction motor.
11. Operation of induction motor as induction generator.
12. "V" and "inverse V" curves of synchronous motor at no load and constant load.
13. Load test on Synchronous motor at various voltages and frequency.
14. Load test on Induction motor at various voltages and frequency.
15. Study of induction motor starters..

Practical Examination:
The examination will be of three hours duration and will consist of an experimentbased on term-work and followed by an oral based on above syllabus.

EE206 Digital Electronics and Logic Design

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	1	2	4	1	5

Prerequisite:

1. Knowledge of Basic Electrical Engineering
2. Present scenario of power system

Course objectives:

1. To introduce number systems and codes.
2. To introduce basic postulates of Boolean algebra and to show the correlation between Boolean expressions.
3. To introduce the methods for simplifying Boolean expressions.
4. To outline the formal procedures for analysis and design of combinational circuits and sequential circuits.
5. To introduce the concept of memories, programmable logic devices and digital ICs.

Course Outcomes:

After completing this course student will have-

1. To represent numerical values in various number systems and perform number conversions between different number systems.
2. To simplify the logic expressions using Boolean laws and postulates, K-map and design them by using Logic gates / MSI chips. Understand the concept of memory, its types and organization, ROM as a PLD.
3. To design combinational and sequential digital logic circuits. Use electronics tools and test equipment competently. Interpret schematic diagrams and waveforms.
4. To verify the operation of various combinational logic circuits for commonly used digital functionalities such as Half / full adders, parallel binary /BCD adders, comparators, decoders, encoders, Multiplexers and Demultiplexers.
5. To design the test bench for combinational and sequential circuits, design of A/D and D/A converters.
6. To design and implement digital based mini-projects.

Syllabus:

Unit 1 Fundamentals of digital systems and logic families

Digital Signals, digital circuits, NAND and NOR operations, EX-OR operation, Boolean algebra, examples of IC Gates, number systems-binary, signed binary, Octal, hexadecimal numbers, binary and BCD arithmetic, one's and two's complement arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families-RTL, DCPL, I2L, DTL, HTL, TTL, schottky TTL, ECL, MOS Logic, CMOS Logic, interfacing CMOS and TTL, Tri-state logic.

Unit 2 Combinational digital circuits

Standard representation for logical functions, K-map representation. simplification of logical functions using four, five and six variable K-maps. minimization of logical functions- don't care conditions, logic design using MSI chips- multiplexer, de-Multiplexer/decoders, adders, subtractors, carry look ahead adder, elementary ALU design, popular MSI chips, digital comparator, parity checker /generator, code converters, priority encoders, decoder/drivers for display devices, Quine-McClusky method of function realization.

Unit 3 Sequential circuits and systems

1-Bit memory cell, properties of bistable latch, clocked SR flip flop, J-K, T and D types of flip flop, applications of flip-flops- shift register and counter types, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, serial adder, ripple (asynchronous) counters, synchronous counters, counter design using flip-flops, special counter ICs and applications.

Unit 4 A/D and D/A converters

Digital to analog converter types: weighted resistor and R-2R ladder, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit. Analog to digital converters: quantization and encoding, parallel comparator A/D converter, types: successive approximation, counting type, single slope and dual Slope A/D converters, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

Unit 5 Semiconductor memories and programmable logic devices (PLDs)

Memory organization and operation, expanding memory size, classification and characteristics of memory, sequential memory, read only memory (ROM), read and write memory (RAM), content addressable memory (CAM), charge-coupled device memory (CCD), commonly used memory chips, ROM as a PLD, programmable logic array, programmable array logic (PAL) and generic array logic (GAL) devices, complex programmable logic devices (CPLDs)- field programmable gate array (FPGA).

Text Books:

1. Jain R.P., Modern Digital electronics, Tata McGraw Hill Edition, 6th Edition2006.
2. Anand Kumar, Fundamentals of Digital Circuits Prentice-Hall India, 2003.

Reference Books:

1. AnandNatrajan, Digital Design, PHI Publication, 2011.
2. Morris M., Mano, Digital Design, Tata McGraw Hill, 4th edition, 2006.
3. An Engineering Approach to Digital Design, Fletcher W. I., Prentice Hall of India, New Delhi.1997.
4. Wakerly J. F., Digital design- Principles and Practices, P H International /Pearson India, 4th edition, 2005.
5. Samuel C. Lee, Digital Circuits and Logic Design, Prentice Hall of India, New Delhi, 1976.

Term Work:

1. Study of Gates.
2. Verification of Boolean Laws & D Morgan's theorem.
3. Realization of Combinational Circuits.
4. Study of Arithmetic Circuits: Half Adder and Full Adder, Sub tractor, BCD Adder/ Sub tractor.

5. Study of Flip Flops: S-R, J-K, D type, master slave J-K truth tables & K maps.
6. Design of Flip Flops.
7. Study of Counters using IC's: Up down, Decade, Synchronous, Binary, BCD counter.
8. Design of Counters.
9. Study of Ring Counter, Johnson Counter etc.
10. Study of MUX & DEMUX and function realization using data selector IC's.
11. Study of D/A & A/D converters (Any one of each class): R-2R ladder, weighted register method, Successive Approximation, Voltage to frequency conversion.
12. Design of Combinational circuits using MUX / DEMUX.
13. Study of Memories.
14. Design of Decoder driver to drive 7 segment LED display

Practical Examination:

1. Practical examination shall consist of performance of the experiment carried out at the time of examination and viva- voce based on the term work submitted by the student for the subject.

EE208 Electrical and Electronics Measurements

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	-	2	3	1	4

Prerequisite:

1. Fundamentals of Electrical Engineering.
2. Concept of galvanometer, Wheatstone bridge.

Course objectives:

1. To expose the students to a broad knowledge of experimental methods and measurement techniques.
2. To train the students in the skill of operation of instruments in the electrical & electronic engineering applications.
3. To understand the basic working of instruments used for measurement.
4. To understand the errors in measurements and their rectification.
5. To gain proficiency in the use of common measuring instruments.
6. To compare theoretical predictions with experimental results and to resolve any apparent differences.

Course outcome:

On completion of this course, students should be able to:

1. Study of operating principles of common electrical and electronic measuring instruments, devicesand circuits, and their application to testing;
2. Measure the performance of equipment and circuits;
3. Identify and classify error sources, and explain how their effects can be minimized in particularmeasurement situations;
4. Analyse test measurements and circuit performance mathematically in both time and frequencydomains;
5. Specify details of instrumentation and devices intended for a particular application;

Syllabus:

Unit 1: Introduction to measurements

Measurement, purpose of measurement, experimental data and errors: measurement recording and reporting, graphical representation of data, precision and accuracy, resolution and sensitivity, errors in measurement, statistical evolution of measurement data and errors

Unit 2: Analog DC and AC meters

PMMC, galvanometer, DC ammeter, DC voltmeter, electrodynamometer type of instruments, analog multimeter, special purpose analog meters, how to use basic meters and meter errors

Unit 3: DC bridges
D.C bridges: low, medium and precise resistance measurement.

Unit 4: AC bridges
Inductance and capacitance measurements. Detectors in bridge measurement, Wagner ground connections, transformer ratio bridges, digital RCL meter, Q meter

Unit 5: Cathode ray oscilloscope
Introduction, block diagram of a general purpose CRO, cathode ray tube, focusing device, post deflection acceleration, beam transit time and frequency limitations, oscilloscope time base, oscilloscope amplifiers, attenuators, basic controls, types of sweeps, delay line, display of electrical signals by oscilloscope, basic oscilloscope patterns, measurement of voltage, frequency and phase.

Unit 6: Electronic instruments
Digital voltmeter, digital multimeter, digital frequency meter system, frequency meter accuracy, time and ratio measurement, counter/time/frequency meter, phase measurement.

Unit 7: Display devices and recorders
LED, LCD display, strip-chart recorder, X-Y recorder, 3-D printers

Text/Reference Books:

1. A.K. Sawhney, "A course in Electrical & Electronic Measurements &Instrumentation", Publication-DhanpatRai& Sons, Edition 1995.
2. E.W Golding; "Electric Measurement & Measuring Instruments", Publication - A. H. Wheeler & Co, Allahabad, Edition 1983.
3. Helfrick and cooper, "Modern Electronic Instrumentation &MeasurementTechniques", Publisher- Pearson, Edition 2007.
4. M. A. Baldwin, "Fundamentals of Electrical Measurements", Publication - Lyall Book Depot,Ludhiyana, Edition 1985.
5. M.U. Reissland, "Electrical Measurements", Publication - Wiely Eastern Ltd, New Delhi, Edition1992.
6. V. Popov; "Electrical Measurements" Publication – Mir, Moscow, Edition 1970.
7. Jones B.E.; "Instrumentation Measurement & Feedback", Publication – Tata McGraw Hill, NewDelhi, Edition 1978.

Term work:
Term work shall consist of at least six to eight practical'sbased on above syllabus. Some of the experiments may be from the following list.
1. Measurement of resistance (high, medium, low)
2. Measurement of inductance.
3. Measurement of capacitance.
4. Phase and frequency measurement on CRO using Lissajous pattern.
5. Study of digital voltmeter, digital multimeter.
6. Study of recorders.

7. Digital measurement of phase and frequency.
8. Study of AC and DC meters.
9. Measuring current and voltage.

Practical Examination:
The examination will be of three hours duration and will consist of an experiment based on term-work and followed by an oral based on above syllabus.

EE210 Signals and System

L	T	P	Credits(Th)	Credits(P)	Total Credits
3	1	-	4	0	4

Prerequisite:

1. Students will required to do arithmetic operation
2. Basic Knowledge derivative, integration, mathematics.
3. Knowledge of Trigonometry.

Course objectives:

The course is designed to provide the fundamental concepts in signals and systems. The course objectives arelisted below:

1. To obtain solid foundation in fundamentals of signals and systems,
2. To gain an understanding of some of the very important and basic applications of these fundamentalstoproblems in filtering, sampling, communications and feedback systems analysis,
3. To develop some appreciation for an extremely powerful and broadly applicable approach toformulating and solving complex problems.

Course outcome:

By the end of the course, students should be able to

1. Know what different types of signals there are,
2. Represent signals in different ways, and know main properties of signals useful to simplifytheir analysis,
3. Determine systems characteristics: homogeneity, time-invariance, linearity and superposition,stability, etc. and know how to classify systems according to their properties,
4. Obtain a system response to standard signals (impulse response, step response) and then thesystem response to any signal in terms of those,
5. Represent systems in the time domain and the frequency domain and know how to pass fromone representation to another,
6. Analyze the system usingLaplace transform, Z-transform, Fourier series representation and Fourier transform
7. Find transfer function (continuous and discrete-time systems) frequency response(continuous and discrete-time systems) of the systems

Syllabus:

Unit 1:Continuous–Time and Discrete –Time Signals and Systems:
Various classifications, Mathematical Representation, Signal Energy and Power, Transformations ofthe Independent Variable; Periodic Signals; Even and Odd Signals; Arithmetic Operations onSequences; Continuous-Time and Discrete-Time Complex Exponential.The continuous-Time UnitStep and Unit Impulse Functions.The Discrete-Time Unit Impulse and Unit Step Sequences;Representation of Direct-Time Signals in Terms of impulse.Continuous-Time and Discrete-Time Systems Interconnections of Systems; Basic System Properties (Causality, Stability, Time-Invariance,Linearity, Invertibility, systems with and without, memory).

Unit 2: Linear Time –invariant systems:
The Discrete–Time and Continuous-Time LTI Systems; Unit Impulse Response; Convolution Sum andConvolution Integral Representation.Properties of LTI Systems (Commutative, Distributive,Associative Properties, Invertibility, Causality, Stability).The Unit Step Response of an LTI System;LTI Systems Described by Differential and the Difference Equations; Block Diagram Representations, Singularity Functions.

Unit 3:Fourier Series Representation of Periodic Signals:
The Response of LTI Systems to Complex Exponential; Fourier Series Representation of Continuous-Time and Discrete–Time periodic Signals; Convergence of the Fourier Series; Properties of Discrete-Time and Continuous-Time Fourier Series; Fourier Series and LTI Systems.

Unit 4: Continuous-Time Fourier Transform and DTFT
Representation of Continuous-Time Aperiodic Signals and Continuous-Time Fourier Transform; theFourier Transform for Periodic Signals, Properties of Continuous-Time Fourier Transform; FourierTransform and LTI Systems.
Representation of Discrete-Time Aperiodic signals and the Discrete-Time Fourier Transform; FourierTransform for Periodic Signals; Properties of the Discrete-Time Fourier Transform; Discrete-Time LTISystems and Discrete-Time Fourier Transform.
Sampling:
Representation of a continuous–Time Signal by its Samples; The Sampling Theorem; Reconstructionof Signals form its Samples using Interpolation; Effect of Under Sampling (Frequency DomainAliasing); Discrete Tim processing of Continuous–Time Signals.

Unit 5: Laplace Transform:
The Laplace Transform; Region of Convergence for Laplace Transform; Properties of Laplace Transform; Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot; Properties ofLaplace Transform; Analysis and Characterization of LTI Systems using the Laplace Transform;System Transfer Function; Block Diagram Representations; The Unilateral Laplace Transform;Solution of Differential Equations using the Unilateral Laplace Transform.

Unit 6:Z Transform:
The Z Transform; The Region of Convergence for the Z- Transform; Geometric Evaluation of theFourier Transform from the Pole-Zero Plot; Properties of Z-Transform; Analysis and Characterizationof Discrete-Time LTI Systems using Z-Transform; System Transfer Function; Block DiagramRepresentation; The Unilateral Z-Transform; Solution of Difference Equation using the Unilateral ZTransform

Reference Books:
1. A. V. Oppenheim, A. S. Willsky with S. H. Nawab, Signals and Systems, Prentice- Hall ofIndiaPrivate Limited, Second Edition, 1997.
2. S. Haykin and B. V. Veen, Signals and Systems, John Wiley and Sons, Inc., Second Edition, 1999.
3. M. J. Roberts, Signals and Systems: Analysis using , Transform Methods and MATLAB, Tata McGraw-Hill Publishing Company Limited, Second Edition, 2003.

EE212CAD Lab

L	T	P	Credits(Th)	Credits(P)	Total Credits
-	-	2	0	1	1

Prerequisite:
1. Minimum knowledge of basic computer programming
2. Introduction to MATLAB.

Course objectives:

1. To study the Simulink toolboxes and special toolboxes.
2. To get introduce with PSPICE software and simulation based on it.

List of Experiments
Minimum ten experiments to be performed from
1. Three MATLAB experiments using Control System Toolbox.
2. Three MATLAB programming experiments using MATLAB m-file.
3. Four MATLAB experiments using Power System Toolbox.
4. Four experiment on circuit analysis using P-spice software.

HS222 Human Values and Professional Ethics

L	T	P	Credits(Th)	Credits(P)	Total Credits
2	-	-	2	0	2

Objectives of the course:

4. Making the students aware and sensitive to value system in real life situations.
5. To help the students to discriminate between ephemeral and eternal values
6. To discriminate between essence and form

Unit 1: Course Introduction (5 Hours)

Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education.
- A look at basic aspirations: Self Exploration, Happiness and Prosperity
- Fulfillment of human aspirations and harmony

Unit 2: Understanding the Harmony (5 Hours)

- Thoughtful human being harmony, sentient, attitude and its importance in relationship
- Significance of restraint and health *(Yama and Niyama)*
- Human goal settings and life management techniques, existence and co-existence, trust, respect in universal order

Unit 3: Understanding professional Ethics (5Hours)

- Harmony at various levels and understanding professional ethics
- Creating environmentally aware engineers
- Humanistic universal education, natural acceptance of human values, ethical human conduct

Unit 4: Competence of professional ethics (5Hours)

- Management models for present technologies, strategies for integrating humans in family and at all levels of existence
- Relevance of the above strategies in becoming responsible engineers, technologists and managers.

Unit 5: Motivation (2 Hours)

- Contribution of ancestors in science and technology development to raise self esteem in Indian context.

Suggested Readings / Books:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Value Education.
2. A Nagraj, 1998, JeevanVidyaekParichay, Divya Path Sansthan, Amarkantak.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
4. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
5. A.N. Tripathy, 2003, Human Values, New Age International Publishers
6. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) KrishiTantraShodh, Amravati.
7. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
8. E G Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
9. M Govindrajran, S Natrajan& V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd
10. SubrotoBagchi, The Professional
11. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
12. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008. Scheme and Syllabus Bachelor of Computer