ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2022-23 onwards

Department of Electrical and Electronics Engineering

For

B.Tech. - Four Year Degree Programme

(MR22 Regulation)

Department of Electrical and Electronics Engineering

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)

(An UGC Autonomous Institution, Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad). Accredited 3rd time by **NAAC with 'A++'** Grade, **NIRF** Rank Band 250-300, **ARIIA** Band Performer, **NBA Tier –I** Accredited
Maisammaguda, Dhulapally (Post ViaKompally), Secunderabad - 500 100.
Website: www.mrec.ac.in E-mail: principal@mrec.ac.in

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
MR21 – ACADEMIC REGULATIONS (CBCS)
for B.Tech. (REGULAR) DEGREE PROGRAMME

Applicable for the students of B.Tech. (Regular) programme admitted from the Academic Year ***2022-23*** onwards

The B.Tech. Degree of Jawaharlal Nehru Technological University Hyderabad, Hyderabad shall be conferred on candidates who are admitted to the programme and who fulfill all the requirements for the award of the Degree.

VISION

To be a premier center of professional education and research, offering quality programs in a socio-economic and ethical ambience.

MISSION

- To impart knowledge of advanced technologies using state-of-the-art infrastructural facilities.
- To inculcate innovation and best practices in education, training and research.
- To meet changing socio-economic needs in an ethical ambience.

DEPARTMENT VISION

- To become a reputed centre for imparting quality education and research in the field of Electrical and Electronics Engineering with human values, ethics and social responsibility.

DEPARTMENT MISSION

- To impart quality education and research to undergraduate and postgraduate students in Electrical and Electronics Engineering.
- To produce professionally competent and ethically committed engineers to meet changing socio-economic needs.
- To impart knowledge of advanced technologies for continual improvement in teaching, learning and research.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Graduates will utilize analytical skills, problem solving skills and design skills which are necessary for a successful career in the diverse fields of Electrical and Electronics Engineering.
PEO 2	Graduates will be receptive to new technologies and attain professional competence through lifelong learning such as post graduate programmes, research, publications and other professional activities.
PEO 3	Graduates will possess excellent communication, team work skills, leadership qualities, along with good professional and ethical attitude.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	Apply fundamental knowledge to identify, formulate, design and investigate various problems of electrical and electronic circuits, power electronics, power systems and renewable energy systems for specific requirements.
PSO2	Demonstrate proficiency in use of modern software tools & hardware to engage in life-long learning and to successfully adapt in multi-disciplinary environments.
PSO3	Solve ethically and professionally various Electrical Engineering problems in societal and environmental context and communicate effectively.

PROGRAMME OUTCOMES (POs)

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B.Tech.

ELECTRICAL AND ELECTRONICS ENGINEERING

MR22 COURSE STRUCTURE and SYLLABUS

(Students Joined in AY 2022-23)

MALLA REDDY ENGINEERING COLLEGE

COURSE STRUCTURE – B.Tech. Electrical and Electronics Engineering Programme.
(MR22 Regulations - Effective from Academic Year 2022 – 22 onwards)

SEMESTER – I							
S. No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	HSMC	C0H01	English	3	-	-	3
2.	BSC	C0B03	Linear Algebra and Applied Calculus	3	1	-	4
3.	ESC	C0501	Programming for Problem Solving	3	-	-	3
4.	PCC	C0201	Basic Electrical and Electronics Engineering	3	-	-	3
5.	ESC	C0502	Programming for Problem Solving Lab	-	-	2	1
6.	HSMC	C0H02	English Language and Communication Skills Lab	-	-	2	1
7.	ESC	C0302	Engineering Workshop	-	-	2	1
8.	PCC	C0202	Basic Electrical and Electronics Engineering Lab	-	-	2	1
			Total	**12**	**1**	**8**	**17**
			Total Contact Hours	**21**			

SEMESTER – II							
S. No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	BSC	C0B17	Engineering Chemistry	3	1	-	4
2.	ESC	C0305	Engineering Graphics	2	-	2	3
3.	BSC	C0B10	Applied Physics	3	1	-	4
4.	BSC	C0B04	Advanced Calculus	3	1	-	4
5.	ESC	C0401	Analog Electronics	3	-	-	3
6.	ESC	C0553	Basic Python Programming Lab	-	1	2	2
7.	BSC	C0B11	Applied Physics Lab	-	-	2	1
8.	BSC	C0B18	Engineering Chemistry Lab	-	-	2	1
9.	ESC	C0402	Analog Electronics Lab	-	-	2	1
			Total	**14**	**4**	**10**	**23**
			Total Contact Hours	**28**			

MALLA REDDY ENGINEERING COLLEGE

COURSE STRUCTURE – B.Tech. Electrical and Electronics Engineering Programme.
(MR22 Regulations - Effective from Academic Year 2022 – 22 onwards)

SEMESTER – III							
Sl. No.	**Category**	**Course Code**	**Name of the Subject**	**L**	**T**	**P**	**Credits**
1	BSC	C0B08	Complex Variables and Numerical Methods	3	-	-	3
2	ESC	C0403	Digital Electronics	3	-	-	3
3	ESC	C0314	Fluid Mechanics and Hydraulic Machines	3	-	-	3
4	PCC	C0203	Electrical Circuit Analysis and Synthesis	2	1	-	3
5	PCC	C0204	Electromagnetic Fields	3	-	-	3
6	ESC	C0561	Fundamentals of Data Structures Lab	-	1	2	2
7	ESC	C0407	Digital Electronics Lab	-	-	2	1
8	PCC	C0205	Electrical Circuits Lab	-	-	4	2
9	MC	C00M2	Environmental Science	2	-	-	-
Total				16	2	8	**20**
Total Contact Hours				**26**			

SEMESTER – IV							
Sl. No.	**Category**	**Course Code**	**Name of the Subject**	**L**	**T**	**P**	**Credits**
1	HSMC	C0H08	Engineering Economics & Accountancy	3	-	-	3
2	ESC	C0460	Signals and Systems	3	-	-	3
3	PCC	C0206	Power Generation and Distribution	3	-	-	3
4	PCC	C0207	DC Machines and Transformers	2	1	-	3
5	PCC	C0208	Control Systems	2	1	-	3
6	ESC	C0461	Basic Simulation Lab	-	-	3	1.5
7	PCC	C0209	DC Machines Lab	-	-	3	1.5
8	ESC	C0562	Object Oriented Programming Lab	-	-	2	1
9	MC	C00M1	Gender Sensitization	-	-	2	-
10	PROJ	C00P1	Real-time Research Project/ Field Based Project	-	-	1	1
Total				13	2	11	**20**
Total Contact Hours				**26**			

SEMESTER – I

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: C0H01	ENGLISH (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	L	T	P
Credits: 3		3	-	-

Course Objectives:

The objective of this course is to improve the English Language and Literary competence of the students. The course provides requisite insights into grammar, vocabulary, prose, and short stories. Further, it also helps in developing the skills of Reading and Writing. The course also equips students to study their academic subjects more effectively using the theoretical and practical components of the English language and literature.

MODULE – I

Speech : "Go Kiss the World" by Subroto Bagchi
Poem : **"**Leisure" by W. H. Davies
Vocabulary : Formation of Words, Roots, Prefixes, Suffixes
Grammar : Articles and Prepositions
Reading : Skimming and Scanning
Writing : Introduction to Writing Skills, Characteristics of Effective Writing

MODULE – II

Short story : "Gift of Magi" by O' Henry
Poem : **"**No Man is an Island" by John Donne
Vocabulary : One Word Substitutions; Synonyms and Antonyms
Grammar : Degrees of Comparison, Active and Passive Voice
Reading : Intensive Reading and Extensive Reading
Writing : Paragraph Writing- Cohesive devices; Jumbled Sentences; Punctuation

MODULE – III

Essay : **"**Lucidity, Simplicity, Euphony" by W. Somerset Maugham
Poem : **"**We wear the Mask" by Paul Laurence Dunbar
Grammar : Tense and Aspect
Vocabulary : Homonyms, Homophones, Homographs
Reading : Reading for Topic and Theme
Writing : Letter Writing

MODULE – IV

Short story : "The Night Train at Deoli" by Ruskin Bond
Poem : **"**Gift of India" by Sarojini Naidu
Grammar : Question Tags; Concord
Vocabulary : Idiomatic Expressions; Phrasal Verbs

Reading : Reading for Interpretation
Writing : Essay Writing, Describing, Defining and Classifying

MODULE – V
Essay : "Toasted English" by R. K. Narayan
Poem : "If" by Rudyard Kipling
Grammar : Direct and Indirect Speech, Misplaced Modifiers
Vocabulary : Redundancies and Clichés
Reading : Reading for Specific Purposes, Reading Comprehension practice
Writing : Paraphrasing & Summarizing,

Prescribed Textbook:

Reference Books:

1. Azar, Betty and Stacy A, Hagen**.** *Understanding and Using English Grammar*. 4th edition, Foundation Books, 2009.
2. Chaudhuri, Santanu S. *Learn English: A Fun Book of Functional Language***,** *Grammar and Vocabulary.* Tata McGraw Hill Education, New Delhi, 2013.
3. Eastwod, John. *Oxford Guide to English Grammar*. 4th edition, Oxford University Press, 1994.
4. Field, Marion**.** *Improve Your Written English*. 5th Edition. How to Books, UK, 2009.
5. Leech, Geoffrey and Svartvik, J. *A Communicative Grammar of English*. 3rd edition, Routledge, 2013.

Related Websites:

1. http://www.slideshare.net/aszardini/word-formationroot-words-prefixes-and-suffixes
2. http://www.scribd.com/doc/37085980/Circulars-Circular-Letters-Notices-Memo#scribd.
3. http://www.zsme.tarnow.pl/jezykiobce/wp-content/uploads/2013/11/writing-letters1.pdf.

Course Outcomes:

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

1. Use written and spoken English considerably well for academic purposes.
2. Communicate in Enrich accurately and fluently.
3. Employ extensive and intensive reading skills.
4. Gain confidence in writing for academic and real life situations.
5. Use standard grammar, punctuation, and spelling in technical documents.
6.

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	**Programme Outcomes(POs)**														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	-	-	**1**	-	-	-	-	**2**	-	**2**	-	-	-
CO2	-	-	-	-	-	-	-	-	-	**1**	-	**2**	-	-	-
CO3	-	**1**	-	**1**	-	-	-	-	-	**2**	-	**2**	-	-	-
CO4	-	-	-	-	**1**	**1**	-	-	**1**	**2**	-	**2**	-	-	-
CO5	-	-	-	-	**1**	-	-	-	**1**	**2**	-	**2**	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0B03	Linear Algebra and Applied Calculus (Common For ECE & EEE)	L	T	-
Credits: 4		3	1	-

Prerequisites: Matrices, Differentiation and Integration.

Course Objectives:

1. To learn types of matrices, Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
2. To learn concept of Eigen values and Eigen vectors of a matrix, diagonalization of a matrix, Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. To learn the concept of the mean value theorems, partial differentiation and maxima and minima.
4. To learn methods of solving differential equations and its applications to basic engineering problems.
5. To learn series solution of the given differential equations.

MODULE I: Matrix Algebra [12 PERIODS]

VECTOR SPACE, BASIS, LINEAR DEPENDENCE AND INDEPENDENCE (ONLY DEFINITIONS)

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; solving system of Homogeneous and Non-Homogeneous linear equations, LU – Decomposition Method.

MODULE II: Eigen Values and Eigen Vectors [12 Periods]

Eigen values , Eigen vectors 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: Nature, rank, index and signature of the Quadratic Form, Linear Transformation and Orthogonal Transformation, Reduction of Quadratic form to canonical forms by Orthogonal Transformation Method. Singular Value Decomposition

Module -III: Differential Calculus [12 Periods]

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.

Functions of Several Variables: Limits, Continuity, Partial differentiation, partial derivatives of first and second order, Jacobian, Taylor's theorem of two variables (without proof). Maxima and Minima of two variables, Lagrange's method of undetermined Multipliers.

Module –IV: Ordinary Differential Equations [12 Periods]

First Order and First Degree ODE: Exact Differential Equations, Non Exact Differential Equations, Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Second and Higher Order ODE with Constant Coefficients: Introduction-Rules for finding complementary function and particular integral. Solution of Homogenous, non-homogeneous differential equations, Non-Homogeneous terms of the type e^{ax} , sin(ax), cos (ax), polynomials in x, e^{ax} V(x), x V(x), Method of variation of parameters.

Module – V: Series Solutions to the Differential Equations [12 Periods]

Motivation for series solution, Ordinary point and regular singular point of a differential equation, series solution to differential equation around zero, Frobenious Method about zero.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R K Jain Srk Iyengar ,Advanced engineering mathematics, Narosa publications.
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley publications.
4. Richard Bellman, Introduction to matrix Analysis, Siam, second Edition.

References Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,
   Reprint, 2008.
3. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, AffiliatedEast–West press, Reprint 2005.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint,2010.

E – RESOURCES:

1. https://www.youtube.com/watch?v=sSjB7ccnM_I (Matrices – System of linear Equations)
2. https://www.youtube.com/watch?v=h5urBuE4Xhg (Eigen values and Eigen vectors)
3. https://www.youtube.com/watch?v=9y_HcckJ96o (Quadratic forms)
4. http://www.math.cmu.edu/~wn0g/noll/2ch6a.pdf(Differential Calculus)
5. https://www.intmath.com/differential-equations/1-solving-des.php(Differential Equations)

NPTEL:

1. https://www.youtube.com/watch?v=NEpvTe3pFIk&list=PLLy_2iUCG87BLKl8eISe4fHKdE2_j2B_T&index=5 (Matrices – System of linear Equations)
2. https://www.youtube.com/watch?v=wrSJ5re0TAw (Eigen values and Eigen vectors)
3. https://www.youtube.com/watch?v=yuE86XeGhEA (Quadratic forms)

Course Outcomes:

1. The student will be able to find rank of a matrix and analyze solutions of system of linear equations.
2. The student will be able to find Eigen values and Eigen vectors of a matrix, diagonalization a matrix, verification of Cayley Hamilton theorem and reduce a quadratic form into a canonical form through a linear transformation.
3. The student will be able to verify mean value theorems and finding maxima and minima of function of two variables.
4. Formulate and solve the problems of first and higher order differential equations
5. The student will be able to solve series solution of given differential equation.

CO- PO Mapping

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COS	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	3	3	-	-	-	2	-	-	3
CO2	3	2	2	3	2	-	-	-	2	-	-	3
CO3	3	2	2	3	2	-	-	-	2	-	-	2
CO4	3	2	2	3	3	-	-	-	2	-	-	2
CO5	3	2	2	3	3	-	-	-	2	-	-	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0501	**Programming for Problem Solving** (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

1. Understand the basic terminology, write, compile and debug programs in computer programming
2. Implement different control statements for solving problems.
3. Understand the concept of structured program and arrays.
4. Implement the idea of strings and pointers.
5. Analyse the usage of structures and different file operations.

MODULE I: Fundamentals and Introduction to 'C' Language [10 Periods]

Introduction Fundamentals– Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

Introduction to 'C' Language: – Background, C-tokens- Keywords, Identifiers, Basic data types, Variables, Constants, Preprocessor directives-include, define, Managing Input / Output functions - formatted input / output functions, Operators. Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Simple C Programming examples.

MODULEII: Conditional Statements and Repetition Statements [09 Periods]
Conditional Statements: Simple if statement, if-else statement, if-elseif- ladder, nested if- else, Dangling else problem, switch statements.

Repetition statements – while, for, do-while statements, nested looping, other statements related to looping – break, continue, goto, Simple C Programming examples.

MODULE III: Designing Structured Programs and Arrays [10 Periods]
Designing Structured Programs-Introduction to function, Advantages, user defined functions, inter function communication-call by value, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion – recursive functions-Towers of Hanoi problem.

Arrays: Basic Concepts, Types of arrays, applications- Selection sort, Bubble sort, Insertion sort, Linear search and Binary search methods, arrays and functions.

MODULE IV: Strings and Pointers [09 Periods]

Strings: Concepts, String Input / Output functions, arrays of strings, string manipulation functions, string conversion, C program examples.

Pointers – Basic Concepts, Pointers for inter function communication-call by reference, pointers to pointers, Pointer arithmetic, array of pointers, pointers to array, applications, pointers to void, pointers to functions, Dynamic memory allocation functions.

MODULE V: Structures and File Handling [10 Periods]

Structures – Declaration, definition and initialization of structures, accessing structure elements, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, difference between structures and union, typedef, bit fields, enumerated types, C programming examples.

Files – Basic Concept of a file, file input / output operations, text files and binary files, file status functions (error handling), Random file access functions, command –line arguments.
C program examples.

TEXTBOOKS

1. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education

REFERENCES

1. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
2. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition
3. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

E–RESOURCES

1. http://oxford university press.ac.in/eBooks/ Programming in C.
2. https://www.journals.elsevier.com/science-of-computer-programming
3. http://www.ejournalofsciences.org
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. http://onlinevideolecture.com/ebooks/?subject=C-Programming

Course Outcomes:

At the end of the course, students will be able to

1. Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flowcharts to programs (in C language).

2. Apply different types of control structures to code and test a given logic in C programming language.
3. Decompose a problem into functions and to develop modular reusable code and Use arrays to formulate algorithms and programs for Searching and sorting problems.
4. Develop programs that make use of concepts such as strings, pointers.
5. Analyze structures, file operations and command line arguments.

CO- PO Mapping

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	1	3	2	2
CO2	3	2	1	-	-	-	-	-	-	-	-	1	3	2	1
CO3	3	3	1	-	-	-	-	-	-	-	-	1	3	2	1
CO4	3	1	-	-	-	-	-	-	-	-	-	2	3	2	1
CO5	3	3	1	-	-	-	-	-	-	-	-	2	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for all branches)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

MODULE I: DC Circuits **9 Periods**

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws - Series, parallel, series-parallel, star-to-delta and delta-to-star transformation-analysis of simple circuits with dc excitation. Superposition, Thevenin's and Maximum Power Transfer Theorems with DC excitation.

MODULE II: AC Circuits **9 Periods**

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).

MODULE III: Introduction to Electrical Machines **10 Periods**

A: DC Machines : Construction & Principle of Operation of DC Generators – E.M.F Equation. Principle of operation DC Motors – Back E.M.F. - Torque equation – Brake Test - Characteristics.

B: AC Machines: Construction and Principle of operation of Transformer- EMF Equation. Construction and Principle of Operation of 3 Phase Induction Motors - Brake test on 3-Phase Induction Motor – Applications.

MODULE IV: P-N Junction Diode **10 Periods**

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers : P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

Filters : Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

MODULE V: Bipolar Junction Transistor (BJT): **10 Periods**

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations and Input-Output Characteristics, Comparison of CE, CB and CC configurations

Junction Field Effect Transistor and MOSFET: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET.

Text Books

1. M.Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, **" Basic Electrical and Electronics Engineering"**, S.Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R.L.Boylestad and Louis Nashlesky, **"Electronic Devices & Circuit Theory"**, Pearson Education, 2007.

References

1. V.K. Mehtha and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Co., 2009.
2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), "Electronic Devices and Circuits", 3 rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, "Digital Fundamentals", Pearson Education, 2009.
4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, "Basic Electrical Engineering", Tata McGraw Hill, 2001.
6. Mittle N., "Basic Electrical Engineering", Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - Resources

1. https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/
2. https://www.eeweb.com/passives
3. http://nptel.ac.in/courses/108108076/
4. http://nptel.ac.in/downloads/108105053/

Course Outcomes:

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

1. Apply KCL, KVL and network theorems to analyse DC circuit.
2. Analyze the single-phase AC Circuits, the representation of alternating quantities and determining the power and power factor in these circuits.
3. Comprehend the construction and Operation of DC and AC machines.
4. Understand the operation of PN Junction diode and its application in rectifier circuits.
5. Compare the different configurations of BJT and draw the V-I characteristics of BJT, JFET and MOSFET.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	**Programme Outcomes (POs)**														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0502	Programming for Problem Solving Lab (Common for CE, EEE, ME, ECE, CSE, CSE (Cyber Security), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL

Course Objectives:

1. Understand the various steps in Program development
2. Identify syntax and semantics of C Programming Language
3. Illustrate the usage of structured programming approach in solving problems.
4. Develop programs that make use of arrays, strings and pointers in C language
5. Analyse structures and different file operations

Software Requirements: C

List of Programs:

1. a. Practice various Internal and External DOS Commands.
   b. Write sample examples of C programs to implement basic operations.
2. a. Write a C program to find smallest and largest of given three numbers.
   b. Write a C program to find the roots of a quadratic equation.
   c. Write a C program to check whether given character is alphabet, digit or special symbol
3. a. Write a C program to find the sum of individual digits of a positive integer.
   b. Write a C program to generate the first 'n' terms of the sequence.
   [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.]
4. a. Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
   b. Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.
5. Write C programs that use both recursive and non-recursive functions
   a. To find the factorial of a given integer.
   b. To find the GCD (greatest common divisor) of two given integers.
6. a. Write a C program to find both the largest and smallest number in a list of integers.
   b. Write a C program that uses non-recursive function to search for a Key value in a given list of integers using linear search.
   c. Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.
7. a. Write a C program that implements the Bubble sort method to sort a given array of integers in ascending order.
   b. Write a C program that implements the Selection sort method to sort a given list of names in ascending order.

8. Write a C program to perform the following:
   a. Addition of Two Matrices
   b. Multiplication of Two Matrices.
9. Write a C program that uses functions to perform the following operations:
   a. To insert a sub-string into given main string from a given position.
   b. To delete n characters from a given position in a given string.
   c. To find substring in a given string
10. a. Write a C program to determine if the given string is a palindrome or not
    b. Write a C program to count the lines, words and characters in a given text.
11. a. Write a C program to swap two numbers, which implement call by value and call by reference.
    b. Write a C program to display the below student details using structures

Roll Number	Name	Gender	Branch	Attendance percentage
501	John	Male	CSE	77.3
502	Alice	Male	ECE	80.5
503	Sam	Female	IT	90.7

    c. Write a C program to find grade of a student using structures.
12. a. Write a C program which copies one file to another
    b. Write a C program to find sum of two numbers using command line arguments
13. a. Develop a mini project which implement the Library Management System
    b. Develop a mini project which implement the Student Record System

TEXT BOOKS:

a. Computer Fundamentals and Programming in C, P. Dey, M Ghosh, Second edition, Oxford University Press
b. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Eighth Edition, Pearson Education.
c. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCES:

a. C Programming & Data Structures, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
b. C for Engineers and Scientists, H. Cheng, Mc. Graw-Hill International Edition
c. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press

Course Outcomes:

At the end of the course, students will be able to

1. Make use various programming constructs and to develop C programs

2. Implement different Operations on arrays, strings, functions, pointers in C programming language.
3. Analyze structures, unions and file in C language to develop Programs.

CO- PO Mapping

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	1	3	2	
CO2	3	2	1	-	-	-	-	-	-	-	-	1	3	3	1
CO3	2	3	1	-	-	-	-	-	-	-	-	1	3	2	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: C0H02	**English Language and Communication Skills Lab**	**L**	**T**	**P**
Credits: 1	**(Common for CE, EEE, ME, ECE, CSE, CSE (C S), CSE (AI and ML), CSE (DS), CSE (IOT), AI, IT and Mi.E)**	**-**	**-**	**2**

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 and contexts.

Course Objectives:

The course aims to develop students' intelligibility in their pronunciation of English - speech Sounds, word accent, intonation and rhythm. It also helps to improve the fluency in spoken English and make them aware of nuances of major skills, namely, listening and speaking skills. It also trains students to understand nuances of both verbal and non-verbal communication during all activities. The course enables the learners to develop their confidence levels so as to Participate in discussions, debates and public speaking. Listening Skills:

Objectives:

1. To enable students to develop their listening skill 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, awareness regarding stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives:

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Just A Minute (JAM) Sessions.

Syllabus: English Language and Communication Skills Lab has two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

Module - I:

CALL Lab : Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab : Ice-Breaking activity and JAM session; Listening: listening for sounds in context, for ideas;Speaking: ideation and translation of ideas into sentences.

Module - II:

CALL Lab : Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab : Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette; Listening: listening for specific purposes, for details; Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

Module - III:

CALL Lab : Word accent and Listening Comprehension-reading aloud meaningfully.

ICS Lab : Descriptions- Narrations- Giving Directions and guidelines; Listening: listening for intelligible English; Speaking: formal and informal conversations, register.

Module - IV:

CALL Lab : Intonation and Common errors in Pronunciation- reading aloud (evaluating through recording).

ICS Lab : Extempore- Public Speaking, Oral Presentation Skills; Listening: note taking and listening for speaker's tone/attitude; Speaking: organizing, connecting ideas and sentences, short forms in spoken English, errors in spoken English

Module - V:

CALL Lab : Reduction of Mother Tongue Interference and Conversation Practice

ICS Lab : Information Transfer, Debate

Minimum requirement of infrastructural facilities for EL Lab:
1. Computer Assisted Language Learning (CALL) Lab:
The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
a) P – IV Processor b) Speed – 2.8 GHZ c) RAM – 512 MB Minimum
d) Hard Disk – 80 GB e) Headphones of High quality
2. Interactive Communication Skills (ICS) Lab: The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.
Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the textbook which are loaded on the systems):

Prescribed Lab Manual:
Rani, Sudha. *English Language Communication Skills Laboratory*. 5th edition, Pearson Publication, 2014.

Reference Books:

1. Roach, Peter. English Phonetics and Phonology. 4th edition, Cambridge University Press, 2009.
2. Hughes, John and Mallett, Andrew. *Successful Presentations DVD and Student's Book Pack*. Oxford University Press, 2013.
3. Hancock, Mark. *English Pronunciation in Use* (Intermediate). 2nd edition, Cambridge University Press, 2009.
4. Karia, Akash. *Public Speaking Mastery: Speak Like a Winner*. Kindle edition, 2013.
5. Lucas, Stephen. *The Art of Public Speaking***.** 11th edition, Tata McGraw Hill, 2011.

Websites:

1. http://www.mindtools.com/CommSkll/ActiveListening.htm
2. http://www.slideshare.net/alisonkis/dialogue-and-roleplay-activity
3. http://www.hse.ru/pubs/lib/data/access/ram/ticket/2/14309868938d576a532b71360b7354268380727a22/An%20article%20for%20Monika%20(2010).pdf

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

1. Understand the nuances of language through audio- visual experience and group activities.
2. Hone the accent for intelligibility
3. Realize the importance of listening skills and speaking skills and their application in real life situations.
4. Recognize significance of non-verbal communication and develop confidence to face audience and shed inhibitions.
5. Speak with clarity and confidence; thereby enhance employability skills of the students.

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	-	-	-	1	-	1	2	2	-	1	-	-	-
CO2	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-
CO3	-	-	-	-	-	-	1	-	1	2	-	2	-	-	-
CO4	-	-	-	-	-	-	-	1	1	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0302	ENGINEERING WORKSHOP (Common for CE, EEE, ME,ECE and Min.E)	L	T	P
Credits: 1		-	-	2

COURSE OBJECTIVES:

To understand the usage of hand tools, acquire the skills in model / pattern making and familiarize with various work materials and tools.

I. TRADES FOR EXERCISES:

At least two exercises from each trade:

1.Carpentry 2.Fitting 3. Tin-Smithy
4. House-wiring 5.Foundry 6.Arc welding

II. TRADES FOR DEMONSTRATION & EXPOSURE

1. Machine shop
2. Plumbing
3. Wood working lathe
4. Identification of Electronic Components
5. Black smithy
6. Computer Peripherals

COURSE OUTCOMES

At the end of the course, students will be able to

1. Knowledge of carpentry process and methods used in the design and fabrication, installation, maintenance and repair of structures and fixtures (e.g., furniture, cabinets) to accomplish work assignments.
2. Assembling together of part and removing metals to secure the necessary joint by using fitting and welding.
3. Understand the hardware components of house wiring.
4. Understand the manufacturing process using machine shop.
5. Analyze the different types of computer Peripherals

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	2	1	-	3	-	-	3	-	2	-
CO2	3	-	-	-	2	2	1	-	3	-	-	3	-	2	-
CO3	3	-	-	-	2	2	1	-	3	-	-	3	-	2	-
CO4	3	-	-	-	2	2	1	-	3	-	-	3	-	2	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: C0202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (Common for all branches)	L	T	P
Credits: 1		-	-	2

Course Objectives:

To get practical knowledge about basic electrical circuits, electronic devices like Diodes, BJT, JFET and also analyze the performance of DC Motors, AC Motors and Transformers.

List of Experiments:

1. Verification of Kirchhoff's Laws.
2. Verification of Maximum Power Transfer Theorem.
3. Determination of Phase Angle for RC series circuit.
4. Brake Test on DC-Shunt Motor. Determination of Performance curves
5. Load Tests on Single Phase Transformer
6. Brake Test on Three Phase Induction Motors. Determination of Performance curves
7. V-I Characteristics of PN junction Diode
8. V-I Characteristics of Zener Diode
9. Half Wave Rectifier and Full Wave rectifier.
10. Input and Output characteristics of BJT with CE configuration
11. Input and Output characteristics of BJT with CB configuration
12. Input and Output Characteristics of JFET.

Course Outcomes:

At the end of the course, students will be able to

1. Experimentally verify the basic circuit theorems, KCL and KVL
2. Measure power, power factor and phase angle in RC circuits experimentally.
3. Acquire hands on experience of conducting various tests on dc shunt motor, single phase transformers and three phase induction motors and obtaining their performance indices using standard analytical as well as graphical methods
4. Draw the characteristics of different semiconductor devices like PN junction Diode, Zener Diode, BJT and JFET by conducting suitable experiments.
5. Experimentally verify the working of half and full wave rectifier by using PN Junction diodes.

CO- PO Mapping

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	2	-	1	1	2	1	1	1	3	1	1
CO2	3	-	2	-	2	-	2	1	2	1	1	1	3	1	1
CO3	3	2	2	2	2	-	2	1	2	1	1	1	3	1	1
CO4	3	1	2	-	2	-	1	1	2	1	1	1	3	1	1
CO5	3	1	2	-	2	-	2	1	2	1	1	1	3	1	1

SEMESTER – II

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech II Semester		
Code: C0B17	Engineering Chemistry (Common for ALL)	L	T	P
Credits: 4		3	1	-

Course objectives:

The purpose of this course is to emphasize the relevance of fundamentals of chemical sciences in the field of engineering and to provide basic knowledge on atomic- molecular orbital's, electrochemistry, batteries, corrosion and the role of water as an engineering material in domestic-industrial use. They will also impart the knowledge of stereochemistry, understanding the chemical reaction pathway mechanisms and synthesis of drugs. Listing out various types of fuels and understanding the concept of calorific value and combustion.

Module I: Water and its treatment [10 Periods]

Introduction to water, hardness of water, causes of hardness, expression of hardness, units and types of hardness-Numerical Problems. Alkalinity of water, specifications of potable water (BIS); Estimation of temporary & permanent hardness of water by EDTA method. Boiler troubles - Scale &Sludge, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water - Internal treatment (colloidal, phosphate, carbonate and calgon conditioning). External treatment - Lime Soda process (cold & hot) and ion exchange process, Numerical Problems. Disinfection of water by chlorination and ozonization.Desalination by Reverse osmosis and its significance.

Module II: Molecular structure and Theories of Bonding: [10 Periods]

Introduction to Molecular orbital Theory. Linear Combination of Atomic Orbital's (LCAO), significance of bonding and anti-bonding molecular orbital, Conditions for the formation of molecular orbital's. Molecular orbital energy level diagrams of diatomic molecules -, N_2,$O_2$and F_2. Introduction to coordination compounds-ligand-coordination number (CN) - spectrochemical series. Salient features of crystal field theory, Crystal field splitting of transition metal complexes in octahedral ($[CoF_6]^{3-}$ and $[Co(CN)_6]^{3-}$) and tetrahedral ($[NiCl_4]^{2-}$ and $[Ni(CO)_4]$) fields - magnetic properties of complexes. Band structure of solids and effect of doping on conductance.

Module III: Electrochemistry and Corrosion [17 Periods]

A. Electrochemistry:

Introduction to Electrochemistry-Conductance(Specific and Equivalent) and units. Types of cells-electrolytic & electrochemical cells (Galvanic Cells)-Electrode potential-cell potential (EMF).Electrochemical series and its applications,Nernst equation its applications and numerical problems. Reference electrodes - Calomel Electrode and Glass electrode-determination of pH using glass electrode. Batteries: Primary (dry cells) and secondary (Lead-Acid cell, Ni-Cd cell) - applications of batteries. Fuel cells: Hydrogen - Oxygen fuel cell and its applications.

B. Corrosion: [7 Periods]

Causes and effects of corrosion: Theories of corrosion - Chemical & Electrochemical corrosion,

Pilling-Bedworth rule,Types of corrosion: Galvanic and Water-line corrosion. Factors affecting rate of corrosion-Nature of metal and Nature of Environment, Corrosion control methods - Cathodic protection (Sacrificial anodic and impressed current cathodic methods). Surface coatings: Methods of metallic coatings - hot dipping (Galvanization),Electroplating (Copper) andElectroless plating (Nickel).

Module IV: Stereochemistry, Reaction mechanism& synthesis of drug molecules and NMR spectroscopy: [12 Periods]

Introduction to Isomers - classification of isomers - structural (chain, positional & functional) and stereoisomerism-geometrical (cis-trans & E-Z system) - characteristics of geometrical isomerism, optical isomerism (chirality - optical activity, specific rotation, enantiomers and diastereomers) of tartaric acid and lactic acid. Conformational isomerism ofn-Butane. Introduction to bond cleavage (homo & hetero cleavage) - reaction intermediates and their stability. Types of organic reactions - Mechanism of substitution (SN^1& SN^2) and (E_1&E_2) reactions with suitable example. Ring opening (Beckmann rearrangement), oxidation and reduction (Cannizaro reaction), cyclization (Components of Diels-Alder reaction-Mechanism of Diels-Alder reaction with suitable example) reactions. Synthesis of Paracetamol, Aspirin and their applications.
Introduction to Spectroscopy, Basic concepts of nuclear magnetic resonance spectroscopy, chemical shift and spin-spin splitting.

UNIT-V Fuels and Combustion [8 Periods]

Fuels: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.

Combustion: Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel. Determination of calorific value by Junkers gas calorimeter-Numerical problems on combustion.

Text Books:

1. P.C.Jain and Monica Jain, "**A Text Book of Engineering Chemistry"**, DhanpatRai Publications, New Delhi, 16th Edition 2014.
2. S.S. Dara and S.S. Umare, "**A Text Book of Engineering Chemistry"**, S Chand Publications, New Delhi, 12th Edition 2010.
3. A.Jaya Shree, "Text book of Engineering Chemistry", Wiley, New Delhi, 2018.

Reference Books:

1. B.Rama Devi, Ch.VenkataRamana Reddy and PrasanthaRath,**"Text Book of Engineering chemistry"**,Cengage Learning India Pvt.Ltd,2016.
2. M.G. Fontana and N. D. Greene, "**Corrosion Engineering"**, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. K. P. C. Volhardt and N. E. Schore, **"Organic Chemistry: Structure and Function"**,

5th Edition, 2006.

Course Outcomes with BLOOM's

At the end of the course, students will be able to:

Course Outcome

CO1 Understand water treatment, specifically hardness of water and purification of water by various methods.

CO2 Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity

CO3 Apply knowledge of electrochemical cell concept with respect to fuel cells, batteries, theories of corrosion. Applications of corrosion control methods.

CO4 Acquire basic knowledge on the concepts of stereochemistry, chemical reaction mechanisms that are used in the synthesis of drug molecules, interpretation of NMR in organic molecules and their uses in medical field.

CO5 Acquire the knowledge of various fuels and identify a better fuel source of less pollution.

CO- PO Mapping

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	2	1	-	-	-	-	-	-	-	-	-	-
CO3	3	3	2	2	1	-	2	-	-	-	-	-	-	-	-
CO4	3	1	1	1	2	1	3	-	-	-	-	-	-	-	-
CO5	3	3	3	1	-	-	3	-	-	-	-	-	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I /II Semester		
Code: C0305	ENGINEERING DRAWINNG (Common for All)	L	T	P
Credits: 3		2	-	2

PREREQUISITES: NIL

Course Objectives:

To develop in students, graphic skills for communication of concepts and ideas of engineering products.

MODULE I:

Introduction to Engineering Drawing, Principles of Engineering Graphics and their significance, Lettering.

Geometrical Constructions: Regular polygons only. Conic Sections: Ellipse, Parabola, Hyperbola– General method only Cycloidal Curves and Involute, tangents & normal for the curves.

Scales: Plane Scale, Diagonal scale, Vernier Scale.

MODULE II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projection of Points: Projection of points including all four quadrants.

Projection of Lines: Projection of Lines - parallel, perpendicular, inclined to reference planes and Traces.

MODULE III:

Projection of Planes: Axis inclined to both the reference plane.

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone by rotatingobject method. Axis inclined to both the reference plane.

MODULE IV:

Section of Solids: Sectioning of single solid with the cutting plane inclined to one plane and perpendicularto the other - true shape of section.

Development of Surfaces: Development of lateral surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone.

MODULE V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale, Isometric Views– Conventions –Plane Figures,Simple Solids.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and vice versa–simple objects.

TEXT BOOKS

1. K.L.Narayana, S. Bheemanjaneyulu “Engineering Drawing with Auto CAD-2016” New Age InternationalPublishers, 1st Edition, 2018.
2. N.D. Bhat, “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2014.

REFERENCES

1. K.L.Narayana, P.Kannaiah, “Engineering Drawing”, SciTech Publishers. 2nd Edition, 2017
2. K.Venugopal,“Engineering Drawing”,NewAge International Publishers, 3rd Edition, 2014.
3. K. V. Natarajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, 2015.
4. M.S. Kumar, “Engineering Graphics”, D.D. Publications, 2011.
5. Trymbaka Murthy, “Computer Aided Engineering Drawing", I.K. international Publishing House, 3rdEdition, 2011.

E - RESOURCES

1. http://nptel.ac.in/courses/112103019/
2. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
3. https://www.wiziq.com/tutorials/engineering-drawing
4. http://freevideolectures.com/Course/3420/Engineering-Drawing
5. http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711
6. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics nit jalandhar (EG MECI102)

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0B10	Applied Physics (Common for ECE and EEE)	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:

1. To outline the dual nature of matter
2. To elaborate the significance of the Kronig-Penney model in classifying the materials
3. To illustrate the working of p-n junction diode, photodiode, LED and solar cell
4. To interpret the Maxwell equations.
5. To compare the working of Ruby laser, He-Ne laser and semiconductor laser, besides illustrating the working principle of optical fibre and elaborate its applications.

Module – I: Quantum mechanics [8 Periods]

Introduction, Plank's theory of black body radiation, deduction of Wien's displacement law and Ralygien's law; Louis de Broglie's concept of matter waves; Davisson and Germer experiment; G P Thomson Experiment; Heisenberg's uncertainty principle – and its application (electron cannot exist inside the nucleus); Schrodinger's time-independent wave equation; Physical significance and properties of wave function; Particle in a one-dimensional infinite potential well.

Module – II: Band theory of solids [8 Periods]

Introduction, Postulates and drawbacks' of Classical and Quantum free electron theory, Fermi Dirac distribution function; Density of energy states; Bloch theorem; Qualitative treatment of Kronig - Penney model; E Vs k relationship; Origin of energy band gap; Classification of materials into Conductors, Semiconductors and insulators; Concept of Effective mass.

Module –III: Semiconductor Physics [13 Periods]

A: Introduction, Intrinsic and Extrinsic Semiconductors; Expression for carrier concentration in intrinsic and extrinsic semiconductors; Variation of Fermi energy level in Intrinsic and extrinsic semiconductors with respect to temperature and doping concentration.

B: Direct and indirect bandgap semiconductors; Carrier generation and Recombination; Drift and Diffusion mechanisms; Equation of Continuity; P-N Junction diode, Energydiagram, V-I Characteristics; Construction and Working of Photodiode, LED & Solar cell and their applications.

Module – IV: Electromagnetic Theory [10 Periods]

Gradient of Scalar field; Divergence and Curl of Vector field and their Physical Significance; Gauss's Law of electrostatics and Gauss law of magnetostatics; Ampere's law and its modification; Faraday's law of electromagnetic induction; Induced E.M.F in a conductor; Lenz's Law; Maxwell equations in differential form; wave equation for free space

Module – V : LASER [12 Periods]

Introduction, Characteristics of LASER; Aborption, Spontaneous and Stimulated emission; Einstein's coefficients derivation; Population inversion; Pumping mechanisms; Basic components of a LASER system; Types of Laser systems; Ruby LASER, He-Ne LASER, Semiconductor diode LASER (Homo junction and hetero junction); Applications of LASER - Computers, Medical, Military.

Optical Fibers: Introduction to Optical fibers; Total Internal Reflection; Acceptance angle and acceptance cone, Numerical aperture; types of optical fibers; Losses in optical fibers - absorption losses, scattering losses and bending losses; Applications of optical fibers - Communications, Level Sensor, LASER angioplasty.

Course Outcomes:

At the end of the course, the student will be able to

1. Explain the dual nature of the matter and evaluate the energy of a particle trapped in 1D infinite potential well.
2. Classify the materials into conductors, semiconductors and insulators based on the outcomes of Kronig - Penney model.
3. Analyze the working of semiconductor devices like PN junction diode, Photodiode, LED and Solar cell.
4. Deduce Maxwell equations in differential form.
5. Compare and contrast Ruby, He-Ne, Semiconductor Lasers and discover the working principle of optical fibers besides and elucidating their applications.

Text Books:

1. K Vijaya Kumar, S Chandralingam, "Modern Engineering Physics'' Volume I & II, S. Chand, 1st Edition, 2017.
2. Jasprit Singh, "Semiconductor Optoelectronics: Physics and Technology", McGraw-Hill, 1995.
3. B K Pandey and S. Chaturvedi, "**Engineering Physics**" Cengage Learning India Revised Edition, 2014.

Reference Books:

1. P K Palanisamy, **"Engineering Physics"**, SciTech Publication, 4th Edition, 2014.
2. R K Gaur and SL Gupta, "**Engineering Physics**" Dhanpat Rai Publications, Eighth Revised Edition, 2006.
3. D K Bhattacharya, Poonam Tandon, "**Engineering Physics**", Oxford University Press, 1st Edition, 2015.
4. P. Bhattacharya, "**Semiconductor Optoelectronic Devices**", Prentice hall of India,1997.
5. S J Adams, "Electromagnetic Theory", Adams Press, 2013.

e-RESOURCES

1. https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_Physics
2. https://www.livescience.com/33816-quantum-mechanics-explanation.html
3. https://nptel.ac.in/courses/115/102/115102025/

Journals :

1. http://www.springer.com/physics/theoretical%2C+mathematical+%26+computational+physics/journal/40094
2. http://www.springer.com/physics/journal/340

NPTEL VIDEOS:

1. http://nptel.ac.in/courses/113104012/
2. https://www.youtube.com/watch?v=9seDKvbaoHU&list=PLzJaFd3A7DZse2tQ2qUFChSiCj7jBidO0&index=29
3. https://nptel.ac.in/courses/108/108/108108122/
4. https://nptel.ac.in/courses/115/101/115101005/

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code:C0B04	Advanced Calculus (Common for EEE & ECE)	L	T	P
Credits:4		3	1	-

Pre-requisites: Differentiation and integration,

Course Objectives: To Learn

1. The Methods of solving Partial differential equations.
2. The Beta and Gamma functions.
3. The Evaluation of multiple integrals and their applications in the allied fields.
4. The physical quantities involved in engineering problems related to vector valued functions.
5. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

MODULE -I: Partial Differential Equations [12 Periods]

Formation of partial differential equations by eliminating arbitrary constants or arbitrary function, solutions of first order linear(Lagrange) equations, solutions of non linear first order equations (four standard types). Equations reducible to linear, Charpits Method.

MODULE – II: Beta and Gamma Functions [12 Periods]

Introduction to Improper Integrals, Definition of Beta and Gamma function, properties and other forms. Relation between Beta and Gamma function, Evaluation of Improper Integrals.

MODULE - III: Multiple Integrals [12 Periods]

(A) Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form),.

(B) Evaluation of Triple Integrals. Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Finding areas using double integrals and Volumes using double and triple integrals.

MODULE - IV: Vector Differentiation [12 Periods]

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Scalar potential functions. Solenoidal and Irrotational vectors. Vector Identities.

MODULE – V: Vector Integration [12 periods]

Line, Surface and Volume Integrals. Green Theorem, Gauss Divergence Theorem and Stokes Theorem (without proofs) and their applications.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R K Jain Srk Iyengar ,Advanced engineering mathematics, Narosa publications.
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley publications.

Reference Books:

1. Kanti B.Datta, **Mathematical Methods of Science and Engineering**, Cengage Learning
2. Alan Jeffrey, **Mathematics for Engineers and Scientists**, 6th Ed, 2013, Chapman & Hall.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed, Pearson, Reprint, 2002.
4. S. L. Ross, **Differential Equations**, 3rd Ed., Wiley India, 1984.
5. ***Amarnath*** T, **An Elementary Course in** *Partial Differential Equations*, Narosa Publishing House 2nd Ed, 2012.

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

1. Identify whether the given partial differential equation can be solvable with the methods or not.
2. Solve the problems which are not solvable with the usual methods and solve using Beta and Gamma functions.
3. Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelepiped.
4. Finds the directional derivatives, angle between vectors understands the physical interpretation of vector, solenoidal and irrotational vectors.
5. Evaluate the line, surface and volume integrals and converting them from one to another.

E-Resources:

a. **Concerned Website links**

1. https://mat.iitm.ac.in/home/sryedida/public_html/caimna/pde/first/partial.html
2. https://homepage.tudelft.nl/11r49/documents/wi4006/gammabeta.pdf
3. https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Calculus_(OpenStax)/15%3A_Multiple_Integration/15.2%3A_Double_Integrals_over_General_Regions
4. https://math.libretexts.org/Bookshelves/Calculus/Book%3A_Calculus_(Apex)/12%3A_Functions_of_Several_Variables/12.06%3A_Directional_Derivatives
5. https://learn.lboro.ac.uk/archive/olmp/olmp_resources/pages/workbooks_1_50_jan2008/Workbook29/29_3_int_vec_thms.pdf

b. **NPTEL :**

1. https://www.digimat.in/nptel/courses/video/111105093/L01.html (PDE)
2. https://www.youtube.com/watch?v=JoyvDWZ0aMY (Beta & Gamma Functions)
3. https://www.youtube.com/watch?v=mIeeVrv447s (Multiple Integrals)
4. https://www.youtube.com/watch?v=M_Irtxhbq3E (Vector Differentiation)
5. https://www.youtube.com/watch?v=EtA0CK8SwkI (Vector Integral Theorems)

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	3	3	-	-	-	2	-	-	3
CO2	3	2	2	3	2	-	-	-	2	-	-	3
CO3	3	2	2	3	2	-	-	-	2	-	-	2
CO4	3	2	2	3	3	-	-	-	2	-	-	2
CO5	3	2	2	3	3	-	-	-	2	-	-	2

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0401	ANALOG ELECTRONICS	L	T	P
Credits: 3	(Common for EEE & ECE)	3	-	-

Pre-Requisites: Applied Physics, Basic Electrical and Electronic Engineering.

Course Objectives: This course provides the knowledge of Transistor and FET Biasing Techniques, Amplifiers particularly Single Stage Amplifiers and also provides knowledge of study about different amplifiers and understand small signal analysis of different transistor configurations and study about feedback and oscillators.

MODULE I: BJT Biasing & FET Biasing [10 Periods]

BJT Biasing: Need for biasing, operating point, load line analysis, bias stabilization techniques: fixed bias, collector to base bias, self - bias, Stabilization against variations in I_{CO}, V_{BE} and β for the self -bias circuit, bias compensation techniques, thermal runaway and thermal stability.

FET Biasing: Biasing techniques: Fixed bias, Source self - bias, Voltage divider bias.

MODULE II: BJT Small Signal Analysis [10 Periods]

Small signal low frequency transistor Amplifier circuits: h-Parameter representation of a Transistor, Analysis of single stage transistor Amplifier (CE, CB, & CC) using h-parameters: voltage gain, current gain, input impedance and output impedance. Comparison of transistor configurations in terms of Ai,Ri, Av, Ro. Analysis of CE Amplifier with Emitter resistance and Emitter follower, Millers theorem and its Dual. Simplified h-parameter Model.

MODULE III: Single Stage Amplifiers [10 Periods]

A: Classification of Amplifiers, Distortion in Amplifiers, Low Frequency response of common emitter Amplifiers, Common Base Amplifiers and Common Collector Amplifier.

B: Small signal JFET model, JFET Amplifiers: Common Drain Amplifier, Common Source Amplifier and Common Gate Amplifier. Gain band width product. Analysis of Common Source Amplifier with resistive load.

MODULE IV: Feedback Amplifiers [10 Periods]

Feedback concept and types, Transfer Gain with feedback, General Characteristics of Negative Feedback Amplifiers, Types of Negative Feedback Connections, Method of Identifying Feedback Topology, Stability of Feedback Amplifier.

MODULE V: Oscillators [10 Periods]

Constituents of an Oscillator, Barkhausen Criterion, Classification of Oscillators, Sine Wave Feedback Oscillators of LC Type - General Form of Oscillator Circuit, Hartley Oscillator, Colpitts Oscillator Sine Wave Feedback Oscillator of RC type - RC Phase Shift Oscillator, Wein Bridge Oscillator, Crystal Oscillator, Frequency Stability. Design of an RC Phase - Shift Oscillator.

Text Books:

1. Jacob Milliman, Christos C. Halkias, SatyabrataJit, "Electronic Devices and Circuits", McGraw Hill (India), 3rd edition, 2013.
2. Shalivahana N. Suresh Kumar, A. Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill (India), 3rd edition, 2007.

Reference Books:

1. Robert Boylestad, LowisNashelsky, “Electronic Devices and Circuit Theory”, Prentice Hall of India, 5th Edition, 1993.
2. G. K. Mithal, “Electronic Devices and Circuits”, Khanna Publications, 22nd Edition, 1999.

E-Resources:

1. http://electronicsforu.com/
2. https://www.elektormagazine.com/
3. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?reload=true&punumber=101
4. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=16
5. http://nptel.ac.in/courses/117101106/6

Course Outcomes:

At the end of the course, students will be able to:

1. Study different biasing techniques and design the DC bias circuits using BJT & FET
2. Understand the small signal analysis of different transistor configurations.
3. Understand the design of single stage Amplifiers
4. Understand the design of Feedback amplifiers and their frequency response.
5. Understand the design of various oscillators such as RC Phase Shift Oscillator, Wein Bridge Oscillator, Crystal Oscillator, LC Oscillator etc

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	2	1	-	1	-	3	2	3	3	2
CO2	2	3	1	2	2	-	2	-	2	-	1	1	3	2	2
CO3	3	2		1	1	2	1	-	2	-	2	2	2	3	2
CO4	2	3	2	1	2	2	1	-	3	-	2	3	3	2	2
CO5	1	2	2	3	2	3	3	-	2	-	2	3	2	2	3

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0553	**Basic Python Programming Lab** (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	1	2

Prerequisites: NIL

Course Objectives: To be able to introduce core programming basics and program design with functions using Python programming language, understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.

Software Requirements: Python

List of Programs:

1. a) Write a program to demonstrate different number data types in Python.
   b) Write a program to perform different Arithmetic Operations on numbers in Python.
2. a) Write a program to create, concatenate and print a string and accessing sub-string from a given string.
   b) Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017"
3. Write a program to create, append, and remove lists in python.
4. Write a program to demonstrate working with tuples in python.
5. Write a program to demonstrate working with dictionaries in python.
6. a) Write a python program to find largest of three numbers.
   b) Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]
7. a) Write a Python script that prints prime numbers less than 20.
   b) Write a python program to find factorial of a number using Recursion.
8. a) Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
   b) Write a python program to define a module and import a specific function in that module to another program.
9. a) Write a program that defines and print a matrix.
   b) Write a program to perform addition of two square matrices.
   c) Write a program to perform multiplication of two square matrices.
10. a) Write a function dups to find all duplicates in the list.
    b) Write a function unique to find all the unique elements of a list.
11. a) Write a program to print each line of a file in reverse order.
    b) Write a program to compute the number of characters, words and lines in a file.
12. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.

TEXT BOOKS:

1. Vamsi Kurama, "Python Programming: A Modern Approach", Pearson Publications.
2. Mark Lutz," Learning Python", Orielly Publishers

REFERENCES:

1. Allen Downey, “Think Python”, Green Tea Press
2. W. Chun, “Core Python Programming”, Pearson.
3. Kenneth A. Lambert, “Introduction to Python”, Cengage

Course Outcomes:

At the end of the course, students will be able to
1. **Develop** simple applications using python.
2. **Make use of** functions in python scripts.

CO- PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
Cos	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	1	1	-	-	-	-	-	-	1	1	-	-
CO2	-	1	2	3	-	-	-	-	-	-	-	3	-	1	1
CO3	1	1	1	1	2	1	1	-	-	-	-	3	-	2	3

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/II Semester		
Code: C0B11	Applied Physics Lab (Common for EEE, ECE,AI&ML, CSE (AI & ML), CSE (Cyb. Sec.), CSE (IoT), CSE (Data Science) ,CSE and IT)	L	T	P
Credits: 1		-	-	2

Course objectives:

The main objective of this course is to provide the necessary exposure to the practical aspects, which is an essential component for learning science.

List of Experiments:

1 **Planck's constant**
To determine Planck's constant using Photo electric effect.
2 **Energy band –gap of a semiconductor**
To determine the energy band gap of a semiconductor.
3 **V-I and P-I characteristics of light emitting diode**
Plot V-I and P-I characteristics of light emitting diode.
4 **Laser diode**
To study the Characteristics of Laser diode.
5 **Solar Cell**
To study the V-I Characteristics of solar cell.
6 **LCR Circuit**
To determination of resonant frequency, bandwidth and quality factor of RLC circuit.
7 **Numerical Aperture of an Optical fiber**
To determine the Numerical aperture of the given fiber.
8 **Bending Loss of a Fiber**
To determine the bending loss of the given fiber.
9 **Light Dependent Resistance (LDR)**
To determine the characteristics of a LDR.
10 **Stewart and Gee's experiment**
Determination of Magnetic field along the axis of current carrying circular coil.
11 **B-H Curve**
To study the magnetization of ferromagnetic material in presence of magnetic field.
12 **Sonometer**
To verify the frequency of AC Supply.
13. Construction of fundamental logic gates using discrete components and verification of truth tables
14. Verification of truth tables of fundamental logic gates using ICs
15. Construction of fundamental logic gates using universal logic gates.

Course Outcomes:

At the end of the course, students will able to

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working, application and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Understand measurement technology.
5. Use new instruments and real time applications in engineering studied

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0B18	Engineering Chemistry Lab (Common for ALL)	L	T	P
Credits: 1		-	-	2

Course objectives:

To provide the students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

List of Experiments:

1. Calibration of Volumetric apparatus.
2. Estimation of Total Hardness of water by EDTA Method.
3. Estimation of an acid by P^Hmetry.
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Estimation of Mn^{+2}ion in $KMnO_4$ by Colorimetry.
8. Determination of viscosity of given liquids by Ostwald's viscometer.
9. Determination of surface tension of given sample using stalagmometer.
10. Estimation of iron (II) by dichrometry.
11. Determination of rate constant of hydrolysis of methyl acetate.
12. Preparation of Aspirin.

Course outcomes:

At the end of the course, students will be able to:

1. Acquire knowledge about the chemistry lab, kind of experiments that can be performed and the precautions to perform four types of titrations & understand the principle involved in the applications of the method.
2. Learn and apply basic technique used in chemistry laboratory for estimation hardness & alkalinity of water.
3. Understand about mineral analytic technique for estimation of ions/metal ions in minerals.
4. Apply instrumental techniques such as colorimetry, conductometry & potentiometry.
5. Learn to determine physical properties like free chlorides in water, viscosity & surface tension.

CO- PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: C0402	ANALOG ELECTRONICS LAB (Common for EEE & ECE)	L	T	P
Credits: 1		-	-	2

Course Objectives: To design different amplifiers, Feedback amplifiers and Oscillator circuits according to the given specifications.

PART - A: Implement the following Simulation using Multisim or Any equivalent open source software

1. Common Source Amplifier.
2. Common Gate Amplifier.
3. Voltage Shunt Feedback Amplifier
4. Wein Bridge Oscillator using Transistors.
5. Hartley Oscillator Using Transistors.
6. Colpitt's Oscillator Using Transistors.

PART - B: To be performed Using Discrete Electronic Components

1. Common Emitter Amplifier.
2. Common Collector Amplifier.
3. Common Drain Amplifier.
4. Voltage Series Amplifier.

5.Current Series Amplifier

6. RC Phase Shift Oscillator using Transistors.

Course Outcomes:

At the end of the course, students will be able to

1. Design Amplifiers Circuits.
2. Design Oscillator Circuits.
3. Analyze Feedback topology for amplifiers.

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2	PSO3
CO1	2	3	3	3	3	-	2	-	-	1	1	2	3	3	1
CO2	2	3	3	3	3	-	2	-	-	1	1	2	3	3	1
CO3	2	3	3	3	2	-	1	-	-	1		2	3	3	1

SEMESTER - III

2022-23 Onwards (MR-22)	MALLAREDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0B08	Complex Variables and Numerical Methods (Common for ECE & EEE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Differentiation, Partial differentiation, Integration

Course Objectives:

1. To learn the concept of analyticity of a function
2. To learn the concept of evaluation of Integrals
3. To learn the Power series expansions of complex functions and evaluation of contour integrals.
4. The various numerical techniques which are indispensable tools to solve many algebraic and transcendental equations and Interpolation.
5. Numerical methods of solving the ordinary differential equations and Numerical Integration.

MODULE I Functions of Complex variable 12 Periods

Introduction, Complex functions and its representation on Argand plane, Concepts of limit, Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions, Milne – Thompson method.

MODULE II Complex Integration 9 Periods

Line integral, Evaluation along a path and by indefinite integration, Cauchy's integral theorem, Cauchy's integral formula, Generalized integral formula.

MODULE III Power series expansions of complex functions& Contour Integration 13 Periods

(A) Radius of convergence, Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point, Isolated singular point, pole of order m, essential singularity.

(B) Residue, Evaluation of residue by formula and by Laurent series, Residue theorem, Evaluation of integrals by indentation Improper real integrals (a) $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{0}^{2\pi} f(\cos\theta,\sin\theta)d\theta$

MODULE IV Algebraic and Transcendental equations and Interpolation 14 Periods

(A) Solution of Algebraic and Transcendental Equations: Introduction-Errors, types of errors. Bisection Method, Method of False Position. The Iteration Method – Newton-Raphson Method

(B) Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences – Symbolic relations and separation of symbols, Differences of a polynomial-Newton's formulae for interpolation, Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

MODULE V Numerical solution of Ordinary Differential Equations and Numerical Integration 12 Periods

Introduction, Solution by Taylor's series method, Picard's Method of successive Approximations, Euler's Method, Modified Euler's Method, Runge-Kutta Methods.

Numerical Integration: Trapezoidal Rule, Simpson's 1/3rd Rule, Simpson's 3/8 Rule

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R K Jain SRK Iyengar ,Advanced engineering mathematics, Narosa publications.
3. M . K Jain, S R K Iyengar, R.K Jain, Numerical Methods for Scientific and Engineering Computation, New age International publishers.

References

1. Murray Spiegel, Complex variables by Schamus outline series.
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley publications.
3. S.S.Sastry, **Introductory Methods of Numerical Analysis**,5th Edition,PHI Learning Private Limited

E- Resources

1. http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf (Numerical Differentiation and Integration)
2. https://www.youtube.com/watch?v=6vs-pymcsqk (Regula Falsi Method and Newton Raphson Method)
3. https://www.youtube.com/watch?v=1pJYZX-tgi0 (Interpolation)
4. https://www.youtube.com/watch?v=Atv3IsQsak8&pbjreload=101 (Numerical Solution of ODE)
5. https://www.youtube.com/watch?v=iviiGB5vxLA (Numerical Integration)
6. https://www.youtube.com/watch?v=HVHtGVOQySI (Functions of Complex Variables)
7. https://www.youtube.com/watch?v=v4yV2t4KBhs (Complex Integration)

Course Outcomes

At the end of the course, students will be able to

1. Apply the concept of analyticity of a function
2. Evaluate of Integrals
3. Find Power series expansions of complex functions and evaluation of contour integrals.
4. Find the root of a given equation by various methods and estimate the value for the given data using interpolation
5. Find the numerical solutions for a given ODE's and evaluations of integrals using numerical techniques.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	-	-	-	2	-	-	1	3	2	2
CO2	2	2	2	3	2	-	-	-	2	-	-	1	2	2	2
CO3	2	2	2	3	2	-	-	-	2	-	-	1	2	2	2
CO4	3	2	2	3	3	-	-	-	2	-	-	2	3	2	2
CO5	2	2	2	3	3	-	-	-	2	-	-	2	2	2	2

2022-23 Onwards (MR-22)	MALLAREDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0403	DIGITAL ELECTRONICS	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

This course introduces various number systems and conversion from one number system to other and also to understand different binary codes**,** the theory of Boolean algebra and to study representation of switching functions using Boolean expressions and their minimization techniques. Understanding the combinational logic design of various logic and switching devices and their realization**,** the basic flip flops and sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations and to analyze a given sequential circuit by using state tables and state diagrams.

MODULE I Number systems& Binary codes 8 Periods

Number systems: Number Systems, Radix conversions, complement of numbers.

Binary codes: Binary codes, Weighted and non-Weighted codes, BCD code, gray code, excess 3 codes - Error detecting code, Error Correcting code, Hamming Code.

MODULE II Boolean Algebra& Boolean functions 10 Periods

Boolean Algebra: Postulates and Theorems - Canonical and Standard forms: SOP and POS forms, Minterms and Maxterms –Logic gates: NOT, OR, AND, NOR, NAND, XOR, XNOR - Universal gates

MODULE III Combinational Logic Circuits 10 Periods

A:Arithmetic circuits: Half adder, full adder, half subtractor, full subtractor, binary adder, Carry look ahead adder, BCD adder

B:Code conversion circuits, Comparator, Decoder, Encoder, Priority Encoder, Multiplexers and Design, De – Multiplexers, ROM, PLA, PAL.

MODULE IV Sequential Logic Circuits - I 10 Periods

Introduction –Latches and Flip flops: Basic Flip flop circuit, RS, D, JK and T Flip-flops – Triggering of Flip flops: Master Slave Flip flop, edge triggered flip flop – Conversion of one type of Flip flop to another,Setup time, hold time.

Registers and Counters: Shift Register, Universal Shift Register, Applications of Registers,Asynchronous counter, Synchronous counter, Mod-N Counter, binary up/down counter, Ripple counter, Johnson counter.

MODULE IV Sequential Logic Circuits - II 9 Periods

Analysis of Sequential Logic circuit: State Diagram, state table, reduction of state table, state Assignment –- Design procedure of sequential circuits using state diagram, state table and Flip flops. Example design Sequence detector.

Finite State Machine: Introduction, FSM capabilities and Limitations, Mealy and Moore models – minimization of completely specified and incompletely specified sequential Machines. Partition techniques and Merger charts

Text Books

1. ZviKohavi, **"Switching and Finite Automata Theory"**,TMH, 2nd edition, 2006.
2. Morris Mano,**"DigitalDesign"**,PHI, 3rd Edition, 2009.
3. A.AnandKumar,**"Switching Theory and Logic Design"**,PHI 2nd Edition, 2014.

4. John F.Wakerly, **"Digital Design Principles & Practices"**, PHI/ Pearson Education Asia, 3rd Ed., 2005.

References

1. Stephen Brown and ZvonkaVramesic, **"Fundamentals of Digital Logic with VHDL Design"**,McGraw Hill, 2nd Edition, 2008.
2. William I. Fletcher, **"An Engineering Approach to Digital Design"**, PHI, 1st Edition, 2009.

E- Resources

1. https://www.researchgate.net/publication/264005171_Digital_Electronics
2. https://www.cl.cam.ac.uk/teaching/0708/DigElec/Digital_Electronics_pdf.pdf
3. http://ieeexplore.ieee.org/abstract/document/753678/
4. http://docshare01.docshare.tips/files/20257/202573063.pdf
5. http://nptel.ac.in/courses/117106086/1
6. http://nptel.ac.in/courses/117105080/
7. http://nptel.ac.in/courses/117106114/

Course Outcomes

At the end of the course, students will be able to

1. Perform radix conversions
2. Minimize a given boolean function by using k-map or tabular method
3. Design a combinational circuit
4. Design a sequential circuit by using various flipflops
5. Analyze and minimize the circuitry of a given sequential circuit and will be able to design a sequence detector

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0314	**FLUID MECHANICS AND HYDRAULIC MACHINES** (Common for EEE and Min.E.)	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: Nil

Course Objectives:

The objective of this subject is to provide the knowledge of fluid power and analyze the performance of various hydraulic machines like turbines, compressors and pumps.

MODULE I: Fluid statics **10 Periods**

Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

Hydro static forces on plane and curved surfaces. Buoyancy and floatation: Meta center, stability of floating body, Submerged bodies, Calculation of metacentric height.

MODULE II: Fluid Kinematics & Fluid Dynamics **10 Periods**

Fluid kinematics: Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform & non uniform, laminar & turbulent, rotational and irrotational flows-equation of continuity for one dimensional flow. Velocity potential and stream function – flow net.

Fluid dynamics : Surface and body forces –Euler‘s and Bernoulli‘s equations for flow along a stream line, Measurement of flow: pitot tube, venturimeter and orifice meter, Flow nozzle, Turbine flow meter, momentum equation and its application on pipe bend.

MODULE III: Closed Conduit Flow & Boundary Layer Concepts **10 Periods**

A: Closed conduit flow: Reynold‘s experiment- Darcy Weisbach equation- Minor losses in pipes pipes in series and pipes in parallel - total energy line - hydraulic gradient line.

B: Boundary Layer Concepts: Definition, thickness, characteristics along thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

MODULE IV: Turbo machinery and Hydraulic Turbines **09 Periods**

Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, workdone and efficiency, flow over radial vanes.

Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, workdone, efficiencies, hydraulic design – draft tube theory - functions and efficiency. Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

MODULE V: Centrifugal Pumps & Reciprocating Pumps **09 Periods**

Centrifugal pumps: Classification, working, workdone – manomertic head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH. Reciprocating pumps: Working, Discharge, slip, indicator diagrams.

Text Books

1. Modi and Seth, “**Hydraulics, fluid mechanics including hydraulic machines**”, Standard Publishers, 19th Edition, 2013
2. R.K. Bansal, “**Fluid Mechanics and hydraulic Machines**”, Laxmi Publications, 9th Edition, 2010.

References

1. R.K. Rajput, "**Fluid Mechanics and Hydraulic Machines**", S.Chand, 5th Edition, 2013.
2. D. Rama Durgaiah, **"Fluid Mechanics and Machinery"**, New Age International (P) Ltd, 1st editions, 2007
3. James W. Dally, William E. Riley **"Instrumentation for Engineering Measurements",** John Wiley & Sons Inc. 3rd editions, 1989.
4. Vijay Gupta and S.K.Gupta, "**Fluid Mechanics and Applications**", New-Age International Ltd. 1999.
5. Banga & Sharma, "**Hydraulic Machines**", Khanna Publishers, 7th Edition, 2007

E - Resources

1. nptel.ac.in/courses/112105183/
2. www.nptelvideos.in/2012/11/fluid-mechanics.htm
3. nptel.ac.in/courses/112104117/
4. www.sanfoundry.com/best-reference-books-fluid-mechanics-and-machinery/
5. https://www.elsevier.com/journals
6. nptel.ac.in/courses/112105183/

Course Outcomes:

1. Know the dimension and units of fundamental properties.
2. Understand the concept of fluid kinematics and dynamics.
3. Understand and solve the problems of closed conduit flow & boundary layer concepts.
4. Analyze the performance of turbo machinery and hydraulic turbines.
5. Understand the principles of centrifugal and reciprocating pumps.
6. Know the dimension and units of fundamental properties.

CO-PO Mapping

CO-PO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	2	1	-	-	-	-	-	3	-	-	-
CO2	3	3	-	3	2	1	-	-	-	-	-	3	-	-	-
CO3	3	3	-	3	2	1	-	-	-	-	-	3	-	-	-
CO4	3	3	-	3	2	1	-	-	-	-	-	3	-	-	-
CO5	3	3	-	3	2	1	-	-	-	-	-	3	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0203	ELECTRICAL CIRCUIT ANALYSIS AND SYNTHESIS	L	T	P
Credits: 3		2	1	-

Prerequisites: Basic Electrical and Electronics Engineering

Course Objectives: This course deals about the network theorems and three phase circuits. It also emphasis on network parameters, synthesis and transient analysis of electrical network. It is the foundation for all courses of the Electrical and Electronics Engineering discipline.

MODULE I Network Theorems (AC and DC) 10 Periods

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation and Tellegen's theorems - Statement of theorems and numerical problems

MODULE II Resonance and Three Phase Circuits 12 Periods

Resonance: Resonance – Series & parallel circuits, concept of bandwidth and Q factor.

Locus diagrams: Series R-L, R-C, R-L-C Circuits.

Three Phase Circuits: Introduction to three phase circuits – types of connection - Star and delta– Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced three phase circuits.

MODULE III Two Port Network Parameters 13 Periods

A: Open circuit impedance (Z) network parameters, Short circuit admittance(Y) network parameters –Transmission (ABCD)

B: Inverse Transmission ($A^1B^1C^1D^1$) and Hybrid parameters – Relationship between two port network parameters – Reciprocity and Symmetry concepts of two port network parameters.

MODULE IV Transient Analysis (Both AC & DC Networks) 13 Periods

Introduction - Initial conditions of all elements-Transient response of Series R-L, R-C and R-L-C circuits (Independent Sources Only) – Solution using Laplace transform approach.

MODULE V Network Synthesis 13 Periods

Hurwitz Polynomials, Positive Real Functions, Frequency Response of Reactive One-Port network, Synthesis of Reactive One Port by Foster's Method, Synthesis of Reactive One Port By Cauer Method, Synthesis of RL, RC and LC One Port Networks by Foster and Cauer Methods.

Text Books

1. William H. Hayt and Jack E. Kimmerly, **"Engineering Circuit Analysis"**, McGraw Hill Company, 6th Edition, 2005.
2. Joseph Edminister and Mahmood Nahvi, **" Electric Circuits"**, Schaum Outline Series, Tata McGraw Hill, 3rd Edition, 1999.

References

1. Vanvalken burg, "**Network Analysis**", Prentice Hall of India, 3 rd Edition, 1994.
2. A. Chakrabarthy, "**Circuit Theory**", Dhanpat Rai & Co., 6 th Edition, 2010.
3. N. N. Parker Smith, "**Problems in Electrical Engineering**", Prentice Hall of India, 9th Edition, 1981.
4. Sudhakar A. and Shyammohan S.P., "**Circuits and Networks: Analysis and Synthesis"**, Tata McGraw Hill, New Delhi, 2004.
5. Arumugam M. and Premkumar N., **"Electric Circuit Theory"**, Kanna Publishers, New Delhi, 1991.

E - Resources

1. http://www.ece.ucsb.edu/Faculty/rodwell/Classes/ece2c/resources/two_port.pdf
2. http://nptel.ac.in/courses/117106108/

3. http://nptel.ac.in/courses/108102042/
4. https://www.vssut.ac.in/lecture_notes/lecture1423722706.pdf

Course Outcomes

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

1. Analyze electrical circuits using network theorems and magnetic circuits.
2. Apply the concepts of three phase electrical circuits to electrical machines and power systems and understand the resonance concepts.
3. Evaluate the different parameters of a given two port electrical network.
4. Analyze the transient response of a network for the given input.
5. Construct the electrical circuit for the given impedance, admittance functions.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0204	ELECTROMAGNETIC FIELDS	L	T	P
Credits: 3		3	-	-

Prerequisites: Applied Physics.

Course Objectives: This course deals about the electrostatics, electric potential, energy density and their applications. It emphasis on magneto statics, magnetic flux density scalar and vector potential and its applications. It also deals with the time varying fields along with their mathematical formulations.

MODULE I Introduction to Electrostatics 10 Periods

Sources and effects of electromagnetic fields – Vector fields – Different co-ordinate systems– Divergence theorem –Stroke's theorem. Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge –Electric Potential– Properties of potential function – Potential gradient – Gauss' s law – Application of Gauss's Law – Maxwell's first law. Laplace's and Poison's equations – Solution of Laplace's equation in one variable.

MODULE II Conductors, Dielectric & Capacitance 10 Periods

Electric dipole – Dipole moment – potential and EFI due to an electric dipole. Conductors and Insulators. Introduction to permanent magnets, their characteristics and applications. Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and 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.

MODULE III Magneto Statics, Ampere's Circuital Law 10 Periods

A: Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Relation between magnetic flux, magnetic flux density and Magnetic field intensity (MFI) – MFI due to a straight current carrying filament

B: MFI due to circular, square and solenoid current – Carrying wire –and MFI – Maxwell's second Equation. Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Maxwell's third equation.

MODULE IV Force in Magnetic Fields, Magnetic Potential 9 Periods

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.

MODULE V Inductance, Time Varying Fields 9 Periods

Self and Mutual inductance – Neumann's formulae – determination of self-inductance of a solenoid, 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. Time varying fields – Faraday's laws of electromagnetic induction – Maxwell's fourth equation – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

Text Books

1 William H. Hayt& John. A. Buck, **"Engineering Electromagnetics"**, McGraw-Hill Companies, 7th Edition, 2012.

2 Mathew N. O. Sadiku, **"Principles of Electromagnetics"**, Oxford University Press Inc. 4th Edition, First India Edition, 2009.

References

1. J P Tewari, **" Electromagnetics"**, Khanna Publishers, 2nd Edition, 2005.
2. J. D Kraus,**" Electromagnetics"**, Mc Graw-Hill Inc, 4th Edition, 1992.
3. S. Kamakshaiah, **"Electromagnetic Fields"**, Right Publishers, 2007.
4. K.A. Gangadhar, P.M. Ramanathan, **"Electromagnetic Field Theory (Including Antennas and Wave Propagation)"**, Khanna Publications, 16th Edition, 2007**.**
5. Bhag Singh Guru and Hüseyin R. Hiziroglu, **"Electromagnetic Field Theory Fundamentals"**, Cambridge University Press, 2nd Revised Edition, 2009.

E - Resources

1. http://www.tandfonline.com/toc/tewa20/current
2. https://www.eeweb.com/passives
3. nptel.ac.in/courses/108106073/

Course Outcomes

At the end of the course, students will be able to

1. State and apply the laws of electromagnetic fields to practical circumstances.
2. Determine the electric field intensity resulting from various configurations of charge distribution.
3. Analyze the concepts of magneto static field and solve the magneto static field problems using laws associated with it.
4. Apply the concept of magnetic fields to compute magnetic potential in scalar and vector forms.
5. Apply the concept of electro dynamic fields and analyze the behavior of conductors using laws associated with it.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	2	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	3	2	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	3	2	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	3	2	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0561	FUNDAMENTALS OF DATA STRUCTURES LAB (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	1	2

Prerequisites: C Programming.

Course Objectives:

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

Software Requirements: Turbo C / C++

List of Programs:

1 Write a program to perform the following operations on matrix
   a) Addition
   b) Subtraction
   c) Multiplication

2 Write a program to create one dimensional array, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements

3 Write a program to create a single linked list, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements.

4 Write a program to create a circular linked list, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements.

5 Write a program to create a double linked list, with the following operations:
   a) Insertion
   b) Deletion
   c) Display the elements
   d) Count number of elements.

6 Write a program to implements stack operations using Arrays

7 Write a program to implements stack operations using Linked list

8 Write a program to implements Linear Queue operations using Arrays

9 Write a program to implements Linear Queue operations using Linked list

10 Write a program to implements Circular Queue operations using Arrays

11 Write a program to implements Double-ended Queue operations using Arrays

12 Write a program to create a Binary Search Tree (BST) and perform insert and search operations on it.

TEXTBOOKS

1. Jean Paul Tremblay, Paul G Sorenson, "**An Introduction to Data Structures with Applications**", Tata McGraw Hills, 2nd Edition, 1984.
2. Richard F. Gilberg, Behrouz A. Forouzan, "**Data Structures: A Pseudo code approach with C** ", Thomson (India), 2nd Edition, 2004.

REFERENCES

1. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, "**Fundamentals of Data Structure in C**", University Press (India), 2nd Edition, 2008..
2. A. K. Sharma, "**Data Structures using C**", Pearson, 2nd Edition, June, 2013.
3. R. Thareja, "**Data Structures using C**", Oxford University Press, 2nd Edition, 2014.

Course Outcomes:

At the end of the course, students will be able to

1. Identify the appropriate recursive algorithms and analyze the performance of algorithms.
2. Understand and implement single, double, and circular linked-lists.
3. Implement linear data structures such as Stacks and Queues using array and linked-list representations.
4. Implement non linear data structures such as trees and graphs.

CO-PO MAPPING

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	-	-	-	-	-	-	-	-	-	3	2	-
CO2	2	2	3	-	-	-	-	-	-	-	-	-	2	3	-
CO3	-	2	3	-	-	-	-	-	-	-	-	-	-	3	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0407	DIGITAL ELECTRONICS LAB	L	T	P
Credits: 1		-	-	2

Course Objectives:
To get programming knowledge on Verilog/VHDL programming of different digital circuits and CMOS circuits.

List of Experiments:
Introduction to Verilog/VHDL and Design of all the logic gates

1. Design of Half adder, Full adder using 3 modeling styles
2. Design of Half Subtractor, Full Subtractor using 3 modeling styles
3. Design of 4X16 Decoder using two 3x8 Decoders
4. Design of 8-to-3 encoder (without and with priority).
5. Design of Multiplexer &Demultiplexer.
6. Design of comparator
7. Design of 4-bit binary to gray converter viceversa,
8. Design of BCD to Excess-3 code converter and viceversa
9. Design of flip flops: SR, D, JK, T.
10. Design of 4-bit binary up/down counter.
11. Design of Johnson counter.

Equipment required for laboratory

1. Computers – Dual Core.
2. Software – Verilog/VHDL or any equivalent software

Course Outcomes:

At the end of the course, students will be able to

1. To develop the Verilog/VHDL code.
2. Design basic combinational circuits.
3. Design flipflops, basic sequential circuits.

Xx

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C0205	ELECTRICAL CIRCUITS LAB	L	T	P
Credits: 2		-	-	4

Course Objectives:

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics and simulation of time response.

List of Experiments:

1. Verification of Thevenin's & Norton's Theorems.
2. Verification of maximum Power Transfer Theorem for the Given 'T' Network.
3. Verification of Super Position Theorem.
4. Verification of Compensation Theorem.
5. Verification of Reciprocity Theorem for DC Excitation.
6. Experimental determination of Quality Factor, Bandwidth and resonant frequency.
7. Experimental Determination of Z & Y Parameters.
8. Experimental determination of Transmission & Hybrid Parameters for the given two port network.

Simulation Experiments:

9. Determination of branch currents in a given electrical circuit.
10. Determination of node voltages of a given electrical network.
11. Determination of transient response of a given RL & RC Circuit.
12. Determination of load current and voltage for a given electrical Network.

Course Outcomes

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

1. Reduce the given complex circuit to simple circuit by applying theorems and can verify the theoretical and practical outputs.
2. Find the impedance value of the given circuit at which the maximum power is transferred and also confirms with the practical results.
3. Design a circuit to accept or reject a particular frequency using resonance principle.
4. Estimate the parameters of the given network.
5. Find the magnitudes of voltages and currents in the given circuit.

CO-PO Mapping

CO- PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	3	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. III Semester		
Code: C00M2	ENVIRONMENTAL SCIENCE	L	T	P
Credits: NIL		2	-	-

Prerequisites: Nil

Course Objectives:

An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences, including geo systems, biology, chemistry, economics, political science and international processes. The ability to work effectively as a member of an interdisciplinary team on complex problem of environment.

Module I: Ecosystems 5 Periods

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains,food webs and ecological pyramids. Flow of energy.

Activity: Plantation.

Module II: Natural resources, Biodiversity and Biotic resources 9 Periods

A: Natural Resources:

Classification of Resources: Living and Non-Living resources, Renewable and non-renewable 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–case studies. Energy resources: growing energy needs, introduction to renewable and non renewableenergy sources.

B: Biodiversity and Biotic resources:

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Threats to Biodiversity (habitat loss, poaching of wildlife, man-wild life conflicts). Conservation of Biodiversity (In-situ and Ex-situ conservation),

Activity: case studies.

Module III Environmental Pollution And Control 7 Periods

A: Classification of pollution and pollutants, Causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards.

B: Soil Pollution, Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, Coastal pollution due to sewage and marine disposal of industrial effluents. E-waste and its management.

Activity: Field visit.

Module IV Global Environmental Problems and Global effects 6 Periods

Green houseeffect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions/Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

Activity: Poster Making.

Module V Towards sustainable future 5 Periods

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism(CDM).

Text Books

1. R.Rajagopalan,**"Environmental Studies from crisis to cure"**, Oxford University Press 2nd Edition, 2005.
2. Anubha Kaushik, C.P.Kaushik, **"Environmental studies"** New age International Publishers,4th Edition,2012

References

1. ErachBharucha,**"Environmental studies"** University Grants Commission, and University Press,I Edition, 2005.
2. M. Anji Reddy **"Text book of Environmental Science and Technology"** 3rd Edition, 2007
3. Richard T.Wright,**"Environmental Science: towards a sustainable future"** PHL Learning, Private Ltd. New Delhi, 2nd Edition., 2008
4. Gilbert McMasters and Wendell P.Ela,**"Environmental Engineering and science"**,3rd Edition, PHI Learning Pvt. Ltd.,2008.

E- Resources

1. http://www.gdrc.org/uem/ait-terms.html (Glossary of Environmental terms).
2. http://www.environmentalscience.org/ (Environmental sciences Lectures series).
3. Journal of earth science and climatic change (OMICS International Journal).
4. Journal of pollution effects & control (OMICS International Journal).
5. nptel.ac.in/courses/120108004/ (Principles of Environment Management Lectures).
6. http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html(NPTEL online video courses IIT lectures).

Course Outcomes

At the end of the course, students will be able to

1. To enable the students to realize the importance of ecosystem, its structure, services. To make the students aware of Different natural functions of ecosystem, which helps to sustain the life on the earth.
2. To use natural resources more efficiently.
3. To make the students aware of the impacts of human actions on the environment, its effects and minimizing measures to mitigate them.
4. To educate the students regarding environmental issues and problems at local, national and international level.
5. To know more sustainable way of living

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	1	-	1	2	1	-	-	-	-	-	-	-	-
CO2	2	3	2	3	1	3	-	2	-	-	-	-	-	-	-
CO3	3	3	2	3	2	2	-	1	-	-	-	-	-	-	-
CO4	3	2	2	1	2	1	-	-	-	-	-	-	-	-	-
CO5	2	1	1	-	-	1	3	3	-	-	-	-	-	-	-

SEMESTER-IV

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech IV Semester		
Code:C0H08	ENGINEERING ECONOMICS AND ACCOUNTANCY (Common for EEE, ECE, CSE and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

EEA is a think beyond program which will make the student to examine the application of microeconomics theory as applied to the manager's responsibilities in an organization. To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making. This course should emphasize the quantitative and qualitative applications of economic principle to business analysis

MODULE-I Business Environment and Managerial Economics 10 Periods

A. **Business Environment**: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship).

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

MODULE – II Theory of Production and Cost Analysis 10 Periods

A. Theory of Production: Production Function – ISOquants and ISOcosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

B. Cost Analysis: Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEA.

MODULE – III Market structures and Pricing Policies 9 Periods

A. **Introduction to Markets & Market structures:** Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

B. Pricing Policies & Methods: Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods.

MODULE – IV Capital and Capital Budgeting 9 Periods

A. **Capital:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

B. Capital Budgeting : Nature and scope of 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)

MODULE – V Financial Accounting and Ratios 10 Periods

A. **Financial Accounting:** Introduction, Accounting principles, Accounting Cycle, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

B. Financial Analysis Through Ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Text Books

1. Aryasri, **"Managerial Economics and Financial Analysis"**, TMH, 2nd edition, 2005.
2. Varshney &Maheswari, **"Managerial Economics"**, 5th edition Sultan Chand, 2003.

References

1. H. Craig Peterson & W. Cris Lewis, **"Managerial Economics"**, PHI, 4 Ed.
2. Domnick Salvatore, **"Managerial Economics In a Global Economy"**, Thomson, 4th Edition.
3. Raghunatha Reddy &Narasimhachary, **"Managerial Economics& Financial Analysis"**, 4TH edition Scitech.
4. S.N.Maheswari& S.K. Maheswari, **"Financial Accounting"**, 6th edition Vikas.
5. Dwivedi, **"Managerial Economics"**, Vikas, 6th Edition.

E- Resources

1. http://www.learnerstv.com/Free-Economics-video-lecture-courses.htm
2. http://nptel.ac.in/courses/110105067/
3. http://nptel.ac.in/courses/110107073/
4. http://nptel.ac.in/courses/110101005/
5. http://nptel.ac.in/courses/109104073/

Course outcomes:

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

1. Understand the concepts of managerial economics and their application in evaluating the demand.
2. Evaluate the production function and identifies the least cost combination to control the costs of production.
3. Understand the structures of various market types and their pricing policies.
4. Understand the types of business forms and also be able to evaluate the investments using capital budgeting techniques.
5. Understand the basic concepts of financial accounting and evaluation of company performance using ratio analysis.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	-	-	-	-	-	-	1	-	3	3	-	-	-
CO2	3	-	-	2	1	-	-	-	-	-	-	3	-	-	-
CO3	-	1	-	-	2	-	-	-	-	-	3	3	-	-	-
CO4	2	1	-	-	3	-	-	-	-	-	-	3	-	-	-
CO5	-	1	-	-	2	-	-	-	-	-	3	3	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech IV Semester		
Code:C0460	SIGNALS AND SYSTEMS	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:
This course is introducing the basic concepts of signals and introduce the Fourier series for the analysis of periodic signals, the Fourier transform for the analysis of non-periodic signals and familiarize the concept of sampling and different types of sampling techniques. This course also introduces the LTI system and the concepts of convolution and correlation applied for the signal analysis, the concept of Laplace transform, its properties and its applications for continuous time domain signals, the concept of Z- transform, its properties and its applications for discrete time domain signals

MODULE-I Introduction to Signals 10 Periods
Definition, Classification of Signals (continuous - time and discrete - time), Elementary signals (continuous - time and discrete - time).
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: Overview of Fourier series.

MODULE-II Fourier Transforms &Sampling 10 Periods
Fourier Transforms: Derivation of Fourier Transform from Fourier Series, Existence of Fourier Transform, Fourier Transform of Standard signals, Properties of Fourier Transform, Fourier Transform of periodic signals, and Introduction to Hilbert Transform.
Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Types of Sampling – Impulse Sampling, Natural and Flat Top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing.

MODULE-III LTI System, Convolution and Correlation 10 Periods
A: Signal Transmission through Linear Systems: System Definition, Classification of systems, Properties of LTI systems, Transfer Function of an LTI system, Filter Characteristics of Linear System, Distortionless Transmission through a system.
B: Convolution and Correlation of Signals: Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem.

MODULE-IV Laplace Transforms 10 Periods
Unilateral and Bilateral Laplace Transform, Relation between Laplace Transform and Fourier Transform, Laplace Transform of some commonly used signals and its Region of Convergence (ROC), Properties of Laplace Transform, Inverse Laplace Transform, Solution of Differential equations using Laplace Transform, Laplace Transform of signals using waveform synthesis.

MODULE-V Z–Transforms 8 Periods
One sided and Bilateral Z-Transform, Z-Transform of some commonly used signals and its Region of Convergence (ROC), Properties of Z-Transform, Inverse Z-Transform- Long Division, Partial Fraction and Residue Methods.

Text Books

1. B. P. Lathi, **"Signals Systems & Communications"**, BSP, 2nd Edition, 2013.
2. P Ramakrishna Rao and Shankar Parkriya, **"Signals and Systems"**, MGH International, 2nd Edition, 2013.

References

1. A.V. Oppenheim, A. S. Willsky, S.H. Nawab, **"Signals and Systems"**, PHI, 2nd Edition, 2014.
2. A. Anand Kumar, **"Signals and Systems"**, PHI, 3rd Edition, 2013.
3. Simon Haykin and Van Veen, **"Signals & Systems"**, Wiley, 2nd Edition, 2007.

E-Resources

1. http://www.tutorialspoint.com/signals_and_systems/
2. https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecture-notes/
3. http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?reload=true&punumber=78
4. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=8919
5. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=82
6. http://nptel.ac.in/courses/117104074
7. http://nptel.ac.in/courses/117101055

Course Outcomes

At the end of the course, students will be able to:

1. Represent any arbitrary signals in terms of complete sets of orthogonal functions and understand the principles of impulse functions, step function and signum function.
2. Express periodic signals in terms of Fourier series and aperiodic signals in terms of Fourier transform.
3. Understand the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
4. Express continuous time domain signals in terms of Laplace Transform ie. complex frequency domain (s-plain) and waveform synthesis.
5. Express discrete time domain signals in terms of Z-Transform and its Region of Convergence.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C0206	POWER GENERATION AND DISTRIBUTION	L	T	P
Credits: 3		3	-	-

Prerequisites: Engineering Chemistry, Electrical Circuit Analysis and Synthesis

Course Objectives: This course deals about the layout of different types of power stations and various power distribution systems. It also emphasis on the importance of economic aspects & tariff.

MODULE I Power Stations 10 Periods

Thermal Power Stations: Layout of Thermal Power Station (TPS). Brief description of functional parts: Air-preheater, Economizer, Super heater, Boilers, Turbines, Condensers, Cooling towers, Chimney and electrostatic precipitators.

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.

MODULE II Hydroelectric and Gas Power Stations 10 Periods

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.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only).

MODULE III Air & Gas Insulated Substations 9 Periods

A: 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.

B: Introduction to Gas insulated substations, Single line diagram of gas insulated substations, bus bar, Construction aspects of GIS, Maintenance and Advantages of GIS, Comparison of Air insulated substations and Gas insulated substations.

MODULE IV D.C. and A.C Distribution Systems 10 Periods

Classification of Distribution Systems - Comparison of DC vs AC Distribution Systems, 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. 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.

MODULE V Economic Aspects of Power Generation & Tariff Methods 9 Periods

Define - Load curve, Load duration and Integrated load duration curves - Load, Demand, Diversity, Capacity, Utilization and Plant Use Factors- Coincidence factor, Contribution factor and Loss factor - Relationship between the Load factor and loss factor. Classification of loads (Residential, Commercial, Agricultural and Industrial) and their characteristics. - Numerical Problems. 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. V.K Mehta and Rohit Mehta, **"Principles of Power Systems",** S.Chand& Company Ltd, New Delhi, 2004.
2. PSR. Murty**, "Electrical Power Systems",**Butterworth-Heinemann Publications, 2017.

References

1. R. K. Rajput, **"A Text Book of Power System Engineering"**, Laxmi Publications (P) Limited, 2nd Edition, 2016.
2. S.N.Singh , **"Electrical Power Generation, Transmission and Distribution"** , PHI Learning Pvt. Ltd., 2nd Edition, 2008.
3. C.L.Wadhwa, **"Electrical Power Systems"**, New Age international (P) Limited, 6th Edition, 2010.
4. Dr.B.R.Gupta, **"Generation of Electrical Energy"** , S.Chand& Company Ltd, 6th Edition, 2008.
5. G.Ramamurthy, **"Handbook of Electrical power Distribution"**, Universities Press, 2013.

E - Resources

1. https://www.electrical4u.com/power-plants-types-of-power-plant/
2. http://spectrum.ieee.org/energy
3. http://nptel.ac.in/courses/108102047/

Course Outcomes

At the end of the course, students will be able to

1. Understand the layouts of Thermal Power station, Nuclear Power Plant and Gas Power plant.
2. Demonstrate the operation of hydro electric power plants and turbines.
3. Comprehend about various types of substations and its equipment.
4. Analyze the voltage drops in DC and AC distribution systems.
5. Evaluate the cost of generation and tariff.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	ProgrammeOutcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-
CO2	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-
CO3	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-
CO4	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-
CO5	3	3	3	3	-	-	-	-	-	-	-	3	2	2	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C0207	DC MACHINES AND TRANSFORMERS	L	T	P
Credits: 3		2	1	-

Prerequisites: Electrical Circuits Analysis and Synthesis, Electro Magnetic Fields.

Course Objectives:

This course introduces the basic concepts of rotating machines. It emphasis on construction and operation of DC generators, DC Motors, Single phase transformers, Auto transformer and poly phase transformers. It also deals about the methods to evaluation the performance of DC Generators, DC Motors and Single phase transformers.

MODULE I Electro Magnetic Induction & Basic Concepts in Rotating Machines **12 Periods**

Introduction to magnetic circuits – Magnetically induced EMF and force – AC operation of magnetic circuits – Hysteresis & Eddy Current Loss. Energy in magnetic systems – Field energy & Mechanical force – Single and Multiple excited systems. MMF of distributed windings – Magnetic fields in rotating machines.

MODULE II DC Generators **13 Periods**

Construction & Principle of Operation of DC Generators – E.M.F Equation- Types of D.C Generators – Armature reaction – Methods of minimizing the effects of armature reaction – Compensating winding – Commutation – Methods of improving commutation. -Voltage build up in generators – OCC-Critical field resistance and critical speed - Causes for failure to self excite and Remedial measures – Load characteristics of shunt, series and compound generators.

MODULE III DC Motors **13 Periods**

A: Principle of operation – Back E.M.F. - Torque equation – Characteristics and application of shunt, series and compound motors and Speed control.

B: Necessity of starter -3- point and 4- point starters – Constant and Variable losses - Calculation of efficiency – Condition for maximum efficiency – Electric Braking – Brake test – Swinburne's test –Hopkinson's test.

MODULE IV Single Phase Transformers **13 Periods**

Types - Constructional details - EMF equation - Operation on no load and load - Phasor diagrams – Equivalent circuit - Losses and efficiency - Regulation. All day efficiency . OC and SC tests - Sumpner's test - Separation of losses test - Parallel operation with equal and unequal voltage ratios.

MODULE V Auto Transformers & Poly-Phase Transformers **13 Periods**

Auto transformers - Comparison with two winding transformers - Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ /Y, Δ / Δ - Open -Scott connection - Three winding transformers – Tertiary windings - Determination of Z_p, Z_s and Z_t. Inrush Current - Off load and on load tap changing.

Text Books

1. J.B.Gupta, **"Theory & Performance of Electrical Machines"**, S.K. Kataria& Sons, 15th Edition, 2015.
2. I.J.Nagrath&D.P.Kothari, **"Electric Machines"** ,Tata Mc Graw Hill, 4th Edition, 2010.

References

1. P.S. Bimbra, **"Electrical Machinery"** , Khanna Publishers, New Delhi, 7th Edition, 2011.
2. A.E.Fitzgerald, C.Kingsley and S. Umans, **"Electric Machinery"**, Tata Mc Graw-Hill Companies, 7th Edition, 2013.
3. Ashfaq Husain, **"Electric Machines"**, Danapati Rai & Co, New Delhi, 2002.
4. S.K.Bhattacharya, **"Electrical Machines"**, Tata McGraw Hill, New Delhi, 4th Edition, 2014.
5. M.V. DESHPANDE, "ELECTRICAL MACHINES", PHI LEARNING PVT. LTD., 2011.

E - Resources

1. https://www.electrical4u.com/electrical-motor-types-classification-and-history-of-motor/
2. https://www.eeweb.com/electromechanical
3. http://nptel.ac.in/courses/108105017

Course Outcomes

At the end of the course, students will be able to

1. Apply the magnetic induction principles and have the awareness on basic concepts of rotating machines.
2. Analyze the performance of DC generators.
3. Analyze the performance of DC motors and starting methods of DC motor.
4. Evaluate the performance of single phase transformer.
5. Understand the construction and operation of poly phase transformers and auto transformer.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	ProgrammeOutcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C0208	CONTROL SYSTEMS (Common for EEE & ECE)	L	T	P
Credits: 3		2	1	-

Prerequisites: Laplace Transforms, Differential Equations

Course Objectives: This course introduces different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response. It also emphasis on analysis of system performance in time and frequency domain and techniques for improving the performance.

MODULE I Systems and Representations 10 Periods

Basic elements in control systems: – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function – Synchro's, AC and DC servomotors – Block diagram reduction techniques – Signal flow graphs

MODULE II Time Response 9 Periods

Time domain specifications – Types of test input (Standard test signals)– I and II order system response – Error coefficients – Generalized error series – Steady state error – Effects of P, PI, PID modes of feedback control.

MODULE III Frequency Response 9 Periods

Introduction, Frequency domain specifications – Bode plot – Polar plot – Gain margin and Phase margin, Nyquist Plot- Determination of closed loop response from open loop response
Effect of Lag, lead and lag-lead compensation on frequency response, Design of Lag, lead and lag-lead compensator using bode plots.

MODULE IV Stability Analysis 9 Periods

A: The concept of stability- Routh's stability criterion – Nyquist stability criterion- Performance criteria

B: Root Locus Technique: The root locus concept - Construction of root loci - Effects of adding poles and zeros to G(s) H(s) on the root loci.

MODULE V State Space Analysis of Continuous Systems 10 Periods

Concepts of state, state variables and state model, State models for linear and time invariant Systems, derivation of state models from block diagrams, diagonalization - Solving the Time invariant state equations - State Transition Matrix and it's Properties – Concepts of Controllability and observability.

Text Books

1. I.J.Nagrath and M.Gopal, "Control Systems Engineering", New Age International Publishers, 5th Edition, 2007.
2. Benjamin.C.Kuo, "Automatic Control Systems", Prentice Hall of India, 7th Edition, 1995.

References

1. A.Nagoorkani, "Control Systems", RBA Publications, 2nd Edition, 2006.
2. M.Gopal, "Control System: Principles and Design", Tata McGraw Hill, 2 nd Edition, 2002.
3. Joseph J Distefano, "Schaum's Outline Series of Feedback and Control Systems", Tata McGraw Hill, 2nd Edition, 2014.
4. K. Ogata, "Modern Control Engineering", Pearson Education, New Delhi, 5th Edition, 2010.
5. M. Gopal, "Control Systems, Principles & Design", Tata McGraw Hill, 4th Edition,2012.

E - Resources

1. https://www.electrical4u.com/control-engineering-historical-review-and-types-of-control-engineering/
2. http://ieeecss.org/CSM/library/2011.html
3. http://nptel.ac.in/courses/108101037/

Course Outcomes

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

1. Apply transfer function models to analyze physical systems.
2. Determine the transient and steady state behavior of systems subjected to standard test signals.
3. Analyze the linear systems for absolute and relative stability in time and frequency domain.
4. Analyze the stability of the linear system in frequency domain and design compensators.
5. Familiarize with state space analysis and system properties like Controllability and Observability.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	ProgrammeOutcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO2	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO3	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO4	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1
CO5	3	3	3	3	-	-	-	-	-	-	-	3	1	-	1

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech IV Semester		
Code: C0461	BASIC SIMULATION LAB	L	T	P
Credits: 1.5		-	-	3

Course Objectives:

To get knowledge on how to write programs for various operations on signals and LTI systems.

List of Experiments

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulses, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
3. Operation of Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd parts of Signal Sequence and Real and Imaginary parts of Signal.
5. Convolution between Signals and Sequences.
6. Auto Correlation and Cross Correlation between signals and Sequences.
7. Verification of linearity and Time Invariance Properties of a given Continuous/ Discrete System.
8. Computation of unit Sample, Unit Step and sinusoidal responses of the given LTI System and Verifying its Physical reliability and stability Properties.
9. Gibbs Phenomenon.
10. Finding the Fourier Transform of a given Signal and Plotting its magnitude and Phase Spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Sampling Theorem Verification.

Course Outcomes:

At the end of the course, students will be able to

1. Generate Different Signals with different Parameters
2. Perform Different Operation on Matrices
3. Implement Different algorithms for small operations on a signal
4. Apply FT & LT on Signals
5. Verify the Different theorems on Signals

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	ProgrammeOutcomes(POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO2	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO3	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO4	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-
CO5	3	3	3	3	2	-	-	-	2	-	-	2	-	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C0209	DC MACHINES LAB	L	T	P
Credits: 1.5		-	-	3

Course Objectives:

To provide students with a strong back ground in different types of electrical machines. To train the students with well practical knowledge of different DC machines.

List of Experiments:

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
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 shunts 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. Separations of losses in DC shunt motor.
12. Brake test on DC series motor.

Course Outcomes

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

1. Assess the performance of DC shunt, series and compound motors.
2. Determine the efficiency of DC shunt, series and compound motors.
3. Perform the speed control methods of DC shunt motor.
4. Predetermine the efficiency of DC shunt motor.
5. Determine the performance characteristics of DC machines.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	-	-	-	-	3	-	-	3	2	-	-
CO2	3	3	3	3	-	-	-	-	3	-	-	3	2	-	-
CO3	3	3	3	3	-	-	-	-	3	-	-	3	2	-	-
CO4	3	3	3	3	-	-	-	-	3	-	-	3	2	-	-
CO5	3	3	3	3	-	-	-	-	3	-	-	3	2	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C0562	Object Oriented Programming Lab (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 1		-	-	2

Prerequisites: NIL

Course Objectives:

This course will make students able to learn and understand the concepts and features of object oriented programming and the object oriented concept like inheritance and will know how to make use of interfaces and package, to acquire the knowledge in Java's exception handling mechanism, multithreading.

Software Requirements: JDK

List of Programs:

1. Write a JAVA program to display default value of all primitive data type of JAVA.

2. Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

3. Write a Java Program to implement
   a) Default Constructor
   b) Parameterized constructor

4. Write a Java Program to implement
   a) Method overloading
   b) Method overriding

5. Write a Java program to implement
   a) Single Inheritance
   b) Multilevel Inheritance
   c) Hierarchical Inheritance

6. Write Java programs that uses the following keywords…
   a) this
   b) super

7. Write Java programs that uses the following keywords…
   a) static
   b) final

8. Write a Java program to implement
   a) abstract method
   b) Interfaces

9. Write a Java program to create user defined packages.

10. Write a Java program to implement Exception Handling using
    a) try-catch clause
    b) Multiple Catch clauses

11. Write a Java program that
    a) create user defined Thread by extending Thread class.
    b) create user defined Thread by implementing Runnable Interface

12. Write a Java program
    a) checks whether a given string is a palindrome or not.
    b) for sorting a given list of names in ascending order.

TEXT BOOKS:

1. Herbert Schildt, "**Java The complete reference**", TMH, 8th edition, 2011.
2. T. Budd, "**Understanding OOP with Java**", Pearson Education, updated edition, 1998.

REFERENCES:

1. P.J. Deitel and H.M. Deitel, "**Java for Programmers**", Pearson education.
2. P. Radha Krishna, "**Object Oriented Programming through Java**", Universities Press.
3. Bruce Eckel," **Programming in Java**", Pearson Education.
4. S. Malhotra and S. Choudhary," **Programming in Java**", Oxford Univ. Press.

Course Outcomes:

Course Outcomes:

At the end of the course, students will be able to

1. Differentiate structured programming and object oriented programming and know the concepts of classes, objects, members of a class.
2. Apply object oriented programming features and concepts for solving given problems using inheritance and will know how to organize files in packages and concept of interface.
3. Capable of handling run time errors using Exceptional Handling and exploring strings.
4. Develop applications for concurrent processing using Thread Concept.
5. Capable of handling IO operations using Files.

CO-PO MAPPING

CO- PO, PSO Mapping
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	3	-	-	-	-	-	-	-	-	-	3	2	-
CO2	-	-	3	-	2	-	-	-	-	-	-	-	2	3	-
CO3	-	2	2	-	2	-	-	-	-	-	-	-	-	2	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C00M1	GENDER SENSITIZATION (An Activity-based Course) (Common for CE, EEE, ME, ECE, MiE, CSE, CSE(DS), CSE(AI and ML), CSE(Cyber Security), CSE(IOT) and IT)	L	T	P
Credits: NIL		-	-	2

Prerequisites: NIL

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

MODULE I UNDERSTANDING GENDER 6 Periods

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudestowards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

MODULE II GENDER ROLES AND RELATIONS 6 Periods

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

MODULE III GENDER AND LABOUR 7 Periods

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Sharethe Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized

and Unaccounted work.-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming.

MODULE IV GENDER - BASED VIOLENCE **7 Periods**

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing-Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

MODULE V: GENDER AND CULTURE **7 Periods**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues- Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

- **ESSENTIAL READING**: The Textbook, "*Towards a World of Equals: A Bilingual Textbook onGender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu**published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

TEXT BOOKS:

1. Towards a World of Equals: A bilingual Textbook on Gender, A Suneetha –etall

REFERENCES:

1. Sen, Amartya. "More than One Million Women are Missing.' New York Review of Books 37.20 (20 December 1990). Print. We Were Making History...' Life Stories of Women in the ToIrmgana People's Struggle. New Delhi: Kali for Women, 1989.
2. TriptiLahiri. "By the Numbers: Where Indian Women Work." Women's Studios Journal (14 November 2012) Available online at: http:// blogs.visj.com/ India real time/2012/11/14/by - the-numbers-where-Indan-womenworkP
3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada htto://harooreollins.co.in/BookDetailasp?FlookCndet,3732
4. Vimata. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press 1995. 599-601.

5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health end Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. 'We Were Making I listory ....' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

E-RESOURCES:

1. http://www.actforyouth.net/resources/rf/rf_gender1_1213.cfm (UNDERSTANDING GENDER)
2. https://www.simplypsychology.org/gender-biology.html(GENDERAND BIOLOGY)
3. http://www.yourarticlelibrary.com/essay/essay-on-gender-issues-in-labour-market-in-india/40442/ (GENDER AND LABOUR)
4. http://journals.sagepub.com/doi/abs/10.1177/1077801200006007004 (ISSUES OF VIOLENCE)
5. http://www.nordiclabourjournal.org/emner/likestilling (GENDER AND BIOLOGY)

Course Outcomes:

At the end of the course,

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.

CO-PO Mapping

CO-PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COS	Programme Outcomes (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	-	3	3	-	2	3	1	-	-
CO2	-	-	-	-	-	3	-	3	3	-	2	3	2	-	-
CO3	-	-	-	-	-	3	-	3	3	-	2	3	1	-	-
CO4	-	-	-	-	-	3	-	3	3	-	2	3	1	-	-
CO5	-	-	-	-	-	3	-	3	3	-	2	3	2	-	-

2022-23 Onwards (MR-22)	MALLA REDDY ENGINEERING COLLEGE	B.Tech. IV Semester		
Code: C00P1	REAL-TIME RESEARCH PROJECT/ FIELD BASED PROJECT	L	T	P
Credits: 1		-	-	2