BACHELOR OF TECHNOLOGY

Electrical and Electronics Engineering

COURSE STRUCTURE & SYLLABUS

(Batches admitted from the Academic Year 2018 -2019)

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

(Autonomous Institution-UGC, Govt. of India)

Accredited by NBA & NAAC with 'A' Grade, UGC, Govt. of India
NIRF Indian Ranking–2020, Accepted by MHRD, Govt. of India
Band Excellent- National Ranking by ARIIA, MHRD, Govt. of India
Affiliated to JNTUH, Approved by AICTE, ISO 9001:2015 Certified Institution, 2nd Rank CSR,
AAAA+ Rated by Digital Learning Magazine, AAA+ Rated by Careers 360 Magazine
Platinum Rated by AICTE-CII Survey, National Ranking-Top 100 Rank band by Outlook,
National Ranking-Top 100 Rank band by Times News Magazine,
141 Natinal Ranking by India Today Magazing
Maisammaguda, Dhullapally, Secunderabad, Kompally-500100

COURSE STRUCTURE

I YEAR I SEMESTER

S. NO.	SUBJECT CODE	SUBJECT	L	T	P	Credits	Max. Marks	
							Internal	External
1	1800BS01	Mathematics – I	3	1	0	4	30	70
2	1800BS05	Applied Physics	3	1	0	4	30	70
3	1805ES01	Programming for Problem Solving	3	1	0	4	30	70
4	1803ES01	Engineering Graphics	1	0	4	3	30	70
5	1800BS61	Applied Physics Lab	0	0	3	1.5	30	70
6	1805ES61	Programming for Problem Solving Lab	0	0	3	1.5	30	70
7*	1800MC01	Environmental Science	3	0	0	0	100	
		Induction Programme						
		Total Credits	13	3	10	18	280	420

I YEAR II SEMESTER

S. NO.	SUBJECT CODE	SUBJECT	L	T	P	Credits	Max. Marks	
							Internal	External
1	1800HS01	English	2	0	0	2	30	70
2	1800BS05	Mathematics – II	3	1	0	4	30	70
3	1800BS06	Engineering Chemistry	3	1	0	4	30	70
4	1802ES01	Basic Electrical Engineering	3	0	0	3	30	70
5	1803ES61	Engineering Workshop	1	0	3	2.5	30	70
6	1800HS61	English Language Communication Skills Lab	0	0	2	1	30	70
7	1800BS62	Engineering Chemistry Lab	0	0	3	1.5	30	70
8	1802ES61	Basic Electrical Engineering Lab	0	0	2	1	30	70
		Total Credits	**12**	**2**	**10**	**19**	**240**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester (III Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1803ES02	Engineering Mechanics	3	-	-	3	30	70
2	1802PC01	Electrical Circuit Analysis	3	1	-	4	30	70
3	1802PC03	Electro Magnetic Fields	3	1	-	4	30	70
4	1802PC02	Analog Electronics	3	-	-	3	30	70
5	1802PC04	Signals & Systems	3	-	-	3	30	70
6	1802PC61	Analog Electronics Lab	-	-	3	1.5	30	70
7	1802PC62	Electrical Circuit Analysis Lab	-	-	3	1.5	30	70
8*	1800MC02	Foreign Language: French	2	-	-	-	100	-
		Total	**17**	**2**	**6**	**20**	**310**	**490**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester (IV Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800BS03	Mathematics – III	3	1	-	4	30	70
2	1805ES03	Basics of Data Structures	3	1	-	4	30	70
3	1802PC05	Electrical Machines – I	3	-	-	3	30	70
4	1802PC06	Power Systems – I	3	-	-	3	30	70
5	1802PC07	Digital Electronics	3	-	-	3	30	70
6	1802PC63	Digital Electronics Lab	-	-	3	1.5	30	70
7	1802PC64	Electrical Machines Lab – I	-	-	3	1.5	30	70
8*	1800MC03	Human Values & Professional Ethics	2	-	-	-	100	-
		Total	**17**	**2**	**6**	**20**	**310**	**490**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech-I Semester (V Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS04	Managerial Economics & Financial Analysis	3	-	-	3	30	70
2	1800HS02	Professional English	3	-	-	3	30	70
3	1802PC08	Control Systems	3	-	-	3	30	70
4	1802PC09	Electrical Machines-II	3	-	-	3	30	70
5	********	Open Elective – I	3	-	-	3	30	70
6	********	Professional Elective –I	3	-	-	3	30	70
7	1802PC65	Control Systems & Simulation Lab	-	-	3	1.5	30	70
8	1802PC66	Electrical Machines Lab – II	-	-	3	1.5	30	70
9*	1800MC04	Indian Constitution	2	-	-	-	100	-
		Total	**20**	**-**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

III Year B. Tech - II Semester (VI Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1800HS03	Management Science	3	-	-	3	30	70
2	1802PC10	Power Electronics	3	-	-	3	30	70
3	1802PC11	Power Systems – II	3	-	-	3	30	70
4	********	Open Elective – II	3	-	-	3	30	70
5	********	Professional Elective –II	3	-	-	3	30	70
6	********	Professional Elective –III	3	-	-	3	30	70
7	1802PC67	Power Electronics & Simulation Lab	-	-	3	1.5	30	70
8	1802PC68	Power Systems Lab	-	-	3	1.5	30	70
9*	1800MC05	Technical & Soft skills	2	-	-	-	100	-
		Total	**20**	**-**	**6**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**
Industry Oriented Mini Project/ Internship - During Summer Vacation-Evaluation in IV-I

IV Year B. Tech -I Semester (VII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	1802PC12	Electrical Measurements & Instrumentation	3	-	-	3	30	70
2	1802PC13	Microprocessors & Microcontrollers	3	1	-	4	30	70
3	********	Open Elective – III	3	-	-	3	30	70
4	********	Professional Elective – IV	3	-	-	3	30	70
5	1802PC69	Electrical Measurements & Instrumentation Lab	-	-	3	1.5	30	70
6	1802PC70	Microprocessors & Microcontrollers Lab	-	-	3	1.5	30	70
7	1802PR01	Industry Oriented Mini Project /Internship	-	-	-	2	30	70
8	1802PR02	Project –I	-	-	8	4	30	70
9*	1800MC06	Indian Traditional Knowledge	2	-	-	-	100	-
		Total	**14**	**1**	**14**	**22**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

IV Year B. Tech-II Semester (VIII Semester)

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks	
							INT	EXT
1	********	Open Elective – IV	3	-	-	3	30	70
2	********	Professional Elective – V	3	-	-	3	30	70
3	********	Professional Elective – VI	3	-	-	3	30	70
4	1802PR03	Technical Seminar	-	-	-	2	100	-
5	1802PR04	Project-II	-	-	16	8	50	100
		Total	**9**	**-**	**16**	**19**	**240**	**310**

I YEAR		II YEAR		III YEAR		IV YEAR		TOTAL CREDITS
I	II	I	II	I	II	I	II	
19	18	20	20	21	21	22	19	160

Total Credits: 160

PROFESSIONAL ELECTIVES					
Professional Elective -I		**Professional Elective -II**		**Professional Elective -III**	
1802PE01	Wind & Solar Energy Systems	**1802PE04**	Power System Protection	**1802PE07**	Digital Signal Processing
1802PE02	High Voltage Engineering	**1802PE05**	Electrical & Hybrid Vehicles	**1802PE08**	Power System Operation & Control
1802PE03	Line Commutated Active Rectifiers	**1802PE06**	Electrical Estimation & Costing	**1802PE09**	High Energy Storage Systems
Professional Elective -IV		**Professional Elective -V**		**Professional Elective -VI**	
1802PE10	Power System Analysis	**1802PE13**	Power Quality & FACTS Devices	**1802PE16**	EHV AC Transmission Systems
1802PE11	Power Semiconductor Drives	**1802PE14**	Electrical Machine Design	**1802PE17**	Utilization of Electrical Energy
1802PE12	Digital Control Systems	**1802PE15**	Electrical Distribution Systems	**1802PE18**	Programmable Logic Controller & Applications

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AAA+ Rated by Careers 360 Magazine, Top Hundred Rank band by Outlook, 7th Rank CSR

List of Open Electives offered by Various Departmets for B.Tech. III & IV Year

S. No	Name of the Department Offering Open Electives	Open Elective –I (Semester- V)	Open Elective -II (Semester –VI)	Open Elective –III (Semester –VII)	Open Elective –IV (Semester –VIII)
1	**Electronics &Communication Engineering**	**1804OE01:** Principles of Electronic Communications **1804OE02:** Introduction to Signals Systems	**1804OE03 :** Principles of Computer Communications & Networks **1804OE04:** Fundamentals of Digital Signal Processing	**1804OE05:**Microprocessor and Interfacing **1804OE06:**Speech Processing	**1804OE07:**Principles of Wireless Communications & Networks **1804OE08:** Image Processing and Applications
2	**Computer Science & Engineering**	**1805OE01:** OperatingSystems Principles **1805OE02:** Data& Knowledge Mining	**1805OE03: Java Programming** 1805OE04: Software Testing Methodologies	**1805OE05:Fundamentals of Database Management Systems** 1805OE06:Information Security	**1805OE07:Fundamentalsof Data Analytics** **1805OE08:**ComputerForensics
3	**Information Technology**	**1812OE01: Python Programming** **1812OE02:** Software Engineering Principles	**1812OE03:**Web Design **1812OE04:**Design Patterns	**1812OE05:** Introduction to Linux **1812OE06:** Cryptography and Network Security	**1812OE07:**R-Programming **1812OE08:**Scripting Languages
4	**Electrical & Electronics Engineering**	**1802OE01:**Fundamentals of Electrical Engineering **1802OE02:**Elements of Electrical Engineering	**1802OE03:**Principles of Power System Engineering **1802OE04:** Basics Control System Engineering	**1802OE05:**Renewable Energy Systems **1802OE06:** Utilization of Solar Energy	**1802OE07:**Energy storage Systems **1802OE08:**Illumination Engineering

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS01) MATHEMATICS - I

Course Objectives:

- To learn Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes:

- After learning the contents of this paper the student must be able to
- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Sequences & Series

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity. Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS02) APPLIED PHYSICS

Course Objectives:

1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and
3. Electromagnetic theory and a broad base of knowledge in physics.
4. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
5. To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

Course Outcomes: Upon graduation:

1. The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.
2. The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials.

UNIT-I: Quantum Mechanics

Introduction to quantum physics, Black body radiation, Planck's law, Photoelectric effect, Compton effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Wave function and its physical significance, Schrodinger's time independent wave equation, Particle in one dimensional box.

UNIT-II: Semiconductor Physics

Intrinsic and Extrinsic semiconductors, Fermi level in intrinsic and extrinsic semiconductors, calculation of carrier concentration in intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, Hall effect: determination of Hall coefficient and experiment, Hall voltage, direct and indirect band gap semiconductors, p-n junction diode: energy band diagram for open and closed circuits , Zener diode and their V-I Characteristics.

UNIT-III: Optoelectronics

Radiative and non-radiative recombination mechanisms in semiconductors, LED and semiconductor lasers: Device structure, Materials, Characteristics and figures of merit, Semiconductor photo detectors: Solar cell, PIN and Avalanche and their structure, Materials, working principle and Characteristics.

UNIT-IV: Lasers and Fiber Optics

Lasers: Characteristics of Lasers, interaction of radiation with matter: stimulated absorption, spontaneous and stimulated emission, Einstein's relations, Principle and working of Laser: Population inversion, Pumping mechanisms, Types of Lasers: Ruby laser, He-Ne laser, Applications of laser. Fiber Optics: Introduction Optical fiber, Optical fiber as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, mode and transmission of signal through Step and Graded index fibers, Losses associated with optical fibers, Applications of optical fibers in communication system (block diagram) and in other fields.

UNIT-V: Dielectric and Magnetic Properties of Materials

Electric dipole, dipole moment, dielectric constant, polarizability, electric displacement, electric susceptibility, types of polarization: electronic, ionic and orientation (qualitative) polarizations, calculation of polarizabilities of electronic and ionic polarization, Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics, Piezo electrics and Pyro electrics, Magnetization, field intensity, magnetic field induction, permeability and susceptibility, Bohr magneton, Classification of magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials.

TEXT BOOKS:

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learing.
2. Halliday and Resnick, Physics - Wiley.
3. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar -S.Chand

REFERENCES:

1. Richard Robinett, Quantum Mechanics
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S.Chand
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
4. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**

3/ 1 / 0/ 4

(1805ES01) PROGRAMMING FOR PROBLEM SOLVING

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

UNIT I:

Introduction: Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems.

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming. Introduction to C Programming Language: **Structure of a C program, Identifiers**, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code , Operators- Arithmetic operators, relational and logical operators, increment and decrement operators, Bitwise operators, conditional operator, assignment operator, expressions and precedence, Expression evaluation, type conversion,typedef, The main method and command line arguments.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

UNIT II:

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do while loops

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

UNIT – III

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries, Passing 1-D arrays, 2-D arrays to functions
Recursion: Simple programs, such as Finding Factorial, Fibonacci series, Towers of Hanoi etc., Limitations of Recursive functions ,
Storage Classes - extern, auto, register, static, scope rules, block structure.

UNIT IV:

Structures: Defining structures, initializing structures, unions, Array of structures
Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, pointers to pointers ,Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) Enumeration data type and bit-fields.
Storage classes (auto, extern, static and register).
Dynamic Memory Management functions, Preprocessing Directives, Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef .

UNIT – V

File Handling: Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions

Introduction to Algorithms: Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Text Books:

1. Computer Science: A Structured Programming Approach Using C, B. A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

Reference Books:

1. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
2. Programming wit
3. h C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
4. C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
5. Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**
1/ 0 / 4/ 3

(1803ES01) ENGINEERING GRAPHICS

Course objectives:

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

Course Outcomes: At the end of the course, the student will be able to:

1. Preparing working drawings to communicate the ideas and information.
2. Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere.

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder.

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):

Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package.

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**
0/ 0 / 3/ 1.5

(1800BS61) APPLIED PHYSICS LAB

List of Experiments:
(Any 8 experiments are mandatory)

1. Energy gap of P-N junction diode-To determine the energy gap of a semiconductor diode.
2. Solar Cell-To study the V-I Characteristics of solar cell.
3. Light emitting diode-Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment-Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect-To determine Hall co-efficient of a given semiconductor.
6. Optical fibre-To determine the Numerical Aperture of given Optic fibre.
7. LASER-To study the characteristics of LASER sources.
8. Optical fibre-To determine the bending losses of Optical fibre.
9. LCR Circuit-To determine the Quality factor of LCR Circuit.
10. R-C Circuit-To determine the time constant of R-C circuit.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T / P/ C**

0 / 0/ 3/ 1.5

(1805ES61) PROGRAMMING FOR PROBLEM SOLVING LAB

Course Objectives: The students will learn the following:

1. To work with an IDE to create, edit, compile, run and debug programs
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
5. To write programs using the Dynamic Memory Allocation concept.
6. To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

1. formulate the algorithms for simple problems
2. translate given algorithms to a working and correct program
3. correct syntax errors as reported by the compilers
4. identify and correct logical errors encountered during execution
5. represent and manipulate data with arrays, strings and structures
6. use pointers of different types
7. create, read and write to and from simple text and binary files
8. modularize the code with functions so that they can be reused

Practice sessions:

a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:

a. Write a program for fiend the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:

   5 x 1 = 5

   5 x 2 = 10

   5 x 3 = 15
e. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

i. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula s = ut+(1/2)at^2 where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).

ii. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

iii. Write a program that finds if a given number is a prime number

iv. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.

v. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

vi. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

vii. Write a C program to find the roots of a Quadratic equation.

viii. Write a C program to calculate the following, where x is a fractional value.

1-x/2 +x^2/4-x^3/6

ix. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x+x^2+x^3+…..... +x^n. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Arrays and Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. ii. Multiplication of Two Matrices
f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. ii. To find the GCD (greatest common divisor) of two given integers.
j. iii. To find x^n
k. Write a program for reading elements using pointer into array and display the values using array.
l. Write a program for display values reverse order from array using pointer.
m. Write a program through pointer variable to sum of n elements from array.

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:

i. To insert a sub-string in to a given main string from a given position.

ii. To delete n Characters from a given position in a given string.

d. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
e. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
f. Write a C program to count the lines, words and characters in a given text.

Structures & Unions:

a. Write a C program that uses functions to perform the following operations using Structure
   f. Reading a complex number
   ii. Writing Complex Number
   iii. Addition of 2 Complex Numbers
   iv. Multiplication of two complex numbers
b. Write a C program to store information of 5 students using structures.
c. Write a C program to Access all structures members using pointer structure variable.
d. Write a C program to access members of union?

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program that does the following:

It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function) Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function).The program should then read all 10 values and print them back.

e. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).

Miscellaneous:

a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b. Write a C Program to construct a pyramid of numbers as follows:

```
*1          1          1          *
* *        2 3        2 2        * *
* * *      4 5 6      3 3 3      * * *
                      4 4 4 4    * *
                                 *
```

c. Write a C Program implement Student Data Base System Using Files & Structures**.**

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending order
e. Write a C program that sorts the given array of integers using insertion sort in ascending order
f. Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
ii. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
iii. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
iv. Hall of India
v. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
vi. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
vii. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year I Sem. **L / T/ P/ C**
3/ 0 / 0/ 0

(1800MC01) ENVIRONMENTAL SCIENCE

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies:
Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution**: Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and

impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).
Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
2/ 0 / 0/ 2

1800HS01 :ENGLISH

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
3. Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

UNIT –I

'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. **Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.**Reading:** Reading and Its Importance- Techniques for Effective Reading.**Basic Writing Skills:** Sentence Structures - Use of Phrases and Clauses in Sentences-Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms – **Idioms and phrases.**
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III
'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
Reading: Sub-skills of Reading- Skimming and Scanning
Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence, ***e-mail Writing and practices***

UNIT –IV
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Standard Abbreviations in English
Grammar: Voice - Redundancies and Clichés in Oral and Written Communication.
Reading: Comprehension- Intensive Reading and Extensive Reading
Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.
UNIT –V
'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: **One word substitution** and Technical Vocabulary and their usage
Grammar: Reported speech and Common Errors in English
Reading: Reading Comprehension-Exercises for Practice
Writing: Report writing - Introduction – Characteristics of a Report – Categories of Reports, Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Textbook:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.

Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS05) MATHEMATICS – II

Course Objectives:

1. To learn Methods of solving the differential equations of first and higher order
2. Evaluation of multiple integrals and their applications
3. The physical quantities involved in engineering field related to vector valued functions
4. The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
4. Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I

First Order ODE Exact, linear and Bernoulli's equations; Applications: Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

Ordinary Differential Equations of Higher Order Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, *sin ax, cos ax*, polynomials in x, $e^{axV(x)}$ and $x\,V(x)$, method of variation of parameters. Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III

Multivariable Calculus (Integration): Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).

UNIT-IV

Vector Differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V

Vector Integration: Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

a. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
b. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
c. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson,Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
3/ 1 / 0/ 4

(1800BS06) ENGINEERING CHEMISTRY

Course Objectives:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

UNIT - I

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N2, O2 and F2 molecules. π molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

UNIT - II

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Boiler troubles: Scales and Sludges, Priming and Foaming, Caustic Embrittlement. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

UNIT - III

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – Calomel, Quinhydrone and Glass electrode. Nernst equation, Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary: Lithium cell , secondary batteries : Lead – acid storage battery and Lithium ion battery, Fuel cells: H_2-O_2 Fuel cell, CH_3OH-O_2 Fuel cell.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galavanising , Tinning , Metal Cladding, Electro-deposition, Electroless plating of Nickel.

UNIT - IV

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of SN1, SN2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using KMnO4 and chromic acid. Reduction reactions: Reduction of carbonyl compounds using LiAlH4 & NaBH4.Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Unit – V

Spectroscopic techniques and applications: Principles of electronic spectroscopy: Beer Lamberts law, Numerical problems, types of electronic excitations , applications of UV –Visible spectroscopy. IR Spectroscopy: Principle, Modes of vibrations, selection rules, Force Constant

,Some common organic functional groups Wave number regions (C-H, NH_2, OH, -COOH, C=O, C≡ N, C=C, C≡ C), applications of IR Spectroscopy, ^{1}H-NMR(NMR Spectroscopy), Principles of NMR spectroscopy, chemical shift, Chemical shifts of some organic protons , Introduction to Magnetic resonance imaging.

Suggested Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P)
3. Ltd., New Delhi.
4. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
5. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
6. University Chemistry, by B.M. Mahan, Pearson IV Edition.
7. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/C**

3/ 0 / 0/ 3

1802ES01: **BASIC ELECTRICAL ENGINEERING**

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations

UNIT-I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II

Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single- phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series RL- C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV:

Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT-V:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Text-Books/Reference-Books:

1. Basic Electrical Engineering - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
2. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
4. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
5. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
1/ 0 / 3/ 2.5

(1803ES61) ENGINEERING WORKSHOP

Course Objectives:

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipment and machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:
I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
V. Welding Practice – (Arc Welding & Gas Welding)
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

TEXT BOOKS:

i. Workshop Practice /B. L. Juneja / Cengage
ii. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 2/ 1

(1800HS61) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize their mother tongue influence
5. To train students to use language appropriately for public speaking and interviews
6. Better understanding of nuances of English language through audio- visual experience and group activities
7. Neutralization of accent for intelligibility
8. Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

Listening Skills

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

1. Listening for general content
2. Listening to fill up information
3. Intensive listening
4. Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
   - Oral practice: Just A Minute (JAM) Sessions
   - Describing objects/situations/people
   - Role play – Individual/Group activities
   - Group Discussion – Group activities

- **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)**

Exercise – I
CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:
Understand: Communication at Work Place- Spoken vs. Written language.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II
CALL Lab:
Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:
Understand: Features of Good Conversation – Non-verbal Communication.
Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III
CALL Lab:
Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).
Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:
Understand: How to make Formal Presentations.
Practice: Formal Presentations.

Exercise – IV
CALL Lab:
Understand: Consonant Clusters, Plural and Past tense Markers
Practice: Words often Miss pelt – Confused/ Misused.

ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.
Practice: Making a Short Speech – Extempore.

Exercise – V

CALL Lab:
Understand: Listening for General and Specific Details.
Practice: Listening Comprehension Tests.

ICS Lab:
Understand: Group Discussion *and* Interview Skills.
Practice: Case studies on Group Discussions *and Mock* Interviews.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 3/ 1.5

(1800BS62) ENGINEERING CHEMISTRY LAB

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as an function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student gain skills on:

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.
4. Calculation of Rf values of some organic molecules by TLC technique.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe2+ by Potentiometry using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of Rf values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a give liquid using stalagmometer.

Experiments beyond syllabus:

1. Preparation of Nylon-6:6.
2. Estimation of Fe+2 by Dichrometry.

References:

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5_{th} edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech. I Year II Sem. **L / T/ P/ C**
0/ 0 / 2/ 1

(1802ES61) BASIC ELECTRICAL ENGINEERING LAB

Course Objectives:

1. To analyze a given network by applying various electrical laws and network theorems
2. To know the response of electrical circuits for different excitations
3. To calculate, measure and know the relation between basic electrical parameters.
4. To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

1. Get an exposure to basic electrical laws.
2. Understand the response of different types of electrical circuits to different excitations.
3. Understand the measurement, calculation and relation between the basic electrical parameters
4. Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law

2. Verification of KVL and KCL

3. Transient Response of Series RL and RC circuits using DC excitation

4. Transient Response of RLC Series circuit using DC excitation

5. Resonance in series RLC circuit

6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits

7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer

8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)

9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)

10. Measurement of Active and Reactive Power in a balanced Three-phase circuit

11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor

13. Performance Characteristics of a Three-phase Induction Motor

14. Torque-Speed Characteristics of a Three-phase Induction Motor

15. No-Load Characteristics of a Three-phase Alternator

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1803ES02: ENGINEERING MECHANICS

B.Tech. II Year I Sem. **L T P C**

3 0 0 3

Course Objectives:

- To understand the resolving forces and moments for a given force system
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area
- To illustrate the laws of motion, kinematis of motion and their relation

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems.

UNIT-II

Friction: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions - Motion of Bodies – Ladder, Wedge & Screw, Screw-jack.

UNIT-III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

UNIT-IV

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of Gyration. Transfer Theorem for Moment of Inertia – Moments of Inertia by integration - Moments of Inertia of Composite Figures.

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

UNIT-V

Kinetics: Kinetics of a particle-D'Alemberts principle. Work-energy and power.Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy.

TEXT BOOKS:

1. A Text Book of Engineering Mechanics/S.S. Bhavikatti/New Age International (P) Limited Publications, New Delhi.

2. Engineering Mechanics Statics and Dynamics/N.H. Dubey/ Mc Graw Hill Education (India) Private Limited, New Delhi.

REFERENCES BOOKS:

1. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company

2. Timoshenko and Young, Engineering Mechanics, 3rd Ed., McGraw Hill Publishers, 2006.

3. Engineering Mechanics / Bhattacharyya/ Oxford.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC01: ELECTRICAL CIRCUIT ANALYSIS

B.Tech. II Year I Sem. **L T P C**

3 1 0 4

Course Objectives:

- To understand Magnetic Circuits, Network Topology and Three phase circuits.
- To analyze transients in Electrical systems.
- To evaluate Network parameters of given Electrical network
- To design basic filter configurations

Course Outcomes: After this course, the student will be able to

- Analyze the Electrical Circuits with the concept of Network topology
- Apply the concepts of Magnetic circuit & Analyze Magnetic circuits
- Determine self and mutually induced EMF's for Magnetically coupled coils
- Understand the importance of three phase circuits and Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads
- Analyze the transient behavior of electrical networks for various excitations
- Obtain the various network parameters for the given two port networks
- Represent the transfer function for the given network
- Determine the parameters for the design of various filters

UNIT – I

Network Theorems: Maximum Power Transfer Theorem, Reciprocity Theorem, Millman's Theorem, Telligen's Theorem. Compensation Theorem. Analysis of dependent and independent Current and Voltage sources.

Network Topology: Definitions– Graph – Tree, Basic Cutset and Basic Tieset matrices for planar networks – Concept of Duality & Dual networks.

UNIT – II

Two Port Networks: Two Port Networks, terminal pairs, relation of two port variables, two port network parameters-Z,Y,ABCD and hybrid parameters, interconnections of two port networks.

Magnetic Circuits: Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits.

UNIT III

Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.

UNIT-IV

Transient Analysis: Solution of first and second order differential equations for series and parallel RL,RC,RLC circuits for DC and AC-Initial and final conditions in network elements. Forced and free response, time constants.different inputs such as step, ramp, pulse and impulse by using Laplace transforms method. convolution integral, inverse Laplace transform, transformed network with initial conditions, poles and zeros, frequency response(magnitude and phase plots).

UNIT – V

Filters: Introduction to filters –low pass – high pass and band pass – RC, RL, filters- constant K and m derived filters and composite filter design.

TEXT BOOKS

1. "William Hayt and Jack E. Kemmerly", "Engineering circuit analysis", Mc Graw Hill Company, 6th edition, 2016.

2. "A. Chakrabarthy", Circuit Theory, Dhanpat Rai, 2005.

REFERENCE BOOKS:

1. "Van Valkenburg", "Network Analysis", PHI, 3rd Edition, 2014

2. "Franklin F Kuo," "Network Analysis & Synthesis", Wiley India PVT. Ltd., second Edition, 2006

3. "K.C. A. Smith & R. E. Alley", "Electrical Circuits", Cambridge University Press, 1992

4. "K. Rajeswaran", "Electric Circuit theory", Pearson Education, 2004.

5. "A. Bruce Carlson", "Circuits", Thomson Publishers, 1999

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC03: ELECTRO MAGNETIC FIELDS

B.Tech. II Year I Sem. **L T P C**
3 1 0 4

Prerequisite: Mathematics II & Physics II

Course Objectives:

- To introduce the concepts of electric field, magnetic field.
- Applications of electric and magnetic fields in the development of the theory for power transmission lines and electrical machines.

Course Outcomes: upon completion of course, student will be able to

- Apply vector calculus to static electric – magnetic fields.
- Compute the force, fields & Energy for different charge & current configurations & evaluate capacitance and inductance Analyze Maxwell's equation in different forms (Differential & Integral) in Electrostatic, Magnetic time varying fields

UNIT – I

Electrostatics: Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass's law – Application of Guass's Law – Maxwell's first law, div (D) = ρ_v – Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field

UNIT – II

Dielectrics & Capacitance: Behavior of conductors in an electric field – Conductors and Insulators – Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions – Capacitance – Capacitance of parallel plots – spherical co-axial capacitors – with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

UNIT – III

Magneto Statics: Static magnetic fields – Biot-Savart's law – Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0

Ampere's Law & Applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc

UNIT – IV

Force in Magnetic fields and Magnetic Potential: Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a

differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field Scalar Magnetic potential and its limitations – vector magnetic potential and its properties – vector magnetic potential due to simple configurations – vector Poisson's equations. Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field. Introduction to permanent magnets, their characteristics and applications.

UNIT – V

Time Varying Fields: Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂t – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement curren

TEXT BOOKS:

1. "William H. Hayt& John. A. Buck", "Engineering Electromagnetics" ,Mc. Graw-Hill Companies, 7th Edition, 2009.
2. "Sadiku", "Electromagnetic Fields", Oxford Publications, 4th Edition, 2009.

REFERENCE BOOKS:

1. "CR Paul and S. A. Nasar", "Introduction to Electromagnetic", Mc-Graw Hill Publications, 3rd Edition, 1997.
2. "Nathan Ida", "Engineering Electromagnetic", Springer (India) Pvt. Ltd. 2nd Edition, 2015.
3. "D J Griffiths", "Introduction to Electro Dynamics", Prentice-Hall of India Pvt. Ltd, 3rd edition, 1999.
4. D J Griffiths", "Introduction to Electro Dynamics", Pearson New International, 4th edition, 2014.
5. "J. D Kraus", "Electromagnetics", Mc Graw-Hill Inc. 4th edition, 1992.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC02: ANALOG ELECTRONICS

B.Tech. II Year I Sem. **L T P C**

3 0 0 3

Course Objectives:

- To introduce circuit realizations with components such as diodes, BJTs and transistors studied earlier.
- To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
- To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

Course Outcomes: Upon completion of the Course, the students will be able to:

- Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
- Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
- Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
- Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.

UNIT-1

P-N Junction Diode: P-N Junction as a Diode, Voltage-Ampere Characteristics, Temperature dependence of VI characteristic, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics. Diode as a Switch, Piecewise Linear Diode Characteristics. **Rectifiers and Filters** : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π- Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT-II

Bipolar Junction Transistor: The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Comparison of CB, CE, and CC Amplifier Configurations..

Junction FET: The junction field Effect Transistor -Construction, principle of operation, Comparison of BJT and FET.

MOSFET: MOSFET Construction, principle of operation, MOSFET Characteristics in Enhancement and Depletion modes. Comparison of FET and MOSFET.

UNIT-III

Feedback Amplifiers: Concept of feedback Amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Voltage series, voltage shunt, Current series and current shunt Feedback configurations, Illustrative problems

Oscillators: Conditions for oscillations, Frequency and Amplitude Stability of Oscillators, Generalized analysis of LC Oscillators, Quartz, Hartley, and Colpitt's Oscillators, RC –phase shift and Wein Bridge oscillators.

UNIT-IV

Large Signal Amplifiers: Class A Power Amplifier, Maximum Efficiency of Class –A Amplifier, Transformer Coupled Amplifier, Push Pull Amplifier complimentary Symmetry Class-B Power Amplifier, Phase Inverters, Transistor Power Dissipation, Thermal Runway, Heat Sinks

UNIT-V

Wave Shaping: High Pass, Low Pass RC Circuits, their response for Sinusoidal.

Clippers and Clampers: Diode Clippers, Transistor Clippers, Clipping at Two Independent Levels, Transfer Characteristics of Clippers, Comparators, Clamping Operation

Switching characteristics: Transistor as a Switch, Design of Transistor Switch, Transistor Switching Times

Multivibrators: Analysis and Design of Bistable, Monostable, Astable, Multivibrators and Schmitt Trigger using Transistors.

TEXT BOOKS:

1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.

2. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A Vallvaraj, 5th Edition, MC GRAW HILL EDUCATION.

3. Electronics Circuits and Applications, Md H Rashid, Cengage 2014

REFERENCES:

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education

2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009, Pearson.

3. Electronic Devices Conventional and current version -Thomas L. Floyd 2015, person

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC04: SIGNALS & SYSTEMS

II Year B.Tech I Sem **L T P C**
3 0 0 3

Course Objective
The main objectives of the course are:

- Coverage of continuous and discrete-time signals and representations and methods that is necessary for the analysis of continuous and discrete-time signals.
- Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
- Knowledge of frequency-domain representation and analysis concepts using Fourier analysis tools, Z-transform.
- Concepts of the sampling process.
- Mathematical and computational skills needed in application areas like communication, signal processing and control, which will be taught in other courses.

Course Outcomes:
After completion of the course, the student will be able to:
- Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands
- Arbitrary signal (discrete) as Fourier transform to draw the spectrum.
- Concepts of auto correlation and cross correlation and power Density Spectrum.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
- Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform

UNIT I:
INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Basic Operations on signals, Classification of Signals.
SIGNAL ANALYSIS: Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.
FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:
FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, Properties of Fourier transforms.
SAMPLING: Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:
SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, system, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF

characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Graphical representation of convolution, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT-V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z-Transform, Properties of Z-transforms.

TEXT BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
3. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4. Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Signals, Systems and Transforms - C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC61: ANALOG ELECTRONICS LAB

B.Tech. II Year I Sem. **L T P C**
0 0 3 1.5

Course Objectives:

- To identify various components and testing of active devices.
- To study and operation of millimeters, function generators ,regulated power supplies and CRO To know the characteristics of various active devices.
- To study frequency response amplifier.

Course Outcomes:

- After Completion of the course the student is able to Apply various devices to real time problems.
- Compute frequency response of various amplifiers.

Part A: (Only for viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specification, testing of R,L,C components (color codes), Potentiometers (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Board, PCB's

2. Identification, Specification, testing of Active devices: Diodes, BJT, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of:
   i. Multimeters (Analog and Digital)
   ii. Function Generator
   iii. Regulated Power Supplies
   iv. CRO

Part B: (For Laboratory Examination – Minimum of 14 experiments)

1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. Zener diode V-I characteristics and Zener diode as voltage regulator.
3. Half Wave rectifier, with and without filters
4. Full wave rectifier with and without filters.
5. Input and output Characteristics of a BJT in CE configuration and calculation of h-parameters.
6. Linear wave Shaping
   RC Low Pass Circuit for different time constants
   RC High Pass Circuit for different time constants
7. Non-linear wave shaping
   Transfer characteristics and response of Clippers:
   Positive and Negative Clippers
   Clipping at two independent levels

The steady state output waveform of clampers for a square wave input
Positive and Negative Clampers
Clamping at different reference voltage

8. Switching characteristics of a transistor
9. Design a Bistable Multivibrator and draw its waveforms
10. Design an Astable Multivibrator and draw its waveforms
11. Design a Monostable Multivibrator and draw its waveforms
12. Current Shunt Feedback Amplifier
13. Voltage Series Feedback Amplifier
14. RC Phase Shift Oscillator using Transistors
15. Class A Power Amplifier (Transformer less)
16. Class B Complementary Symmetry Amplifier

PART C: Equipment required for Laboratory:

1. Regulated Power Supplies : (0-30)V
2. CRO's : (0-20)MHz
3. Function Generators : (0-1)MHz
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital): 0-20 μA, 0-50 μA, 0-100 μA, 0-200 μA, 10mA
8. Voltmeters (Analog or Digital): 0-50V, 0-100V, 0-250V

Electronic Components: Resistors, Capacitors, BJTs, Diodes-Ge & Si type, Transistors – NPN, PNP type

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC62: ELECTRICAL CIRCUIT ANALYSIS LAB

B.Tech. II Year I Sem. **L T P C**
0 0 3 1.5

Course Objectives:

- To design electrical systems
- To analyze a given network by applying various Network Theorems
- To measure three phase Active and Reactive power.
- To understand Mutual induction.

Course Outcomes: After Completion of this lab the student is able to

- Analyze complex DC and AC linear circuits
- Apply concepts of electrical circuits across engineering
- Evaluate response in a given network by using theorems

The following experiments are required to be conducted as compulsory experiments

1. Verification of Thevenin's and Norton's Theorems.
2. Verification of Superposition and Maximum Power Transfer theorems.
3. Verification of Reciprocity and millmann's theorems.
4. Verification of compensation theorem.
5. Two port network parameters – Z – Y parameters, Analytical verification.
6. Two port network parameters – A, B, C, D & Hybrid parameters, Analytical verification.
7. Determination of resonant frequency by using Parallel Resonance.
8. Separation of Self and Mutual inductance in a Coupled Circuit. Determination of Co-efficient of Coupling.
9. Measurement of Active Power for Star/delta connected balanced load.
10. Measurement of Reactive Power for Star/delta connected balanced load.
11. Measurement of 3-phase power by two wattmeter method for unbalanced loads.
12. Determination of form factor for Non Sinusoidal Waveform.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1800MC02: FRENCH

B.Tech. II Year I Sem. **L T P C**
0 0 2 0

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

Course Objectives:

- To inculcate the basic knowledge of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in their vocation.

Course Outcomes:

- The students will be able to communicate in French at A1 level.
- The student will have an advantage in the competitive job market.
- This course benefits the graduates when pursuing study opportunities in the countries where French is the official language

UNIT - I:

Speaking: Introduction to the French language and culture – Salutations - French alphabet - Introducing people

Writing: Understand and fill out a form

Grammar: The verbs “to be ' and “to have " in the present tense of the indicative Vocabulary: The numbers from 1 to 20 - Professions – Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation

Writing: Write and understand a short message

Grammar: Nouns (gender and number) - Articles - The –er verbs in the present - Possessive adjectives - Qualifying adjectives

Vocabulary: The family – Clothes - Colors - The numbers from 1 to 100 - The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency

Writing: A letter to a friend

Grammar - The expression of time – The –ir verbs in the present - The verbs do, go, take, come,
-Adverbs - Reflexive verbs

Vocabulary - The days and months of the year - The sports – Hobbies

UNIT - IV

Speaking: Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing: A dialogue between a vendor and a customer at the market

Grammar: Verbs “to want”, “to can” - Express capacity / possibility - Express will / desire – the future tense
Vocabulary: The food – Meals - Fruits and vegetables – The parts of the body

UNIT - V
Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement
Writing: Descriptions
Grammar: Demonstrative adjectives - Prepositions - The verb 'must' to indicate obligation and necessity in the present
Vocabulary: Seasons – Holidays - The city – Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1. Apprenons le Français 1& 2, New Saraswati House, 2015
2. A propos, A1, Langers International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier- Berman, Anne C. Cummings.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1800BS03: MATHEMATICS – III

B.Tech. II Year II Sem

L	T	P	C
3	1	0	4

Course Objectives: To learn

- differentiation and integration of complex Valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- a periodic function by Fourier series and a non-periodic function by Fourier transform
- z-transform of a sequence and properties

Course Outcomes: After learning the contents of this paper the student must be able to

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- understanding the characteristics and properties of z-transforms
- to compute inverse z-transform
- to solve difference equations using z-transforms

UNIT – I

Analytic Functions: Introduction, Continuity, Differentiability, Analyticity, Cauchy-Riemann equations in Cartesian and polar coordinates(without proof)**.** Harmonic and conjugate harmonic functions-Milne-Thompson method(without proof).

UNIT – II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series-Laurent series.

UNIT – III

Singularities and Contour Integration: Singular points, isolated singular points essential singularity,Pole, Residue, Cauchy Residue theorem (Without proof) Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(cos\Theta, sin\Theta)d\Theta$

UNIT – IV

Fourier series: Introduction, Fourier series definition, Dirichlet's conditions, Even and odd functions, Half range sine and cosine series.

UNIT – V

Transform Techniques:

Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier

transforms.

z-transforms: z- transforms, inverse z-transforms, properties, damping rule, shifting rule, Initial and final value theorems, convolution theorem, solution of difference equation by z-transofrms.

TEXT BOOKS:

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1805ES02: BASICS OF DATA STRUCTURES

B.Tech. II Year I Sem. **L T P C**

3 1 0 4

Course Objectives:

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists trees and graphs.
- To enable them to write algorithms for solving problems with the help of fundamental data Structures

Course Outcomes:

At the end of the course the students are able to:

- For a given Algorithm student will able to analyze the algorithms to determine time & computation complexity and justify the correctness.
- For a given Search problem (Linear Search and Binary Search) student will able to implement it.
- For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
- Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity
-

UNIT- I

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures. Singly Linked Lists-Operations-Insertion, Deletion, Circularly linked lists- Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays.

UNIT- II

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, Queue ADT, definition and operations, array and linked Implementations in C, Circular queues-Insertion and deletion operations.

UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling. Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT- V

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees- Definition and Examples, B-Trees-Definition, Comparison of Search Trees.

TEXT BOOKS:

1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2nd Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH. 8. Data structures using C, A.K.Sharma, 2nd edition, Pearson.. 9. Data Structures using C &C++, R.Shukla, Wiley India.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC05: ELECTRICAL MACHINES-I

B.Tech. II Year I Sem. **L T P C**

3 0 0 3

Course Objectives:

- To study and understand different types of DC generators, Motors and Transformers their construction, operation and applications
- To analyze performance aspects of various testing methods.

Course Outcomes: After this course, the student will be able to

- Identify different parts of a DC machine & understand its operation
- Carry out different testing methods to predetermine the efficiency of DC machines
- Understand different excitation and starting methods of DC machines
- Control the voltage and speed of a DC machines

UNIT-I

D.C. Generators: Principle of Operation – Action of Commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E.M.F Equation. Armature reaction – Cross magnetizing and demagnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation. Methods of Excitation – separately excited and self excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self excite and remedial measures. Load characteristics of shunt, series and compound generators. Need for parallel operation of DC generators, Parallel operation of DC shunt, series, and compound generators.

UNIT-II

D.C Motors: Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Series Parallel Control. Electric Braking - Rheostatic, Plugging, Regenerative Braking. Testing of D.C. machines - Losses – Constant & Variable losses – Calculation of efficiency – condition for maximum efficiency.

UNIT-III

DC Motor Starters - 3 point starter, 4 point starters, DC Series Motor Starter, Automatic starters, Speed control of D.C. Motors - Armature voltage and field flux control methods Methods of Testing – Direct, Indirect, and Regenerative testing – Brake Test – Swinburne's Test – Hopkinson's Test – Field's Test - Separation of stray losses in a d.c. motor test.

UNIT-IV

Single phase transformers: Types - constructional details-minimization of Hysteresis and Eddy current losses- EMF Equation - Operation on no load and on load - Phasor diagrams Equivalent circuit - losses and efficiency – regulation - All day efficiency - effect of variations of frequency & supply voltage on iron losses. Condition for Maximum Efficiency, output KVA corresponding to maximum efficiency.

UNIT-V

OC and SC tests - Sumpner's test - Predetermination of Efficiency and Regulation-Separation of losses test - parallel operation with equal and unequal voltage ratios - auto transformers equivalent circuit - comparison with two winding transformers. Poly phase transformers - Poly phase connections - Y/Y, Y/□, □/Y, □/□ and open□. Scott connection.

TEXT BOOKS:

1. "I.J. Nagrath & D.P. Kothari", "Electric Machines", Tata Mc Graw Hill Publishers, 3rd edition, 2004.
2. "P.S. Bimbra", "Electrical Machines", Khanna Publishers, 7th Edition, 2014.

REFERENCE BOOKS:

1. E. Clayton & N. M. Hancock "The Performance and Design Of Direct Current Machines" 3rd Edition Pitman, London 1959.
2. "A. E. Fritzgerald, C. Kingsley and S. Umans", "Electric Machinary", McGraw Hill Companies, 6th edition, 2003.
3. "Abhijith Chakrabarthi & SubithaDebnath", "Electrical Machines", Mc Graw Hill, 2015

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC06: POWER SYSTEMS – I

B.Tech. II Year II Sem **L T P C**
3 0 0 3

Course Objectives:

- To understand the hydro, thermal, nuclear and gas generating stations.
- To examine A.C. and D.C. distribution systems.
- To understand and compare air insulated and gas insulated substations.
- To illustrate the economic aspects of power generation and tariff methods.

Course Outcomes: After Completion of this course the student is able to

- Draw the layout of hydro power plant, thermal power station, Nuclear power plant and gas power plant and explain its operation
- Describe A.C. and D.C. distribution systems and its voltage drop calculations
- Illustrate various economic aspects of the power plant erection, operation and different tariff methods
- Understand power factor improvement methods and determine economical power factor

UNIT- I

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses. - Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and cooling towers

Gas and Nuclear Power Stations: Nuclear Power Stations: Nuclear Fission and Chain reaction. - Nuclear fuels. - Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants. - Radiation hazards: Shielding and Safety precautions. - Types of Nuclear reactors and brief description of PWR, BWR and FBR. Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

UNIT – II

Hydroelectric Power Stations: Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies. Hydraulic Turbines: Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design - draft tube-theory- functions and efficiency.

UNIT - III

D.C. Distribution Systems: Classification of Distribution Systems.- Comparison of DC vs. AC and Under-Ground vs. Over- Head Distribution Systems.- Requirements and Design features of Distribution Systems.-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor. A.C. Distribution Systems: Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

UNIT-IV

Substations: Classification of substations

Air insulated substations - Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

UNIT-V

Economic Aspects of Power Generation: Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors- Numerical Problems. Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method.-Tariff Methods: Flat Rate, Block Rate, two-part, three –part, and power factor tariff methods and Numerical Problems

TEXT BOOKS:

1. "C. L. Wadhawa", "Generation and utilization of Electrical Energy", New age International (P) Limited, Publishers 1997.
2. "C. L. Wadhawa", "Electrical Power Systems", New age International (P) Limited, Publishers 1997.
3. "M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakraborti", "A Text Book on Power System Engineering", Dhanpat Rai and Co. Pvt. Ltd, 1999.

REFERENCE BOOKS:

1. "M.V. Deshpande", "Elements of Power Station design and practice" , Wheeler Publishing, 3rd Edition 1999.
2. "S. N. Singh", "Electrical Power Generation, Transmission and Distribution", PHI, 2003.
3. "V.K Mehta and Rohit Mehta", "Principles of Power Systems", S. Chand& Company

Ltd, New Delhi, 2004

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC07: DIGITAL ELECTRONICS

B.Tech. II Year II Sem. **L T P C**
3 0 0 3

Course Objectives:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.

Course Outcomes: Upon completion of the course, student should possess the following skills:

- Be able to manipulate numeric information in different forms
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and to use standard sequential functions to build larger more complex circuits

UNIT -I:

Number System and Gates: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Excess-3 code, Unit Distance Code, Error Detecting and Correcting Codes, Hamming Code. Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates.

UNIT -II:

Boolean Algebra and Minimization: Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Multilevel NAND/NOR realizations. K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Prime and Essential prime Implications, Quine Mc Cluskey Tabular Method

UNIT -III:

Combinational Circuits Design: Combinational Design, Half adder, Full adder, Half subtractor, Full subtractor, Parallel binary adder/subtracor, BCD adder, Comparator, decoder, Encoder, Multiplexers, DeMultiplexers, Code Converters.

UNIT -IV:

Sequential Machines Fundamentals: Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop, The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another, Timing and Triggering Consideration.

UNIT -V:

Sequential Circuit Design and Analysis: Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Aspects, State Reduction, Design Steps, Realization using Flip-Flops. Counters – Design of Asynchronous and Synchronous counters, Decade Counter, Register- Shift Register, Bidirectional Shift Register,universal shifteregister,shift registers using Ring Counter

TEXT BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
5. Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006. 6. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC63: DIGITAL ELECTRONICS LAB

B.Tech. II Year II Sem **L T P C**
0 0 3 1.5

COURSE OBJECTIVES

1.To enable the students to implement the digital circuits using logic gates
2.To know the concepts of Combinational Circuits
3.To understand the concepts of Flipflops,registers & Counters

CORSE OUTCOMES

1. Able to demonstrate the digital circuits using Logic gates
2. Able to Identify the various digital ICs and understand their operation.
3. Able to Design simple logic circuits.

Minimum Twelve experiments to be conducted

LIST OF EXPERIMENTS

1. Study of logic gates.
2. Design and implementation of adders and subtractors using logic gates.
3. Design and implementation of code converters using logic gates.
4. Design and implementation of 4-bit binary adder/subtractor.
5. Design and implementation of encoder and decoder using logic gates
6. Design a 4 –bit Gray to Binary and Binary to Gray Converter.
7. Design a 450 KHz clock using NAND / NOR gates.
8. Design a 16 x 1 multiplexer using 8 x 1 multiplexer.
9. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
10. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
11. Implementation and verification of Decoder and Encoder using logic gates
12. Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops.
13. Design a 4 bit Comparator using gate\IC
14. Design and Implement a Decade counter.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1802PC64: ELECTRICAL MACHINES LAB – I

B.Tech. II Year II Sem. **L T P C**
0 0 3 1.5

COURSE OBJECTIVE:

1. The Students will be able to conduct testing and experimental procedures on different types of Electrical DC Machines.
2. A chance to practice different types of wiring and device connections.
3. The Students will have capability to analyze the operation of electric machines under different loading conditions.

COURSE OUTCOME:

1. To impart knowledge on Constructional details, principle of operation, Performance, starters and speed control of DC Machines
2. Testing of DC Motors.
3. To Understand the Different Types of Tests on Motors and Generators.
4. To understand the characteristics of motors and generators.
5. To understand the concepts of Speed Control of Dc Motors.

LIST OF EXPERIMENTS

1. Magnetization characteristics of DC shunt generator.
2. Load test on DC shunt generator.
3. Load test on DC series generator
4. Load test on DC compound generator.
5. Hopkinson's test on DC shunt machines.
6. Fields test on DC series machines.
7. Swinburne's test and speed control of DC shunt motor.
8. Brake test on DC compound motor.
9. Brake test on DC shunt motor.
10. Retardation test on DC shunt motor.
11. Separation of losses in DC shunt motor.

MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

1800MC03: HUMAN VALUES AND PROFESSIONAL ETHICS

B.Tech. II Year II Sem **L T P C**
2 0 0 0

Course Objective: To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcome: The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT - I:

Introduction to Human Values: Need, basic Guidelines, Content and Process for Value Education, Self Exploration - 'Natural Acceptance' and Experiential Validation. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities. Understanding Happiness and Prosperity correctly

UNIT - II:

Understanding Harmony in the Family and Society: Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family). Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT – III:

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT – IV:

Professional Practices in Engineering: Work Place Rights & Responsibilities, Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT – V:

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone

Depletion, Pollution, Ethics in Manufacturing and Marketing, Media Ethics, War Ethics, Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
3. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCE BOOKS:

1. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.
2. Ivan IIIich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.
4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

3/0/0/3

1800HS03: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

To enable the student to understand and appreciate, with a particular insight, the importance of certain basic issues governing the business operations namely, demand and supply, production function, cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

Course Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.
- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
- Develop an understanding to analyze how capital budgeting decisions are carried out.
- Understanding the framework for both manual and computerized accounting process.
- Know how to analyze and interpret the financial statements through ratio analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function - MRTS, Least Cost Combination of Inputs, Laws of Returns to Scale, Internal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA) - Determination of Break-Even Point (simple problems).

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition, Pricing: Objectives and Policies of Pricing, Methods of Pricing, Business: Features and evaluation of different forms of Business Organization, Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment, Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital, Capital Budget, Cash Budget, Capital

Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting, Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Double Entry - Book Keeping, Journal, Ledger, Trial Balance - Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments), Financial Statement Analysis: cash flow & Funds flow statements (simple problems).

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012.
4. Domnick Salvatore: Managerial Economics In a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting - A Managerial Perspective, Pearson, 2012.
6. S.N. Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha: MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J.V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**
3/0/0/3

1800HS02: PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

OBJECTIVES:

- To enrich students to express themselves appropriately and fluently in professional contexts.
- To enhance their employability through regular participation in group discussions and interview skills.
- To lay foundation with writing strategies for the futurework place needs.
- To acquaint students with different components of professionalpresentation skills.
- To equip students with necessary training in listening to comprehend dialects of English language.

OUTCOMES:

Students will be able to:

- Draft coherent and unified paragraphs with adequatesupporting details.
- Demonstrate problem solving skills, decision-making skills,analyticalskills.
- Comprehend and apply the pre-interview preparation techniques for successful interview.
- Achieve expertise in writing resume and coverletterformats.
- Understand the steps of writing 'ReportsandAbstract'.

UNIT I: FOCUS ON LANGUAGE

Parts of speech - nominal compounds, noun phrases - relative pronoun - adjective - numerical, comparison and contrast, collocation and word combinations - verb - preposition and relative - conjunction- connectives, expressions of purpose and function, cause and effect - articles - adjectives - sentence pattern - tenses - voice - rewriting the sentences in impersonal/abbreviated passive grammatical structures - concord - sentence level verb noun agreement - gerund - rewriting infinitive into gerund - imperative - rewriting imperative into recommendation using should - word formation - varied grammatical function of the same word - affixes - prefixand suffix, number prefix, negative prefix - reported speech - editing strategies - conditional structures - real, unreal, no possibility, zero condition.
writing formal definition - abbreviation and acronym - idioms and phrases ,varieties of English - British versus American.

UNIT II: LISTENING SKILLS

Comprehension practice - vocabulary development - familiarity to varied types of spoken English and accents - developing ability to understand audio and video media - aiming at overcoming barriers to listening - listening to documentaries, radio news broadcasts, TV news telecasts - active listening in discussions and to lectures - taking notes while listening - extracting information from listening.

UNIT III: SPEAKING SKILLS

Oral practice - role play - interplay - seminar - transcoding visual into oral - participating in short and longer conversation - voice record, replay, correction of intonation, pronunciation and flow of speech - phonemes - vowels, consonants, stress, rhythm, intonation - group discussion - participative learning -

acquiring proficiency, fluency, accuracy in oral communication - speaking practice - developing confidence - extempore speech - learning professional/conversational etiquette – Oral presentation skills.

UNIT IV: READING SKILLS

Vocabulary extension - improving vocabulary - intensive reading - reading strategies - identifying topic sentence - guessing meaning from content - picking out specific information - professional reading - reading practice - predicting the content, critical and analytical reading - reading articles in English newspapers, sports magazines, encyclopedias - reading aloud, use of stress and intonation - reading and comprehending technical materials - cloze reading.

UNIT V: WRITING SKILLS

Discourse cohesion - improving writing skills, avoiding common grammatical errors in academic writing - extending the hints - writing shorter sentences - punctuation - dialogue writing - paragraph writing, problems and solutions, achieving coherence, transition words, sequence words - essays of descriptive and argumentative - writing instructions, use of imperatives - jumbled sentences into sequential paragraph using linguistic clues - report writing - technical reports, industry visit reports, events reports - writing recommendations - letter writing - formal and informal letters, e-mail writing - job application and resume, permission for in-plant training, business correspondence letters, calling for quotation, placing order, lodging complaint, persuasive letters - assignment writing - mini-project –telephonic etiquette-transcoding - transferring of information from text to pictorial/graphical representation and vice versa.

* Exercises apart from the text book shall also be referred for classroom tasks.

TEXT BOOKS:

1. Practical English Usage. Michael Swan.OUP.1995.
2. Remedial English Grammar. F.T.Wood.Macmillan.2007
3. On Writing Well. William Zinsser. Harper ResourceBook.2001

REFERENCE BOOKS:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge UniversityPress.2006.
2. Communication Skills. Sanjay Kumar and PushpLata. Oxford UniversityPress.2011.
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. OxfordUniversityPress

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

3/0/0/3

1802PC08: CONTROL SYSTEMS

COURSE OBJECTIVES:

- To understand the different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.
- To assess the system performance using frequency domain analysis and techniques for improving the performance.
- To design various controllers and compensators to improve system performance.

COURSE OUTCOMES:

After completion of this course the student is able

- To improve the system performance by selecting a suitable controller and/or a compensator for a specific application.
- Apply various time domain and frequency domain techniques to assess the system performance.
- Apply various control strategies to different applications (example: Power systems, electrical drives etc…)
- Test system Controllability and Observability using state space representation and applications of state space representation to various systems.

UNIT-I

Introduction to Control Problem: Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra-Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT - II

Time Response Analysis of Standard Test Signals: Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Steady state errors and error constants.Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci,effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT - III

Frequency-Response Analysis: Relationship between time and frequency response, Polar plots, Bode plots. Determination of Frequency domain specifications and transfer function from the Bode Diagram. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

UNIT - IV

Introduction to Controller Design: Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and Lag compensation in designs. Analog and Digital implementation of controllers.

UNIT-V

State Variable Analysis and Concepts of State Variables: State space model. Derivation of state models from block diagrams. Diagonalization of State Matrix. Solution of state equations. Eigen values and Stability Analysis. Concept of controllability and observability. Difference Equations. State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

TEXT BOOKS:

1. "I. J. Nagrath and M. Gopal", "Control Systems Engineering", New Age International (P) Limited, Publishers, 5th edition, 2009
2. "B. C. Kuo", "Automatic Control Systems", John wiley and sons, 8th edition, 2003.

REFERENCE BOOKS:

1. "N. K. Sinha", "Control Systems", New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. "NISE", "Control Systems Engineering", John wiley, 6th Edition, 2011.
3. "Katsuhiko Ogata", "Modern Control Engineering", Prentice Hall of India Pvt. Ltd., 3 rd edition, 1998.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

3/0/0/3

1802PC09: ELECTRICAL MACHINES-II

COURSE OBJECTIVES:

- To deal with the detailed analysis of polyphase induction motors & Synchronous generators and motors
- To understand operation, construction and types of single phase motors and their applications in house hold appliances and control systems.
- To introduce the concept of parallel operation of synchronous generators.
- To introduce the concept of regulation and its calculations.

COURSE OUTCOMES:

After this course, the student

- Identify different parts of transformers and induction motors and specify their functions
- Understand the operation of transformers and induction motors
- Carry out different testing methods and assess the performance of transformers and induction motors
- Start and control the induction motor

UNIT - I

Poly-Phase Induction Machines: Constructional details of cage and wound rotor machines production of a rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and Power factor at standstill and during operation.

UNIT - II

Characteristics of Induction Machines: Rotor power input, rotor copper loss and mechanical power developed and their inter relation-torque equation-deduction from torque equation - expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram ,Losses and efficiency - crawling and cogging -.No-load Test and Blocked rotor test –Predetermination of performance- Methods of starting and starting current and Torque calculations.

Speed Control Methods: Change of voltage, change of frequency, voltage/frequency, injection of an EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

UNIT - III

Synchronous Machines: Constructional Features of round rotor and salient pole machines –

Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated e.m.f.–suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance–experimental determination - phasor diagram – load characteristics. Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – salient pole alternators – two reaction analysis – experimental determination of Xd and Xq (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT - IV

Parallel Operation of Synchronous Machines: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing - Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's.

Synchronous Motors: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed .- hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT – V:

Single Phase & Special Machines: Single phase induction motor – Constructional features-Double revolving field theory – Cross field theory, Equivalent circuit ,Determination of parameters- split-phase motors – shaded pole motor. Stepper motors, Reluctance motors, Applications.

TEXT BOOKS:

1. "I. J. Nagrath & D. P. Kothari", "Electric Machines", Tata Mc Graw Hill, 7th Edition, 2009
2. "PS Bhimbra", "Electrical machines", Khanna Publishers, 2014

REFERENCE BOOKS:

1. "M. G. Say", "Performance and Design of AC Machines", CBS Publishers, 3rd Edition, 2002.
2. "A.E. Fitzgerald, C. Kingsley and S. Umans", "Electric machinery", Mc Graw Hill Companies, 7th edition, 2013
3. "Langsdorf", "Theory of Alternating Current Machinery", Tata McGraw-Hill Companies, 2nd edition, 1984.
4. "M.V Deshpande", "Electrical Machines", Wheeler Publishing, 2011

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

0/0/3/1.5

1802PC65: CONTROL SYSTEMS & SIMULATION LAB

COURSE OBJECTIVE:

1. It is aimed to introduce to the students the principles and applications of control systems in everyday life.
2. The basic concepts of time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

COURSE OUTCOME:

1. the student gets a thorough knowledge on open loop and closed loop control systems
2. Able to obtain feed back in control systems mathematical modeling and transfer function derivation of translational and rotational systems.
3. Able to obtain Transfer functions of synchros AC and DC servo motors
4. Time response analysis of different ordered systems through their characteristic equation and time domain specifications
5. Stability analysis of control system in s-domain through Bode Plot, Nyquist Plot and Root Locus techniques through Simulation and MATLAB.
6. Students can be able to apply the above conceptual things to real world electrical and electronics problems and applications

LIST OF EXPERIMENTS

1. Time Response of Second Order System
2. Characteristics of Synchros
3. Characteristics of Ac Servomotor
4. Characteristics of Magnetic Amplifiers
5. Temperature Controller Using PID
6. Effect of P, PI, PID Controller on a Second Order System
7. Effect of Feedback on DC Servomotor Speed – Torque Characteristics
8. Transfer Function of DC Motor
9. Transfer Function of DC Generator
10. Programmable Logic Controller
11. Lag & Lead Compensation – Magnitude & Phase Plot
12. Simulation of Stability Analysis (Bode Plot, Root Locus, Nyquist Plot) of a Linear Time Invariant System .
13. Simulation of State Space Model for Classical Transfer Function
14. Simulation of OP – AMP Based Integrator & Differentiator.
15. Simulation of Linear System Analysis Using MATLAB

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

0/0/3/1.5

1802PC66: ELECTRICAL MACHINES LAB – II

COURSE OBJECTIVE:

1. Understand the concept of efficiency and the short circuit impedance of a three-phase transformer from no-load test, winding resistance, short circuit test and load test
2. Experimentally obtain the load characteristics, starting current and starting torque of a squirrel-cage induction motor and to derive circuit parameters from no-load and blocked-rotor tests
3. Understand the effect of unbalanced loading on a three-phase transformer with different connections, and the effects and limitations of each connection.

COURSE OUTCOME:

1. Gets the thorough knowledge on operational characteristics of AC machines.
2. The ability to conduct testing and experimental procedures on different types of electrical machines
3. The capability to analyze the operation of electric machines under different loading conditions.

LIST OF EXPERIMENTS

1. Brake test/load test on 3 phase induction motor
2. Regulation of 3-phase alternator by EMF and MMF methods.
3. OC and SC test on 1-ph transformer
4. No load and blocked rotor test on 3-phase induction motor.
5. Efficiency of Three phase alternator
6. Equivalent circuit of single-phase induction motor.
7. Determination of X_d and X_q of a salient pole synchronous machine.
8. V and inverted V curve of a three phase synchronous motors
9. Sumpner's test on a pair of 1_ph transformers
10. Parallel operation of 1-ph transformer
11. Separation of core losses of a single phase transformer
12. Scott connection of transformers

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

2/0/0/0

1800MC04: INDIAN CONSTITUTION

Course Objective:

To enable the students to be aware of emergence and evolution of Indian Constitution,to understand their fundamental rights and duties and to understand the structure and composition of Election Commission.

Course Outcome:

Students will be able tounderstand and discuss about Indian constitution. The students will learn their Rights and Responsibilities as an Indian citizen.

UNIT –I

Meaning and Importance of Constitution, Evolution of the constitution of India. Salient features of the constitution of India

UNIT –II

Scheme of fundamental rights, fundamental duties and its legal status. The Directive Principles of State Policy- Significance and implementation

UNIT –III

Government of the Union : President of India – Election and Powers, Prime Minister and Council of Ministers, Lok Sabha – Composition and Powers, Rajya Sabha – Composition and Powers

UNIT –IV

The historical perspectives of the constitutional amendments in India. Emergency provisions: National Emergency, President Rule, Financial Emergency, Local self-government-Constitutional scheme in India

UNIT –V

Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXTBOOKS:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.

REFERENCES:

1. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015
2. ‘Indian Administration’ by Avasti and Avasti

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE –I

1802PE01: WIND & SOLAR ENERGY SYSTEMS

COURSE OBJECTIVES:

- To understand the fundamental energy sourses
- To study and to to learn how to design the solar and wind energy generation

COURSE OUTCOMES:

Student will be able to understand

- How to design solar and wind energy systems
- Photo voltaic system performance and design
- Wind energy application and knowledge on wind generation

UNIT-I

Fundamentals of Energy Science and Technology: Introduction, Energy, Economy and Social Development, Classification of Energy Sources, Importance of Non -conventional Energy Sources, Salient features of Non-conventional Energy Sources, World Energy Status, Energy Status in India.

Energy Conservation and Efficiency: Introduction, Important Terms and Definitions, Important Aspects of Energy Conservation, Global Efforts, Achievements and Future Planning, Energy Conservation/Efficiency Scenario in India, Energy Audit, Energy Conservation Opportunities.

Energy Storage: Introduction, Necessity of Energy Storage, Specifications of Energy Storage Devices.

UNIT 2

Solar Energy-Basic Concepts: Introduction, The Sun as Source of Energy, The Earth, Sun, Earth Radiation Spectrum, Extraterrestrial and Terrestrial Radiations, Spectral Power Distribution of Solar Radiation, Depletion of Solar Radiation. Measurement of Solar Radiation, Solar Radiation Data, Solar Time, Solar Radiation Geometry, Solar Day Length, Extraterrestrial Radiation on Horizontal Surface, Empirical Equations for Estimating Terrestrial Solar Radiation on Horizontal Surface, Solar Radiation on Inclined Plane Surface.

UNIT-3

Solar Thermal Systems: Introduction, Solar Collectors, Solar Water Heater, Solar Passive Space Heating and Cooling Systems, Solar Industrial Heating Systems, Solar Refrigeration and Air Conditioning Systems, Solar Cookers.

Solar Photovoltaic Systems: Introduction, Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell Technologies, Solar Cell, Module, and Array Construction, Maximizing the Solar PV Output and Load Matching. Maximum Power Point Tracker. Balance of System Components, Solar PV Systems, Solar PV Applications.

UNIT-4

Wind Energy: Introduction, Basic Principles of Wind Energy Conversion, History of Wind Energy, Wind Energy Scenario – World and India. The Nature of the Wind, The Power in the Wind, Forces on the Blades, Wind Energy Conversion, Wind Data and Energy Estimation, Site Selection Considerations
Wind energy systems: Environment and Economics Environmental benefits and problems of wind energy, Economics of wind energy, Factors influence the cost of energy generation, machine parameters, Life cycle cost analysis.

UNIT-5

Basic Components of a Wind Energy Conversion(WEC) System: Classification of WEC systems, Advantages and Disadvantages of WECS, Types of Wind Machines (Wind Energy Collectors), Analysis of Aerodynamic Forces Acting on the Blade, Performance of Wind- machines, Generating Systems, Energy Storage, Applications of Wind Energy, Environmental Aspects.

TEXT BOOKS/REFERENCE BOOKS:

1. Goswami DY. Kreith F. Kreider JF. Principles of Solar Engineering, Taylor & Francis, 1999
2. Tiwari GN. Solar Energy, Fundamentals design, modeling and Applications. Narosa, 2002
3. Duffie JA. Beckman WA. Solar Engineering of Thermal Processes, John Wiley, 2006
4. Kishore VVN. Renewable Energy Engineering and Technologies, TERI, 2009
5. Johnson GL. Wind Energy Systems, (Electronic Edition), Prentice Hall Inc, 2006
6. Mathew S. Wind Energy: Fundamentals, Resource Analysis and Economics. Springer, 2006
7. Burton T. Sharpe D. Jenkins N. Bossanyi E. Wind Energy Handbook. John Wiley, 2001
8. Jha AR. Wind Turbine Technology, CRC Press, Taylor & Francis, 2011
9. Jain P. Wind Energy Engineering. McGraw-Hill 2011
10. Nag P K. Power Plant Engineering, 3rd Edition, Tata McGraw Hill, 2008.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE –I

1802PE02: HIGH VOLTAGE ENGINEERING

COURSE OBJECTIVES:

- To understand what is high voltage engineering and its application.
- To attain the knowledge of different types of insulation medium and their breakdown phenomenon.
- To construct the circuits for high voltage generation and design circuits for measurement of high voltage.
- To understand the different causes for over voltage for high voltage equipment.
- Able to test the high voltage equipment for their withstand of insulation under different conditions.

COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

- Can define what high voltage engineering is and illustrate its applications.
- Can differentiate types of insulation medium and their breakdown phenomenon.
- Can understand construction of circuits for high voltage generation and design of circuits for measurement of high voltage
- Can identify different causes for over voltage for high voltage equipment.
- Can test the high voltage equipment for their withstand of insulation under different conditions

UNIT - I

Breakdown in Gases

Ionization processes and de-ionization processes, Types of Discharge, Gases as insulating materials, Breakdown in Uniform gap, non-uniform gaps, Townsend's theory, Streamer mechanism, Corona discharge, Paschen's law

Breakdown in Liquid and Solid Insulating Materials

Breakdown in pure and commercial liquids, Solid dielectrics and composite dielectrics, intrinsic breakdown, electromechanical breakdown and thermal breakdown, Partial discharge, applications of insulating materials.

UNIT - II

Generation of High Voltages

Generation of high voltages, generation of high D. C. and A.C. voltages, generation of impulse voltages, generation of impulse currents, tripping and control of impulse generators.

UNIT- III

Measurements of High Voltages and Currents

Peak voltage, impulse voltage and high direct current measurement method, cathode ray oscillographs for impulse voltage and current measurement, measurement of dielectric constant and loss factor, partial discharge measurements.

UNIT - IV

LIGHTNING AND SWITCHING OVER-VOLTAGES

Charge formation in clouds, Stepped leader, Dart leader, Lightning Surges. Natural causes for over voltages, Switching over voltages, Protection against over-voltages, Surge diverters, Surge modifiers.

UNIT - V

High Voltage Testing of Electrical Apparatus and High Voltage Laboratories Various standards for HV Testing of electrical apparatus, IS, IEC standards, Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, power transformers and some high voltage equipment, High voltage laboratory layout, indoor and outdoor laboratories, testing facility requirements, safety precautions in H. V. Labs.

TEXT BOOKS

1. High Voltage Engineering, M.S.Naidu and V. Kamaraju, TMH Publications.
2. High Voltage Engineering, C.L.Wadhwa, New Age Internationals (P) Limited.

REFERENCE BOOKS

1. High Voltage Engineering: Fundamentals, E.Kuffel, W.S.Zaengi, J.Kuffel by Elsevier.
2. High Voltage Insulation Engineering, Ravindra Arora, Wolfgang Mosch, New Age International (P) Limited.
3. High Voltage Engineering, Theory and Practice, Mazen Abdel Salam, Hussein Anis, Ahdan El-Morshedy, Roshdy Radwan, Marcel Dekker

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year I Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE –I

1802PE03: LINE COMMUTATED ACTIVE RECTIFIERS

Course Objectives:

- To analyse controlled rectifier circuits
- To design and understand line commutated active rectifiers

Course Outcomes:

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

- Analyse controlled rectifier circuits.
- Understand the operation of line-commutated rectifiers – 6 pulse and multi-pulse configurations.
- Understand the operation of PWM rectifiers – operation in rectification and regeneration modes and lagging, leading and unity power factor mode.

UNIT 1: Diode rectifiers with passive filtering

Half-wave diode rectifier with RL and RC loads; 1-phase full-wave diode rectifier with L, C and LC filter; 3-phase diode rectifier with L, C and LC filter; continuous and discontinuous conduction, input current waveshape, effect of source inductance; commutation overlap.

UNIT 2: Thyristor rectifiers with passive filtering

Half-wave thyristor rectifier with RL and RC loads; 1-phase thyristor rectifier with L and LC filter; 3-phase thyristor rectifier with L and LC filter; continuous and discontinuous conduction, input current waveshape.

UNIT 3: Multi-Pulse converter

Review of transformer phase shifting, generation of 6-phase ac voltage from 3-phase ac, 6- pulse converter and 12-pulse converters with inductive loads, steady state analysis, commutation overlap, notches during commutation.

Single-phase ac-dc single-switch boost converter

Review of dc-dc boost converter, power circuit of single-switch ac-dc converter, steady state analysis, unity power factor operation, closed-loop control structure.

UNIT 4: Ac-dc bidirectional boost converter

Review of 1-phase inverter and 3-phase inverter, power circuits of 1-phase and 3-phase ac-dc boost converter, steady state analysis, operation at leading, lagging and unity power factors. Rectification and regenerating modes. Phasor diagrams, closed-loop control structure.

UNIT 5 : Isolated single-phase ac-dc flyback converter

Dc-dc flyback converter, output voltage as a function of duty ratio and transformer turns ratio. Power circuit of ac-dc flyback converter, steady state analysis, unity power factor operation, closed loop control structure.

TEXT / REFERENCES:

1. G. De, "Principles of Thyristorised Converters", Oxford & IBH Publishing Co, 1988.
2. J.G. Kassakian, M. F. Schlecht and G. C. Verghese, "Principles of Power Electronics", Addison- Wesley, 1991.
3. L. Umanand, " Power Electronics: Essentials and Applications", Wiley India, 2009.
4. N. Mohan and T. M. Undeland, " Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.
5. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2001

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year II Sem **L/T/P/C**

3/0/0/3

1800HS03: MANAGEMENT SCIENCE

Course Objectives:

This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues in organizational structure, production operations, marketing, human resource management, product management and strategy.

Course Outcomes:

By the end of the course, the student will be in a position to

- Plann organizational structure for a given context in the organization
- Carry out production operations through Work study.
- Understand the markets, customers and competition better and price the given products appropriately.
- Ensure quality for a given product or service.
- Plan and control the HR function better.
- Plan, schedule and control projects through PERT and CPM.
- Evolve a strategy for a business or service organization.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory- Fayol's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Designing Organizational Structures: Basic concepts related to Organisation - Departmentation and Decentralization.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management(HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Performance Appraisal, Job Evaluation and Merit Rating - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year II Sem **L/T/P/C**

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1802PC10: POWER ELECTRONICS

COURSE OBJECTIVES:

- To Design/develop suitable power converter for efficient control or conversion of power in drive applications
- To Design / develop suitable power converter for efficient transmission and utilization of power in power system applications.

COURSE OUTCOMES:

- After completion of this course the student is able to Choose the appropriate converter for various applications
- Design the power converters suitable for particular applications Develop the novel control methodologies for better performance

UNIT-I:

POWER SWITCHING DEVICES

Concept of power electronics, scope and applications, types of power converters; Power semiconductor switches and their V-I characteristics - Power Diodes, Power BJT, SCR, Power MOSFET, Power IGBT; Thyristor ratings and protection, methods of SCR commutation, UJT as a trigger source, gate drive circuits for BJT and MOSFETs, Two transistor analogy of SCR

UNIT-II:

AC-DC CONVERTERS (PHASE CONTROLLED RECTIFIERS)

Principles of single-phase fully-controlled converter with R, RL, and RLE load, Principles of single-phase half-controlled converter with RL and RLE load, Principles of three-phase fully-controlled converter operation with RLE load, Effect of load and source inductances, General idea of gating circuits, Single phase and Three phase dual converters

UNIT-III:

DC-DC CONVERTERS (CHOPPER/SMPS)

Introduction, elementary chopper with an active switch and diode, concepts of duty ratio, average inductor voltage, average capacitor current. Buck converter - Power circuit, analysis and waveforms at steady state, duty ratio control of output voltage. Boost converter - Power circuit, analysis and waveforms at steady state, relation between duty ratio and average output voltage. Buck-Boost converter - Power circuit, analysis and waveforms at steady state, relation between duty ratio and average output voltage- Morgan's chopper – Jones chopper

UNIT-IV:

AC-DC CONVERTERS (INVERTERS)

Introduction, principle of operation, performance parameters, single phase bridge inverters with R, RL loads, 3-phase bridge inverters - 120 and 180 degrees mode of operation, Voltage control of single phase inverters –single pulse width modulation, multiple pulse width modulation, sinusoidal pulse width modulation-current source inverter

UNIT-V:

AC-AC CONVERTERS

Phase Controller (AC Voltage Regulator)-Introduction, Single phase two SCR's in anti-parallel with R and RL loads , modes of operation of Triac – Triac with R and RL loads – Derivation of RMS load voltage, current and power factor- wave forms-Cyclo-converter-Principle of operation of single phase cyclo-converters, relevant waveforms, circulating current mode of operation, Advantages and disadvantages.

TEXT BOOKS:

1. M. D. Singh & K. B. Kanchandhani, "Power Electronics", Tata Mc Graw – Hill Publishing Company, 1998.
2. "M. H. Rashid", "Power Electronics: Circuits, Devices and Applications", Prentice Hall of India, 2nd edition, 1998 3. "V. R. Murthy", "Power Electronics", Oxford University Press, 1st Edition 2005.

REFERENCE BOOKS:

1. VedamSubramanyam, "Power Electronics", New Age International (P) Limited, Publishers, 2nd Edition 2008.
2. Philip T. Krein, "Elements of Power Electronics", Oxford University Press, 1997.
3. M. S. Jamil Asghar, "Power Electronics", PHI Private Limited, 2004.
4. P. C. Sen, "Power Electronics", Tata Mc Graw-Hill Publishing, 2001.
5. John G. Kassakian, Martin, F. Schlect, Geroge C. Verghese, "Principles of Power Electronics", Pearson Education, 1st Edition 201

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year II Sem **L/T/P/C**

3/0/0/3

1802PC11: POWER SYSTEMS - II

Course Objectives:

- To compute inductance and capacitance of different transmission lines.
- To understand performance of short, medium and long transmission lines.
- To examine the traveling wave performance and sag of transmission lines.
- To design insulators for over head lines and understand cables for power transmission.

Course Outcomes:

After this course, the student will be able to

- Able to compute inductance and capacitance for different configurations of transmission lines.
- Able to analyze the performance of transmission lines
- Can understand transient's phenomenon of transmission lines and insulation coordination.
- Able to calculate sag and tension calculations.
- Will be able to understand overhead line insulators and underground cables.

UNIT- I:

Performance of Lines

Representation of lines, short transmission lines, medium length lines, nominal T and PIrepresentations, long transmission lines. The equivalent circuit representation of a long Line, A,B, C, D constants, Ferranti Effect, Power flow through a transmission line, receiving end power circle diagram.

UNIT- II:

Voltage Control

Introduction – methods of voltage control, shunt and series capacitors / Inductors, tap changing transformers, synchronous phase modifiers. Compensation In Power Systems Introduction - Concepts of Load compensation – Load ability characteristics of overhead lines –Uncompensated transmission line – Symmetrical line – Radial line with asynchronous load –Compensation of lines.

UNIT- III:

Per Unit Representation of Power Systems The one-line diagram, impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unit system. Travelling Waves on Transmission Lines Production of travelling waves, open circuited line, short circuited line, line terminated through a resistance, line connected to a cable, reflection and refraction at T-junction line terminated through a capacitance, capacitor connection at a T-junction, Attenuation of travelling waves.

UNIT- IV:

Overvoltage Protection and Insulation Coordination Over voltage due to arcing ground and Peterson coil, lightning, horn gaps, surge diverters, rod gaps, expulsion type lightning arrester, valve type lightning arrester, ground wires, ground rods, counter poise, surge absorbers, insulation coordination, volt-time curves.

UNIT - V:

SYMMETRICAL COMPONENTS AND FAULT CALCULATIONS

Significance of positive, negative and zero sequence components, Average 3-phase power in terms of symmetrical components, sequence impedances and sequence networks, fault calculations, sequence network equations, single line to ground fault, line to line fault, double line to ground fault, three phase fault, faults on power systems, faults with fault impedance, reactors and their location, short circuit capacity of a bus.

TEXT BOOKS:

1. John J. Grainger & W.D. Stevenson: Power System Analysis – Mc Graw Hill International 1994.
2. C.L. Wadhwa: Electrical Power Systems – New Age International Pub. Co. Third Edition, 2001.

REFERENCES:

1. Hadi Scadat: Power System Analysis – Tata Mc Graw Hill Pub. Co. 2002
2. W.D. Stevenson: Elements of Power system Analysis – McGraw Hill International Student Edition.
3. D.P. Kothari and I. J. Nagrath, Modern Power System Analysis - Tata Mc Graw Hill Pub. Co., New Delhi, Fourth edition, 2011

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year II Sem **L/T/P/C**

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1802PC67: POWER ELECTRONICS & SIMULATION LAB

COURSE OBJECTIVES:

- Apply the concepts of power electronic converters for efficient conversion/control of power from source to load.
- Design the power converter with suitable switches meeting a specific load requirement.

COURSE OUTCOMES:

After completion of this course, the student is able to

- Understand the operating principles of various power electronic converters.
- Use power electronic simulation packages& hardware to develop the power converters.
- Analyze and choose the appropriate converters for various applications

LIST OF EXPERIMENTS

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate firing circuits for SCR's
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase half controlled bridge converter with R and RL loads
5. Forced Commutation circuits (Class A, Class B, Class C, Class D & Class E)
6. Single Phase Cyclo converter with R and RL loads
7. Single Phase series inverter with R and RL loads
8. DC Jones chopper with R and RL Loads
9. Three Phase half controlled bridge converter with R-load
10. Single Phase dual converter with RL loads
11. Single Phase parallel inverter with R and RL loads
12. Simulation of single-phase full converter using R, RL and RLE loads
13. Simulation of single-phase Semi converter using R, RL and RLE loads
14. Simulation of Single-phase AC voltage controller using R and RL loads
15. Simulation of Three Phase Inverter with PWM Control.

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B.Tech III Year II Sem **L/T/P/C**

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1802PC68: POWER SYSTEMS LAB

COURSE OBJECTIVES:

1).Perform testing of CT, PT's and Insulator strings
2). To find sequence impedances of 3-Φ synchronous machine and Transformer
3). To perform fault analysis on Transmission line models and Generators.

COURSE OUTCOMES:

1) Perform various load flow techniques
2) Understand Different protection methods
3) Analyze the experimental data and draw the conclusions.

LIST OF EXPERIMENTS

1. Characteristics of IDMT over Current Relay.
2. Differential protection of 1-Φ transformer.
3. Characteristics of Micro Processor based Over Voltage/Under Voltage relay.
4. Testing of CT, PT's and Insulator strings.
5. Finding the sequence impedances of 3-Φ synchronous machine.
6. Finding the sequence impedances of 3-Φ Transformer.
7. LG, LL and 3-Φ fault analysis of 3-Φ synchronous machine.
8. Power circle diagrams of a 3-Φ transmission line model.
9. ABCD constants and Regulation of a 3-Φ transmission line model.
10. Simualation of Transient Stability Analysis for Single Machine connected to Infinite Bus by Point by Point method .
11. Simualation of Formation of Y_{BUS}
12. Simualation of Load Flow Analysis using Gauss Seidal (GS) Method.
13. Simualation of Load Flow Analysis using Fast Decoupled (FD) Method
14. Simualation of Formation of Z_{BUS}

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech III Year II Se **L/T/P/C**

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1800MC05: TECHNICAL & SOFT SKILLS

INTRODUCTION:

Technical Communication and Soft skills focuses on enhancing students' communication. A thorough drill in grammar exercises is given. Various technical writing styles and skills are developed. The future placement needs of the students are met by giving them an exposure to group discussions and mockinterviews.The students hone these skills under the guidance of instructor whose constant evaluation helps in the professional development. This course fulfills the need of the aspirants in acquiring and improving the skills required for placements and professional success.

OBJECTIVES:

- To make the students recognize the role of Technical English in their academic and professionalfields.
- To improve language proficiency and develop the required professionalskills.
- To equip students with tools to organize, comprehend, draft short and long forms of technicalwork.

The textbook prescribed for study is a manual that has been compiled by the epartment of English to meet the academic and professional needs of the students.

UNIT I – Personal Evaluation

Self-Assessment and Self- Awareness - Self-Esteem - Perception and Attitudes - Values and Beliefs - Time Management- Concord

UNIT 2 - Professional Communication

Extempore - Oral Presentations – Presentation Aids- Email Writing, Business Letter Writing - Memo Writing - Transformation of Sentences

UNIT 3 – Career Planning

Group Discussion, Interviews - Leadership Skills & Team Building - Personal Goal Setting and Career Planning - Complex Problem Solving - Creativity - Role and Responsibilities of an Engineer - Tenses

UNIT 4 - Technical Writing

Principles of Effective Writing - Editing Strategies to Achieve Appropriate Technical Style – Technical Report Writing - Voice

UNIT 5 - Ethics and Responsibilities

Personality Development in Social and Office Settings – Netiquettes - Work Culture and Cubicle Etiquettes - Correction of Sentences

REFERENCES:

1. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York,2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York,2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London,2004.
5. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi2012.
6. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
7. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi2002.
8. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN0402213)

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B.Tech III Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE - II

1802PE04: POWER SYSTEM PROTECTION

Course Objectives:

1. To introduce all kinds of circuit breakers and relays for protection of Generators
2. Transformers and feeder bus bars from Over voltages and other hazards.
3. To describe neutral grounding for overall protection.
4. To understand the phenomenon of Over Voltages and it's classification.

Course Outcomes: After Completion of this course student will be able to

1. Understand the types of Circuit breakers and choice of Relays for appropriate
2. Protection of power system equipment.
3. Understand various types of Protective devices in Electrical Power Systems.
4. Interpret the existing transmission voltage levels and various means to protect the
5. System against over voltages.
6. Understand the importance of Neutral Grounding, Effects of Ungrounded Neutral
7. Grounding on system performance, Methods and Practice

UNIT - I

Protective Relays

Introduction, Need for power system protection, effects of faults, evolution of protective relays, zones of protection, primary and backup protection, essential qualities of protection, classification of protective relays and schemes, current transformers, potential transformers, basic relay terminology. Operating Principles and Relay Construction: Electromagnetic relays, thermal relays, static relays, microprocessor based protective relays.

UNIT - II

Over-Current Protection

Time-current characteristics, current setting, over current protective schemes, directional relay, protection of parallel feeders, protection of ring mains, Phase fault and earth fault protection, Combined earth fault and phase fault protective scheme, Directional earth fault relay.

Distance Protection: Impedance relay, reactance relay, MHO relay, input quantities for various types of distance relays, Effect of arc resistance, Effect of power swings, effect of line length and source impedance on the performance of distance relays, selection of distance relays, MHO relay with blinders, Reduction of measuring units, switched distance schemes, auto re-closing.

UNIT- III

Pilot Relaying Schemes - Wire Pilot protection, Carrier current protection. AC Machines and Bus Zone Protection: Protection of Generators, Protection of transformers, Buszone protection, frame leakage protection.

UNIT - IV:

Static Relays

Amplitude and Phase comparators, Duality between AC and PC, Static amplitude comparator, integrating and instantaneous comparators, static phase comparators, coincidence type of phase comparator, static over current relays, static directional relay, static differential relay, static distance relays, Multi input comparators, concept of Quadrilateral and Elliptical relay characteristics. Microprocessor Based Relays: Advantages, over current relays, directional relays, distance relays.

UNTI-V:

Circuit Breakers

Introduction, arcing in circuit breakers, arc interruption theories, re-striking and recovery voltage, resistance switching, current chopping, interruption of capacitive current, oil circuit breaker, air blast circuit breakers, SF6 circuit breaker, operating mechanism, selection of circuit breakers, high voltage d.c. breakers, ratings of circuit breakers, testing of circuit breakers.

FUSES: Introduction, fuse characteristics, types of fuses, application of HRC fuses, discrimination.

TEXT BOOKS:

1. "Badri Ram , D. N Viswakarma", "Power System Protection and Switchgear", TMH Publications, 2011.
2. "Sunil S Rao", "Switchgear and Protection", Khanna Publishers, 2008.

REFERENCE BOOKS:

1. "Paithankar and S. R. Bhide", "Fundamentals of Power System Protection", PHI,2003.
2. "C R Mason", Art & Science of Protective Relaying – Wiley Eastern Ltd, 1966.
3. "C. L. Wadhwa", "Electrical Power Systems", New Age international (P) Limited, Publishers, 6th Edition 2007

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B.Tech III Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE - II

1802PE05: ELECTRICAL & HYBRID VEHICLES

Course Objectives:

- To study the concepts and drive train configurations of electric drive vehicles
- To provide different electric propulsion systems and energy storage devices
- To explain the technology, design methodologies and control strategy of hybrid electric vehicles
- To emphasize battery charger topologies for plug in hybrid electric vehicles

Course Outcomes: Upon the completion of this course, the student will be able to

- Understand the concepts and drivetrain configurations of electric drive vehicles
- Interpret different electric propulsion systems and energy storage devices
- Appreciate the technology, design methodologies and control strategy of hybrid electric vehicles
- Realize battery charger topologies for plug in hybrid electric vehicles

UNIT – I :

Introduction to Electric Vehicles:Sustainable Transportation – EV System – EV Advantages – Vehicle Mechanics – Performance of EVs – Electric Vehicle drivetrain – EV Transmission Configurations and components-Tractive Effort in Normal Driving – Energy Consumption – EV Market – Types of Electric Vehicle in Use Today – Electric Vehicles for the Future.

UNIT – II :

Electric Vehicle Modelling– Consideration of Rolling Resistance – Transmission Efficiency – Consideration of Vehicle Mass – Tractive Effort – Modelling Vehicle Acceleration – Modelling Electric Vehicle Range -Aerodynamic Considerations – Ideal Gearbox Steady State Model – EV Motor Sizing – General Issues in Design.

UNIT – III :

Introduction to electric vehicle batteries –electric vehicle battery efficiency – electric vehicle battery capacity – electric vehicle battery charging – electric vehicle battery fast charging – electric vehicle battery discharging – electric vehicle battery performance – testing.

UNIT – IV :

Hybrid Electric Vehicles –HEV Fundamentals -Architectures of HEVs- Interdisciplinary Nature of HEVs – State of the Art of HEVs – Advantages and Disadvantages – Challenges and Key Technology

of HEVs – Concept of Hybridization of the Automobile-Plug-in Hybrid Electric Vehicles – Design and Control Principles of Plug-In Hybrid Electric Vehicles – Fuel Cell Hybrid Electric Drive Train Design – HEV Applications for Military Vehicles.

UNIT – V :

Advanced topics –Battery Charger Topologies, Charging Power Levels, and Infrastructure for PlugIn Electric and Hybrid Vehicles – The Impact of Plug-in Hybrid Electric Vehicles on Distribution Networks – Sizing Ultra capacitors for Hybrid Electric Vehicles.

TEXT BOOKS:

- Modern Electric, Hybrid Electric and Fuel Cell Vehicles – Fundamentals, Theory and Design – Mehrdad Ehsani, Uimin Gao and Ali Emadi – Second Edition – CRC Press, 2010.
- Electric Vehicle Technology Explained – James Larminie, John Lowry – John Wiley & Sons Ltd, – 2003.
- Electric Vehicle Battery Systems – Sandeep Dhameja – Newnes – New Delhi – 2002.
- Hybrid electric Vehicles Principles and applications With practical perspectives -Chris Mi, Dearborn – M. Abul Masrur, David Wenzhong Gao – A John Wiley & Sons, Ltd., – 2011.
- Electric & Hybrid Vehicles – Design Fundamentals – Iqbal Hussain, Second Edition, CRC Press, 2011.

RESEARCH PAPERS:

- The Impact of Plug-in Hybrid Electric Vehicles on Distribution Networks: a Review and Outlook – Robert C. Green II, Lingfeng Wang and Mansoor Alam – 2010 IEEE.
- Sizing Ultracapacitors for Hybrid Electric Vehicles – H. Douglas P Pillay -2005 IEEE.
- Review of Battery Charger Topologies, Charging Power Levels, and Infrastructure for Plug-In Electric and Hybrid Vehicles – Murat Yilmaz, and Philip T. Krein, – IEEE transactions on power electronics, vol. 28, no. 5, May 2013.

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B.Tech III Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE - II

1802PE06: ELECTRICAL ESTIMATION & COSTING

Course Objectives:

- To emphasize the estimation and costing aspects of all electrical equipment, installation and designs on the cost viability.
- To design and estimation of wiring
- To design overhead and underground distribution lines, substations and illumination

Course Outcomes:

After Completion of this course, student will be able to

- Understand the design considerations of electrical installations.
- Design electrical installation for buildings and small industries.
- Identify and design the various types of light sources for different applications.

UNIT-1

GENERAL PRINCIPLES OF ESTIMATION

Introduction to estimation & costing, Electrical Schedule, Catalogues, Market Survey and source selection, Recording of estimates, Determination of required quantity of material, Labor conditions, Determination of cost material and labour, Contingencies, Overhead charges, Profit, Purchase system, Purchase enquiry and selection of appropriate purchase mode, Comparative statement, Purchase orders, Payment of bills, Tender form, General idea about IE rule, Indian Electricity Act and major applicable rules.

UNIT-2

RESIDENTIAL BUILDING ELECTRIFICATION

General rules guidelines for wiring of residential installation and positioning of equipments, Principles of circuit design in lighting and power circuits, Procedures for designing the circuits and deciding the number of circuits, Method of drawing single line diagram, Selection of type of wiring and rating of wires and cables, Load calculations and selection of size of conductor, Selection of rating of main switch, distribution board, protective switchgear ELCB and MCB and wiring accessories, Earthing of residential Installation, Sequence to be followed for preparing estimate, Preparation of detailed estimates and costing of residential installation.

UNIT-3

DESIGN AND ESTIMATION OF OVERHEAD TRANSMISSION & DISTRIBUTION LINES

Introduction, Typical AC electrical power system, Main components of overhead lines, Line supports, Factors governing height of pole, Conductor materials, Determination of size of conductor for overhead transmission line, Cross arms, Pole brackets and clamps, Guys and Stays, Conductors configuration spacing and clearances, Span lengths, Overhead line insulators, Insulator materials, Types of insulators, Lightning Arrestors, Phase plates, Danger plates, Anti climbing devices, Bird guards, Beads of jumpers, Muffs, Points to be considered at the time of erection of overhead lines, Erection of supports, Setting of stays, Fixing of cross arms, Fixing of insulators, Conductor erection, Repairing and jointing of conductor , Dead end clamps, Positioning of conductors and attachment to insulators, Jumpers, Tee-offs, Earthing of transmission lines, Guarding of overhead lines, Clearances of conductor from ground, Spacing between conductors, Testing and commissioning of overhead distribution lines, Some important specifications.

UNIT-4

ELECTRIFICATION OF COMMERCIAL INSTALLATION

Concept of commercial installation,Differentiate between electrification of residential and commercial installation, Fundamental considerations for planning of an electrical installation system for commercial building, Design considerations of electrical installation system for commercial building, Load calculation and selection of size of service connection and nature of supply, Deciding the size of the cables,busbar and bus bar chambers, Mounting arrangements and positioning of switchboards, distribution boards main switch etc, Earthing of the electrical installation, Selection of type wire, wiring system and layout, Sequence to be followed to prepare estimate, Preparation of detailed estimate and costing of commercial installation

UNIT-5

DESIGN AND ESTIMATION OF SUBSTATIONS

Introduction, Classification of substation, Indoor substations, Outdoor substations, Selection and location of site for substation, Main Electrical Connections, Graphical symbols for various types of apparatus and circuit elements on substation main connection diagram, Key diagram of typical substations, Equipment for substation and switchgear installations, Substation auxiliaries supply, Substation Earthing

ELECTRICAL INSTALLATION FOR POWER CIRCUITS

Introduction, Important considerations regarding motor installation wiring, Determination of input power, Determination of input current to motors, Determination of rating of cables, determination of rating of fuse, Determination of size of Condit, distribution Board main switch and starter.

Text Books:

- "K. B. Raina, S. K. Bhattacharya", "Electrical Design Estimating and Costing", New Age International Publisher, 2010.
- "Er. V. K. Jain, Er. Amitabh Bajaj", "Design of Electrical Installations", University Science Press.

Reference Books:

- Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.
- Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.
- Electrical Installation buildings Indian Standard Institution, IS: 2032.
- Code of Practice for selection, Installation of Maintenance of fuse (voltage not exceeding 650 V), Indian Standard Institution, IS: 3106-1966.
- Code of Practice for earthling, Indian Standard Institution, IS: 3043-1966.
- Code of Practice for Installation and Maintenance of induction motors, Indian Standard Institution, IS: 900-1965.
- Code of Practice for electrical wiring, Installations (system voltage not exceeding 650 Volts), Indian Standard Institution, IS: 2274-1963.
- "Gupta J. B., Katson, Ludhiana", "Electrical Installation, estimating and costing", S. K. Kataria and sons, 2013.

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PROFESSIONAL ELECTIVE - III

1802PE07: DIGITAL SIGNAL PROCESSING

Course Objectives:

This course is an essential course that provides design techniques for processing all type of signals in various fields. The main objectives are:

- To provide background and fundamental material for the analysis and processing of digital signals.
- To familiarize the relationships between continuous-time and discrete time signals and systems.
- To study fundamentals of time, frequency and Z-plane analysis and to discuss the inter-relationships of these analytic method.
- To study the designs and structures of digital (IIR and FIR) filters from analysis to synthesis for a given specifications.
- The impetus is to introduce a few real-world signal processing applications.
- To acquaint in FFT algorithms, Multi-rate signal processing techniques and finite word length effects.

Course Outcomes: On completion of this subject, the student should be able to:

- Perform time, frequency, and Z -transform analysis on signals and systems.
- Understand the inter-relationship between DFT and various transforms.
- Understand the significance of various filter structures and effects of round off errors.
- Design a digital filter for a given specification.
- Understand the fast computation of DFT and appreciate the FFT processing.
- Understand the tradeoffs between normal and multi rate DSP techniques and finite length word effects.

UNIT - I

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, conversion of continuous to discrete signal, Normalized Frequency**,** Linear Shift Invariant Systems, Stability, and Causality, linear differential equation to difference equation**,** Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

Realization of Digital Filters: Applications of Z – Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonic, Cascade and Parallel Forms.

UNIT - II

Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT: Over-Lap Add Method, Over-Lap Save Method, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix-N.

UNIT - III

IIR Digital Filters: Analog filter approximations – Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method, Spectral Transformations.

UNIT - IV

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, Comparison of IIR & FIR filters.

UNIT - V

Multirate Digital Signal Processing: Introduction, Down Sampling, Decimation, Upsampling, Interpolation, Sampling Rate Conversion, Conversion of Band Pass Signals, Concept of Resampling, Applications of Multi Rate Signal Processing.

Finite Word Length Effects: Limit cycles, Overflow Oscillations, Round-off Noise in IIR Digital Filters, Computational Output Round off Noise, Methods to Prevent Overflow, Trade off between Round Off and Overflow Noise, Measurement of Coefficient Quantization Effects through Pole-Zero Movement, Dead Band Effects.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris
2. G. Manolakis, Pearson Education / PHI, 2007.
3. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
4. Fundamentals of Digital Signal Processing – Loney Ludeman, John Wiley, 2009

REFERENCES:

1. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
3. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009

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B.Tech III Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE - III

1802PE08: POWER SYSTEM OPERATION & CONTROL

Course Objectives:

To understand real power control and operation To know the importance of frequency control
To analyze different methods to control reactive power
To understand unit commitment problem and importance of economic load dispatch
To understand real time control of power systems

Course Outcomes: After completion of this course, the student will be able to

Analyze the optimal scheduling of power plants

Analyze the steady state behavior of the power system for voltage and frequency fluctuations

Describe reactive power control of a power system

Design suitable controller to dampen the frequency and voltage steady state oscillations

UNIT – I

Load –Frequency Control: Basics of speed governing mechanism and modeling - speed-load characteristics – load sharing between two synchronous machines in parallel. Control area concept LFC control of a single-area system. Static and dynamic analysis of uncontrolled and controlled cases. Integration of economic dispatch control with LFC. Two-area system – modeling - static analysis of uncontrolled case - tie line with frequency bias control of two-area system - state variable model.

UNIT – II

Reactive Power – Voltage Control: Basics of reactive power control. Excitation systems – modeling. Static and dynamic analysis - stability compensation - generation and absorption of reactive power. Relation between voltage, power and reactive power at a node - method of voltage control - tap-changing transformer. System level control using generator voltage magnitude setting, tap setting of OLTC transformer and MVAR injection of switched capacitors to maintain acceptable voltage profile and to minimize transmission loss.

UNIT – III

Economic Load Dispatch: Statement of economic dispatch problem – cost of generation – incremental cost curve - co-ordination equations without loss and with loss, solution by direct method and λ-iteration method.

UNIT – IV

Unit Commitment: Statement of Unit Commitment problem – constraints; spinning reserve, thermal unit constraints, hydro constraints, fuel constraints and other constraints. Solution methods - Priority-list methods - forward dynamic programming approach. Numerical problems on priority-list method using full-load average production cost and Forward DP method.

UNIT – V

Computer Control of Power Systems: Need of computer control of power systems. Concept of energy control centre (or) load dispatch centre and the functions - system monitoring - data acquisition and control. System hardware configuration – SCADA and EMS functions. Network topology – Importance of Load Forecasting and simple techniques of forecasting.

Text Books:

1. D. P. Kothari and I. J. Nagrath, 'Modern Power System Analysis', Third Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.

2. Olle. I. Elgerd, 'Electric Energy Systems Theory – An Introduction', Tata McGraw Hill Publishing Company Ltd, New Delhi, 30th reprint, 2007.

Reference Books:

1. Chakrabarti & Haldar, "Power System Analysis: Operation and Control", Prentice Hall of India, 2004 Edition.

2. C. L. Wadhwa , 'Power System Analysis', New Age International-6th Edition, 2010, ISBN : 978-81-224-2839-1

3. Robert Miller, James Malinowski, 'Power System Operation', Tata McGraw Hill Publishing Company Ltd, New Delhi, 3rd Edition 2009.

4. P. Kundur, Neal J. Balu, 'Power System Stability & Control', IEEE, 1998.

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B.Tech III Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE - III

1802PE09: HIGH ENERGY STORAGE SYSTEMS

Course Objective:

- To enable the student to understand the need for energy storage, devices and technologies available and their applications

Course Outcomes: After completion of this course, the student will be able to

- Analyze the characteristics of energy from various sources and need for storage classify various types of energy storage and various devices used for the purpose Identify various real time applications.

UNIT - I

Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT - II

Needs for Electrical Energy Storage: Emerging needs for EES, More renewable energy, less fossil fuel, Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

UNIT - III

Features of Energy Storage Systems: Classification of EES systems , Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES),Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2),Synthetic natural gas (SNG).

UNIT - IV

Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors (DLC) ,Superconducting magnetic energy storage (SMES),Thermal storage systems ,Standards for EES, Technical comparison of EES technologies.

UNIT - V

Applications: Present status of applications, Utility use (conventional power generation, grid operation & service) , Consumer use (uninterruptable power supply for large consumers), New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batteries.

Text Books:

1. "James M. Eyer, Joseph J. Iannucci and Garth P. Corey ", "Energy Storage Benefits and Market Analysis", Sandia National Laboratories, 2004.
2. The Electrical Energy Storage by IEC Market Strategy Board.

Reference Book:

1. "Jim Eyer, Garth Corey", Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Sandia National Laboratories, Feb 2010

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B.Tech IV Year I Sem **L/T/P/C**
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1802PC12: ELECTRICAL MEASUREMENTS & INSTRUMENTATION

Course objectives:

- To introduce the basic principles of all measuring instruments
- To deal with the measurement of voltage, current, Power factor, power, energy and magnetic measurements.

Course Outcomes: After completion of this course, the student

- Understand different types of measuring instruments, their construction, operation and characteristics
- Identify the instruments suitable for typical measurements
- Apply the knowledge about transducers and instrument transformers to use them effectively.

UNIT- I

Introduction to Measuring Instruments: Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT– II

Potentiometers & Instrument transformers: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

UNIT –III

Measurement of Power & Energy: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active and reactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV

DC & AC bridges: Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge. Measurement of capacitance and loss angle –Desaunty's Bridge - Wien's bridge – Schering Bridge.

UNIT-V

Transducers: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.

Introduction to Smart and Digital Metering: Digital Multi-meter, True RMS meters, Clamp-on meters, Digital Storage Oscilloscope

TEXT BOOKS:

1. "G. K. Banerjee", "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
2. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements", BS Publications, 2012.

REFERENCE BOOKS:

1. "A. K. Sawhney", "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. "R. K. Rajput", "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. "Buckingham and Price", "Electrical Measurements", Prentice – Hall, 1988.
4. "Reissland, M. U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
5. "E.W. Golding and F. C. Widdis", "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**
3/1/0/3

1802PC13: MICROPROCESSORS & MICROCONTROLLERS

Course Objectives:

- To develop an understanding of the operations of microprocessors and micro controllers; machine language programming and interfacing techniques.

Course Outcomes:

- Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.
- Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.

UNIT - I

8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT - II

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT – III

I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232,USB.

UNIT – IV

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

UNIT – V

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, MHE, 2nd Edition 2006.
2. The 8051 Microcontroller, Kenneth. J. Ayala, Cengage Learning, 3rd Ed.
3. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012

REFERENCE BOOKS:

1.Microprocessors and Interfacing, D. V. Hall, MGH, 2nd Edition 2006.
2.Introduction to Embedded Systems, Shibu K.V, MHE, 2009
3.The 8051 Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

0/0/3/1.5

1802PC69: ELECTRICAL MEASUREMENTS & INSTRUMENTATION LAB

Course Objectives:

- To calibrate LPF Watt Meter, energy meter, P. F Meter using electro dynamo meter type instrument as the standard instrument
- To determine unknown inductance, resistance, capacitance by performing experiments on D.C Bridges & A. C Bridges
- To determine three phase active & reactive powers using single wattmeter method practically
- To determine the ratio and phase angle errors of current transformer and potential transformer.

Course Outcomes: After completion of this lab the student is able to

- to choose instruments test any instrument
- find the accuracy of any instrument by performing experiment
- calibrate PMMC instrument using D.C potentiometer

The following experiments are required to be conducted as compulsory experiments

1. Calibration and Testing of single phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Dielectric oil testing using H.T. testing Kit.
6. Schering bridge & Anderson bridge.
7. Measurement of 3 - Phase reactive power with single-phase wattmeter.
8. Measurement of displacement with the help of LVDT.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted

9. Calibration LPF wattmeter – by Phantom testing.
10. Measurement of 3-phase power with single watt meter and two CTs
11. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given CT by Null method.
12. PT testing by comparison **– V. G.** as Null detector – Measurement of % ratio error and phase angle of the given PT
13. Resistance strain gauge – strain measurements and Calibration.
14. Transformer turns ratio measurement using AC bridges.
15. Measurement of % ratio error and phase angle of given CT by comparison.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

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1802PC70: MICROPRECESSORS & MICROCONTROLLERS LAB

Note: - Minimum of 12 experiments to be conducted.

The following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits

List of Experiments:

1. Programs for 16 bit arithmetic operations 8086(using various addressing modes)
2. Programs for sorting an array for 8086.
3. Programs for searching for a number of characters in a string for 8086.
4. Programs for string manipulation for 8086.
5. Programs for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessor kits using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify interrupt handling in 8051.
13. UART operation in 8051.
14. Communication between 8051 kit and PC
15. Interfacing LCD to 8051
16. Interfacing Matrix/Keyboard to 8051
17. Data transfer from peripheral to memory through DMA controller 8237/8257

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

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1800MC06: INDIAN TRADITIONAL KNOWLEDGE

Course Objectives:

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

Course Outcomes:

- After completion of the course, students will be able to:
- 1. Upon completion of the course, the students are expected to:
- 2. Understand the concept of Traditional knowledge and its importance
- 3. Know the need and importance of protecting traditional knowledge.
- 4. Know the various enactments related to the protection of traditional knowledge.
- 5. Understand the concepts of Intellectual property to protect the traditional knowledge.

UNIT 1

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT : II

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT : III

Legal frame work and TK:

A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act);

B: The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT : IV:

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT : V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE- IV

1802PE10: POWER SYSTEMS ANALYSIS

Course Objectives:

- To understand and develop Ybus and Zbus matrices
- To know the importance of load flow studies and its importance
- To analyse various types of short circuits
- To know rotor angle stability of power systems

Course Outcomes:

- After this course, the student will be able to Develop the Ybus and Zbus matrices
- Analyze load flow for various requirements of the power system
- Analyze short circuit studies for the protection of power system
- Estimate stability and instability in power systems

UNIT - I Power System Network Matrices: Graph Theory: Definitions and Relevant concepts in Graph Theory, Network Matrices. Transmission Network Representations: Bus Admittance frame and Bus Impedance frame. Formation of Ybus: Direct and Singular Transformation Methods, Numerical Problems. Formation of ZBus: Modification of existing ZBus Matrix for addition of a new branch, & complete ZBus building algorithm Numerical Problems.

UNIT – II Power Flow Studies – I: Introduction: Necessity of Power Flow Studies, Bus classification and Notations, Convergence & Bus mismatch criteria. Load Flow Methods: Gauss-Seidal Method in complex form without & with voltage control buses, line flows and loss calculations, Newton Raphson method in Polar and Rectangular form, derivation of Jacobian elements, Numerical Problems for one or two iterations.

UNIT – III Power Flow Studies - II: Introduction to sensitivity & decoupled sub matrices of J-matrix, Decoupled load flow method and its assumptions, Fast Decoupled load method and its assumptions, Comparison of Different Methods – DC load Flow method, Numerical problems for one or two iterations.

UNIT – IV Short Circuit Analysis: Per-Unit Systems. Per-Unit equivalent reactance network of a three phase Power System, Numerical Problems. Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors, Numerical Problems. Symmetrical Components, sequence impedances and networks, Numerical Problems. Unsymmetrical Fault Analysis: Fault current calculations for LG, LL, LLG faults with and without fault impedance, Numerical Problems.

UNIT – V Power System Stability Analysis: Introduction to Power System Stability issues. Rotor dynamics & Swing equation, Power angle equation with & without neglecting line resistance, Steady State Stability, Determination of Transient Stability through Equal Area Criterion for single machine infinite system, Critical clearing angle & time, Numerical problems. Multimachine transient analysis: Classical representation of system and its assumptions, Solution of Swing Equation by Point-by-Point Method, Methods to improve Stability.

TEXT BOOKS:

1. "I. J. Nagrath & D. P. Kothari", "Modern Power system Analysis", Tata McGraw-Hill Publishing Company, 4th Edition 2011.
2. "Hadi Saadat", "Power System Analysis", TMH Edition, 2002.

REFERENCE BOOKS:

1. "M. A. Pai", "Computer Techniques in Power System Analysis", TMH Publications, 3 rd Edition 2014.
2. Grainger and Stevenson, "Power System Analysis", Tata McGraw Hill, 2003.
3. Abhijit Chakrabarthi and Sunita Haldar, "Power System Analysis Operation and Control", 3rd Edition, PHI, 2010.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE- IV

1802PE11: POWER SEMICONDUCTOR DRIVES

Course Objectives:

- To introduce the drive system and operating modes of drive and its characteristics
- To understand Speed – Torque characteristics of different motor drives by various power converter topologies
- To appreciate the motoring and braking operations of drive
- To differentiate DC and AC drives

Course Outcomes: After completion of this course the student is able to

- Identify the drawbacks of speed control of motor by conventional methods.
- Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits
- Understand Ac motor drive speed–torque characteristics using different control strategies its merits and demerits
- Describe Slip power recovery schemes

UNIT - I

Control of DC Motors

Introduction to Thyristor controlled Drives, Single Phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d.c motors.

Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT - II

Four Quadrant Operation of DC Drives

Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic, and Regenerative Braking operations. Four quadrant operation of D.C motors by single phase and three phase dual converters – Closed loop operation of DC motor (Block Diagram Only)

Control of DC Motors By Choppers: Single quadrant, Two quadrant and four quadrant chopper fed dc separately excited and series motors – Continuous current operation – Output voltage and current wave forms – Speed and torque expressions – speed-torque characteristics – Problems on Chopper fed D.C Motors – Closed Loop operation (Block Diagram Only)

UNIT - III

Control of Induction Motor

Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics. Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters- PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT - IV

Rotor Side Control of Induction Motor

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages, applications, problems.

UNIT - V

Control of Synchronous Motors

Separate control and self-control of synchronous motors – Operation of self-controlled synchronous motors by VSI, CSI and cyclo converters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control - Cyclo converter, PWM based VSI & CSI.

TEXT BOOKS:

1. "G K Dubey", Fundamentals of Electric Drives, CRC Press, 2002.
2. "Vedam Subramanyam", Thyristor Control of Electric drives, Tata McGraw Hill Publications, 1987.

REFERENCES:

1. "S K Pillai", A First course on Electrical Drives, New Age International (P) Ltd. 2nd Edition. 1989
2. "P. C. Sen", Thyristor DC Drives, Wiley-Blackwell, 1981
3. "B. K. Bose", Modern Power Electronics, and AC Drives, Pearson 2015.
4. "R. Krishnan", Electric motor drives - modeling, Analysis and control, Prentice Hall PTR, 2001

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year I Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE- IV

1802PE12: DIGITAL CONTROL SYSTEMS

Course Objectives:

- To understand the fundamentals of digital control systems, z-transforms
- To understand state space representation of the control systems, concepts of controllability and observability
- To study the estimation of stability in different domains
- To understand the design of discrete time control systems, compensators, state feedback controllers, state observers through various transformations

Course Outcomes: After completion of this course, the student will be able to

- Carry map S-plane and Z-plane, do state-space analysis Carry stability analysis in S-domain and Z-domains
- Carry stability analysis through bilinear transformation and R-H criteria,design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers and design of state feedback controllers and observers,
- Apply the above concepts to real-world electrical and electronics problems and applications.

UNIT - I

Introduction To Digital Control Systems And Z-Transforms: Introduction - Merits and Demerits of Digital Control Systems - Practical aspects of the choice of sampling rate and Multirate sampling - Basic discrete time signals - Quantization – Sampling Theorem - Data Conversions and Quantization - Sampling process - Mathematical Modeling - Data Reconstruction and Filtering of sampled signals - Zero - Order Hold (ZOH).

z- Transform and Inverse z-Transform, Relationship between s - plane and z - plane - Difference equation - Solution by recursion and z-Transform - Pulse Transfer Functions of the ZOH and relationship between G(s) and G(z) - Bilinear Transformation.

UNIT- II

Input/output Analysis of Digital Control Systems: Pulse transfer function - z transform analysis of open loop, closed loop systems - Modified z Transform - transfer function - Stability of linear digital control systems - Stability tests – Jury Stability test.

Root loci - Frequency domain analysis - Bode plots - Gain margin and phase margin.

UNIT – III

Design of Controllers For I/O Model Digital Control Systems: Cascade and Feedback Compensation by continuous data controllers - Digital controllers - Design using Bilinear Transformation - Realization of Digital PID controllers, Design of Digital Control Systems based on Root Locus Technique.

UNIT – IV

State Space Analysis and State Feedback Control Design of Digital Control Systems:

State Equations of discrete data systems, solution of discrete state equations, State Transition Matrix: Computation methods for State Transition Matrix: z - transform method - Relation between State Equations and Pulse Transfer Functions.

Concepts on Controllability and Observability - Pole placement design by state feedback.

UNIT - V

Digital State Observer and Stability Analysis: Design of the full order and reduced order state observer, Design of Dead beat Controller - some case studies - Stability analysis of discrete time systems based on Lyapunov approach.

TEXT BOOKS:

1. K. Ogata, Discrete Time Control Systems, PHI/Addison - Wesley Longman Pte. Ltd., India, Delhi, 1995.

2. B. C Kuo, Digital Control Systems, 2nd Edition, Oxford University Press, Inc., 1992.

REFERENCE BOOKS:

1. F. Franklin, J.D. Powell, and M.L. Workman, Digital control of Dynamic Systems, Addison - Wesley Longman, Inc., Menlo Park, CA , 1998.

2. M. Gopal, Digital Control and State Variable Methods, Tata McGraw Hill, India, 1997.

3. C. H. Houpis and G.B. Lamont, Digital Control Systems, McGraw Hill, 1985.

4. John S. Baey, Fundamentals of Linear State Space Systems, McGraw Hill, 1st edition 1999

5. Bernard Fried Land, Control System Design, McGraw Hill, 1st edition 1986.

6. Dorsay, Continuous and Discrete Control Systems, McGraw Hill, 2001.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year II Sem **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE- V

1802PE13: POWER QUALITY & FACTS DEVICES

Course Objectives:

- Definition of power quality and different terms of power quality.
- Study of voltage power quality issue – short and long interruption.
- To understand the fundamentals of FACTS Controllers,
- To know the importance of controllable parameters and types of FACTS controllers & their benefits
- To understand the objectives of Shunt and Series compensation
- To Control STATCOM and SVC and their comparison and the regulation of STATCOM, Functioning and control of GCSC, TSSC and TCSC

Course Outcomes: After completion of this course, the student will be able to:

- Know the severity of power quality problems in distribution system
- Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage)
- Concept of improving the power quality to sensitive load by various mitigating custom power devices
- Choose proper controller for the specific application based on system requirements
- Understand various systems thoroughly and their requirements
- Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping
- Understand the Power and control circuits of Series Controllers GCSC, TSSC and TCSC

UNIT – I

Introduction: Introduction of the Power Quality (PQ) problem, Terms used in PQ: Voltage, Sag, Swell, Surges, Harmonics, over voltages, spikes, Voltage fluctuations, Transients, Interruption, overview of power quality phenomenon, Remedies to improve power quality, power quality monitoring.

UNIT – II

Long & Short Interruptions: Interruptions – Definition – Difference between failures, outage, Interruptions – causes of Long Interruptions – Origin of Interruptions – Limits for the Interruption

frequency – Limits for the interruption duration – costs of Interruption – Overview of Reliability evaluation to power quality, comparison of observations and reliability evaluation.

Short interruptions: definition, origin of short interruptions, basic principle, fuse saving, voltage magnitude events due to re-closing, voltage during the interruption, monitoring of short interruptions, difference between medium and low voltage systems. Multiple events,

single phase tripping – voltage and current during fault period, voltage and current at post fault period, stochastic prediction of short interruptions.

UNIT- III

Facts Concepts: Transmission interconnections power flow in an AC system, loading capability limits, Dynamic stability considerations, importance of controllable parameters, basic types of FACTS controllers, and benefits from FACTS controllers.

UNIT- IV

Objectives of shunt compensation, midpoint voltage regulation, voltage instability prevention, improvement of transient stability, Power oscillation damping, Methods of controllable var generation, variable impedance type static var generators, switching converter type var generators and hybrid var generators

UNIT – V

SVC: FC-TCR and TSC-TCR. STATCOM: The regulation and slope. Comparison between SVC and STATCOM

Static Series Compensators: Objectives of Series compensation, concept of series capacitive compensation, GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC) control schemes for GSC TSSC and TCSC.

Text Books:

1. "N.G. Hingorani and L. Guygi", Understanding FACTS Devices, IEEE Press Publications 2000.
2. "Yong- Hua Song, Allan Johns", Flexible AC Transmission System, IEE Press 1999.
3. "Math H J Bollen", "Understanding Power Quality Problems" , IEEE Press, 2000.
4. "R. Sastry Vedam and Mulukutla S. Sarma", "Power Quality VAR Compensation in Power Systems", CRC Press, 2008.

Reference Books:

1. "Kalyan K. Sen and Meylingsen", Introduction to FACTS Controllers, John wiley& sons, Inc., Mohamed E.EI – Hawary Series editor, 2009.
2. "K. R Padiyar, Motilal",FACTS controllers in power transmission and distribution UK Books of India 2007.
3. C. Sankaran, Power Quality, CRC Press 2001.
4. Roger C. Dugan , Mark F. Mc Granaghan, Surya Santoso, H. Wayne Beaty, Electrical Power Systems Quality, Tata McGraw Hill Education Private Ltd, 3rd Edition 2012.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year II Sem **L/T/P/C**

3/0/0/3

PROFESSIONAL ELECTIVE- V

1802PE14: ELECTRICAL MACHINE DESIGN

Objective:

Principle of operation of various electrical machines is covered in detail in the previous courses of electrical machines. The objective of this course is to make student understand and appreciate the design aspects of various electrical machines (transformer, dc machine, induction motor and synchronous machine) used in the power system.

UNIT–I:

Introduction to Electrical Machine Design

Design concepts, factors, Material Selection, Manufacturing techniques.
Review of basic Principles, Heating & Cooling Techniques.

Armature Windings (DC & AC)

Single layer winding, two layer winding, lap and wave windings, concept of pole pitch, emf generation -full pitch coil, fractional pitch coil and concentrated winding.

UNIT–II:

DC Machines

Constructional details – Output equation - Choice of specific electric and magnetic loadings – Separation of D and L for rotating machines. Estimation of number of conductors / turns- Coils – armature Slots – Conductor dimension – Slot dimension. Choice of number of poles – Length of air gap – Design of field system, Interpoles, Commutator and Brushes.

UNIT-III

Transformers –I

Construction – Comparison of Core and Shell type, Single and Three phase transformer comparison. Core and Yoke Design – cross section, construction, cooling of transformers, Number of tubes.

Transformers – II

Transformer windings, Coil design, Output equation, determination of number of turns and length of mean turn of winding, Resistance, Leakage reactance, no load current calculation, losses and efficiency.

UNIT -IV

Induction Motors – I

Principles of operation, choice of specific electric and magnetic loadings, Stator Design (Frames), output equation, choice of conductor rating, stator winding, stator slots.

Induction Motors – II

Squirrel cage rotor design - air gap length, rotor slots and rotor bars. Design of wound rotor - rotor slots, windings, short circuit (blocked rotor currents).

UNIT–V:

Synchronous Machines

Constructional features – short circuit ratio– Output equation – Specific loadings – Main dimensions – Stator design – Design of Salient Pole field coil.

TEXTBOOKS:

1. "Electrical Machine Design", Sawhney, Dhanpath Rai.

REFERENCEBOOKS:

1. "Performance and Design of DC Machines", Clayton & Hancock, ELBS.

2. "Performance and Design of AC Machines", M.G.Say; Pitman, ELBS.

MALLAREDDY ENGINEERING COLLEGE FOR WOMEN

B.Tech IV Year II Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE- V

1802PE15: ELECTRICAL DISTRIBUTION SYSTEMS

Course Objectives:

- To understand the characteristics of load forecasting in distribution systems Design of feeders and Substations
- To understand the Performance of a Distribution System i.e Voltage drop & Power loss calculations. Protection of Distribution System & Co ordination of Protective Devices
- To study the Voltage Control & Compensation Techniques.

Course Outcomes:

After this course, Student will able to,

- Identify the load curve characteristics for distribution systems.
- Demand forecasting in distribution systems, secondary distribution systems, primary feeders-radial & loop type.
- Understand the Loading of feeder and its voltage level. Location of substations with its ratings.
- Voltage drop and power loss in lines with uniform and non-uniform loads for a radial net-work.
- Fault current calculations in distribution systems. Latest power control & compensation techniques.

UNIT – I

GENERAL CONCEPTS

Introduction to distribution system, Distribution system planning, Factors effecting the Distribution system planning, Load modelling and characteristics. Coincidence factor - contribution factor - Loss factor – Relationship between the load factor and loss factor. Load growth, Classification of loads (Residential, commercial, Agricultural and Industrial) and their characteristics.

DISTRIBUTION FEEDERS:

Design Considerations of Distribution Feeders: Radial, loop and network types of primary feeders, Introduction to low voltage distribution systems (LVDS) and High voltage distribution systems (HVDS), voltage levels, Factors effecting the feeder voltage level, feeder loading, Application of general circuit constants (A,B,C,D) to radial feeders, basic design practice of the secondary distribution system, secondary banking, secondary network types, secondary mains.

UNIT-II:

SUBSTATIONS

Location of Substations: Rating of distribution substation, service area with ‘n’ primary feeders. Benefits derived through optimal location of substations. Optimal location of Substations (Perpendicular bisector rule and X, Y coordinate method). System Analysis: Voltage drop and power-loss calculations: Derivation for voltage drop and power loss in lines, manual methods of solution for radial networks, three phase balanced primary lines, analysis of non-three phase systems, method to analyze the distribution feeder cost.

UNIT-III:

PROTECTION

Objectives of distribution system protection, types of common faults and procedure for fault calculations, over current Protective Devices: Principle of operation of Fuses, Auto-Circuit Recloser - and Auto-line sectionalizes, and circuit breakers.

COORDINATION:

Coordination of Protective Devices: Objectives of protection co-ordination, general coordination procedure, Types of protection coordination: Fuse to Fuse, Auto-Recloser to Fuse, Circuit breaker to Fuse, Circuit breaker to Auto- Recloser..

UNIT-IV:

COMPENSATION FOR POWER FACTOR IMPROVEMENT

Capacitive compensation for power-factor control - Different types of power capacitors, shunt and series capacitors, effect of shunt capacitors (Fixed and switched), effect of series capacitors, difference between shunt and series capacitors, Calculation of Power factor correction, capacitor allocation - Economic justification of capacitors - Procedure to determine the best capacitor location.

UNIT-V:

VOLTAGE CONTROL

Voltage Control: Importance of voltage control, methods of voltage control, Equipment for voltage control, effect of shunt capacitors, effect of series capacitors, effect of AVB/AVR on voltage control, line drop compensation, voltage fluctuations.

TEXT BOOKS

1. "Electric Power Distribution system, Engineering" – by Turan Gonen, CRC Press.

2. Electrical Power Distribution Systems – by V Kama Raju Tata Mc Graw-hill Publishing

Com-pany, 2nd edition, 2010.

REFERENCE BOOKS

2. Electrical Power Distribution and Automation by S.Sivanagaraju, V.Sankar, Dhanpat Rai & Co, 2006

3. Electric Power Distribution – by A.S. Pabla, Tata Mc Graw-hill Publishing company, 4th edition, 1997.

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PROFESSIONAL ELECTIVE- VI

1802PE16: EHV AC TRANSMISSION SYSTEMS

Course objectives:

- To identify the different aspects of Extra High Voltage A.C and DC Transmission design and analysis.
- To understand the importance of modern developments of EHV and UHV transmission systems.
- To demonstrate EHV AC transmission system components, protection and insulation level for over voltages.

Course Outcomes:Upon the completion of this course, the student will be able to

- Understand the importance of EHV AC transmission
- Estimate choice of voltage for transmission, line losses and power handling capability of EHV Transmission.
- Analyse by applying the statistical procedures for line designs, scientific and engineering principles in power systems.

UNIT- I:

E.H.V.A.C. Transmission line trends and preliminary aspect standard transmission voltages – Estimation at line and ground parameters-Bundle conductor systems-Inductance and Capacitance of lines – positive, negative and zero sequence impedance – Line Parameters for Modes of propagation.

UNIT- II:

Electrostatic field and voltage gradients – calculations of electrostatic field of AC lines – effect of high electrostatic field on biological organisms and human beings – surface voltage gradients and maximum gradients of actual transmission lines – voltage gradients on sub conductor.

UNIT- III:

Electrostatic induction in unenergized lines – measurement of field and voltage gradients for three phase single and double circuit lines – unenergized lines. Power Frequency Voltage control and overvoltages in EHV lines: No load voltage – charging currents at power frequency-voltage control – shunt and series compensation – static VAR compensation.

UNIT – IV:

Corona in E.H.V. lines – Corona loss formulae- attention of traveling waves due to Corona – Audio noise due to Corona, its generation, characteristic and limits. Measurements of audio noise radio interference due to Corona – properties of radio noise – frequency spectrum of RI fields – Measurements of RI and RIV.

UNIT- V:
Design of EHV lines based on steady state and transient limits – EHV cables and their characteristics.

TEXT BOOKS:

- R. D. Begamudre, "EHVAC Transmission Engineering", New Age International (p) Ltd. 3rd Edition.
- K.R. Padiyar, "HVDC Power Transmission Systems" New Age International (p) Ltd. 2nd revised Edition, 2012.

REFERENCES:

- S. Rao "EHVAC and HVDC Transmission Engineering. Practice" Khanna publishers.
- Arrillaga. J "High Voltage Direct Current Transmission" 2nd Edition (London) Peter Peregrines, IEE, 1998.
- Padiyar. K.R, "FACTS Controllers in Power Transmission and Distribution" New Age International Publishers, 2007.
- Hingorani H G and Gyugyi. L "Understanding FACTS-Concepts and Technology of Flexible AC Transmission Systems" New York, IEEE Press, 2000.

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PROFESSIONAL ELECTIVE- VI

1802PE17: UTILISATION OF ELECTRICAL ENERGY

Course Objectives:

- To understand the fundamentals of illumination and good lighting practices
- To understand the methods of electric heating and welding.
- To understand the concepts of electric drives and their application to electrical traction systems.

Course Outcomes: After completion of this course, the student will be able to

- Acquire knowledge on, electric drives characteristics and their applicability in industry based on the nature of different types of loads and their characteristics
- understands the concepts and methods of electric heating, welding, illumination and electric traction
- apply the above concepts to real-world electrical and electronics problems and applications.

UNIT – I

Electric Drives: Type of electric drives, choice of motor, starting and running characteristics, speed control, temperature rise, particular applications of electric drives, types of industrial loads, continuous, intermittent and variable loads, load equalization.

UNIT – II

Electric Heating: Advantages and methods of electric heating, resistance heating induction heating and dielectric heating.

Electric Welding: Electric welding, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding.

UNIT – III

Illumination: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light.

Various Illumination Methods: Discharge lamps, MV and SV lamps – comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

UNIT – IV

Electric Traction – I: System of electric traction and track electrification. Review of existing

electric traction systems in India. Special features of traction motor, methods of electric braking-plugging rheostat braking and regenerative braking.
Mechanics of train movement. Speed-time curves for different services – trapezoidal and quadrilateral speed time curves.

UNIT – V

Electric Traction-II: Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

Text books:

1. E. Openshaw Taylor, Utilisation of Electric Energy – by University press, 1961.

2. Partab, H., 'Art and Science of Utilisation of Electrical Energy', Dhanpat Rai and Sons, New Delhi, 1986.

Reference books:

1. N. V. Suryanarayana, Utilization of Electrical Power including Electric drives and Electric traction, New Age International (P) Limited, Publishers, 1996.

2. C. L. Wadhwa, Generation, Distribution and Utilization of electrical Energy, New Age International (P) Limited, Publishers, 1997.

3. Tripathy, S.C., 'Electric Energy Utilisation and Conservation', Tata McGraw Hill Publishing Company Ltd. New Delhi, 1991.

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PROFESSIONAL ELECTIVE- VI

1802PE18: PROGRAMMABLE LOGIC CONTROLLER & APPLICATIONS

Course Objective: To introduce interfacing data acquisition systems to PC and introducing PLCs with their classification, operation, and programming.

UNIT – I

Introduction to Computer Instrument Communication: Personal Computer, overview of operating System, I/O Ports, Plug-in-slots, PCI bus, Operators Interface. Computer Interfacing for Data Acquisition and Control – Interfacing Input Signals, Output system with continuous actuators. Data Acquisition and Control using Standard Cards: PC expansion systems, Plug-in Data Acquisition Boards; Transducer to Control room, Backplane bus – VXI.

UNIT – II

Programmable logic controller (PLC) basics: Definition, overview of PLC systems, input/output modules, power supplies, and isolators.

Basic PLC programming: Programming On-Off inputs/ outputs. Creating Ladder diagrams Basic PLC functions PLC Basic Functions, register basics, timer functions, counter functions.

UNIT – III

PLC intermediate and advanced functions: Arithmetic functions, number comparison functions, Skip and MCR functions, data move systems. Utilizing digital bits, sequencer functions, matrix functions. PLC Advanced functions: Analog PLC operation, networking of PLC.

UNIT – IV

Application of PLC: Controlling of Robot using PLC, PID control of continuous processes, Continuous Bottle-filling system, Batch mixing system, 3-stage air conditioning system, Automatic frequency control of Induction heating

UNIT – V

Related Topics: Alternate programming languages. Auxiliary commands and functions. PLC installation, troubleshooting, and maintenance. Field bus: Introduction, concept. HART protocol: Method of operation, structure, and applications. Smart transmitters, smart valves, and smart actuators.

TEXT BOOKS

i) Programmable Logic Controllers – Principles and Applications, John. W .Webb Ronald A Reis , Fourth edition, Prentice Hall Inc., New Jersey, 1998.
ii) Computer Control of Processes – M.Chidambaram. Narosa 2003.

REFERENCES

i) PC Based Instrumentation and Control Third Edition by Mike Tooley ; Elsevier.
ii) PC Interfacing and Data Acquisition Techniques for Measurement, Instrumentation, and Control. By Kevin James; Elsevier.
iii) Practical Data Acquisition for Instrumentation and Control Systems by John Park and Steve Mackay.
iv) Distributed Control Systems, Lukcas M.P, Van Nostrand Reinhold Co., New York, 1986.
v) 5. Programmable Logic Controllers, Second edition, Frank D. Petruzella, Mc Graw Hill, New York, 1997.
vi) Programmable Logic Controllers Programming methods and applications-Prentice Hall by John R. Hackworth and Frederick D. Hackworth, Jr.