REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2021-22 onwards

Department of Electronics and Communication Engineering

For

B.Tech. - Four Year Degree Programme

(MR21 Regulations)

Department of Electronics and Communication Engineering

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)

(An UGC Autonomous Institution, Approved by AICTE and Affiliated to JNTUH, Hyderabad)
Recognized under section 2(f) &12 (B) of UGC Act 1956, Accredited by NAAC with 'A' Grade (II Cycle) and NBA
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 ***2021-22*** 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 produce innovative, globally competent and ethical Electronics and communication Engineers to cater socio-economic needs.

DEPARTMENT MISSION

- To impart quality education in Electronics and Communication Engineering discipline and produce employable graduates
- To improve the thought process of students by exposing them to advanced technologies and make them innovative in their career
- To provide ethical and value-based education by encouraging activities addressing the societal needs.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates acquire insights into mathematics, sciences, computing and fundamentals of electronics and communication engineering including breadth to meet global demand and competitiveness in terms of technological aspects.

PEO2: Graduates excel in best postgraduate schools, reaching advanced degrees in engineering and related disciplines; will have skills for continued independent, lifelong learning to become experts in their profession.

PEO3: Graduates possess best communicative skills and work efficiently on team-based projects in electronics, communication, computational and manufacturing firms with a sense of social responsibility.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Understand the basics of Electronics and Communications and will be able to apply and analyzing the problems related to Electronics, Communications, Signal processing, VLSI, Embedded systems, etc.

PSO2: Solve any problem related to Electronics and Communication Engineering with the help of latest softwares and specialized hardware. They will also be able to design a working prototype of the solution.

PSO3: Will be able to apply the knowledge of Electronics and Communication Engineering and design projects for the betterment of people's life (health, security, resource management, etc.) in society and to maintain ecological balance.

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.

MALLA REDDY ENGINEERING COLLEGE

COURSE STRUCTURE – B.Tech. Electronics and Communication Engineering Programme.

(MR21 Regulations - Effective from Academic Year 2021 – 22 onwards)

SEMESTER – I							
S. No	**Category**	**Course Code**	**Name of the Subject**	**Contact hours/week**			**Credits**
				L	**T**	**P**	
1.	HSMC	B0H01	English	3	-	-	3
2.	BSC	B0B03	Linear Algebra and Applied Calculus	3	1	-	4
3.	ESC	B0501	Programming for Problem Solving	3	-	-	3
4.	ESC	B0201	Basic Electrical and Electronics Engineering	3	-	-	3
5.	ESC	B0502	Programming for Problem Solving Lab	-	-	2	1
6.	HSMC	B0H02	English Language and Communication Skills Lab	-	-	2	1
7.	ESC	B0302	Engineering Workshop	-	-	2	1
8.	ESC	B0202	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	B0B17	Engineering Chemistry	3	1	-	4
2.	ESC	B0305	Engineering Drawing	2	-	2	3
3.	BSC	B0B10	Applied Physics	3	1	-	4
4.	BSC	B0B04	Advanced Calculus	3	1	-	4
5.	PCC	B0401	Analog Electronics	3	-	-	3
6.	ESC	B0553	Basic Python Programming Lab	-	1	2	2
7.	BSC	B0B11	Applied Physics Lab	-	-	2	1
8.	BSC	B0B18	Engineering Chemistry Lab	-	-	2	1
9.	PCC	B0402	Analog Electronics Lab	-	-	2	1
			Total	**14**	**4**	**10**	**23**
			Total Contact Hours	**28**			

SEMESTER-III							
S.No	**Category**	**Course Code**	**Name of the Subject**	**L**	**T**	**P**	**Credits**
1	BSC	B0B08	Complex Variables and Numerical Methods	3	-	-	3
2	PCC	B0403	Digital Electronics	3	-	-	3
3	PCC	B0404	Signal Theory and Stochastic Processes	3	-	-	3
4	PCC	B0405	Electromagnetic Waves & Transmission lines	3	-	-	3
5	PCC	B0406	Network Theory and Circuit Analysis	3	-	-	3
6	PCC	B0407	Digital Electronics Lab	-	-	2	1
7	PCC	B0408	Signals and Stochastic Processes Lab	-	-	2	1
8	ESC	B0554	Fundamentals of Data Structures Lab	-	-	4	2
9	MC	B00M2	Environmental Science	2	-	-	0
			Total	**17**	**0**	**8**	**19**
			Total contact hours	**25**			

SEMESTER-IV							
S.No.	**Category**	**Course Code**	**Name of the Subject**	**L**	**T**	**P**	**Credits**
1	HSMC	B0H08	Engineering Economics and Accountancy	3	-	-	3
2	PCC	B0409	Microprocessor & Microcontroller	3	-	-	3
3	PCC	B0410	Analog and Digital Communications	3	-	-	3
4	PCC	B0411	Pulse and Linear Integrated Circuits	3	-	-	3
5	OEC-I		Open Elective-I	3	-	-	3
6	PCC	B0412	Analog and Digital Communications Lab	-	-	2	1
7	PCC	B0413	Electronic Circuits and Pulse Circuits Lab	-	-	2	1
8	ESC	B0555	Object Orient Programming through Java Lab	-	-	4	2
9	MC	B00M1	Gender Sensitization	2	-	-	0
			Total	**17**	**0**	**8**	**19**
			Total contact hours	**25**			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: B0H01	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.

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				1	2		2			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech ISemester		
Code: B0B03	**Linear Algebra and Applied Calculus (Common For ECE & EEE)**	**L**	**T**	**P**
Credits: 4		**3**	**1**	**-**

Prerequisites: Matrices, Differentiation and Integration.

Course Objectives:

To learn types of matrices, Concept of rank of a matrix and concept of Eigen values and Eigen vectors of a matrix, diagonalization of a matrix, Cayley Hamilton theorem and concept of the mean value theorems, partial differentiation and maxima and minima. To learn methods of solving differential equations and 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, Affiliated East–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**

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0501	**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:

Understand the basic terminology, write, compile and debug programs in computer programming, Implement different control statements for solving problems. Understand the concept of structured program and arrays.Implement the idea of strings and pointers. 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.

MODULE II: 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, 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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0201	Basic Electrical And ElectronicsEngineering (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.

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		
CO2	3	3	3									3	3		
CO3	3	3	3									3	3		
CO4	3	3	3									3	3		
CO5	3	3	3									3	3		

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0502	**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:

Understand the various steps in Program development. Identify syntax and semantics of C Programming Language. Illustrate the usage of structured programming approach in solving problems. Develop programs that make use of arrays, strings and pointers in C language. 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:

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

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, 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**

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I / II Semester		
Code: B0H02	**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 throughrecording).
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:

1. 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			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code:B0302	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	

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0202	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
(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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech		
Code: B0B17	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 **[08 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"**, 5thEdition, 2006.

Course Outcomes with BLOOM's

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

	Course Outcome	Bloom's Taxonomy Level
CO1	Understand water treatment, specifically hardness of water and purification of water by various methods.	Understand**(L2)**
CO2	Analyze microscopic chemistry in terms of atomic and molecular orbital's splitting and band theory related to conductivity	Analyze **(L4)**
CO3	Apply knowledge of electrochemical cell concept with respect to fuel cells, batteries, theories of corrosion. Applications of corrosion control methods.	Apply **(L3)**
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.	Analyze **(L4)**
CO5	Acquire the knowledge of various fuels and identify a better fuel source of less pollution.	Analyze **(L4)**

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								

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: B0305	ENGINEERING DRAWING (Common for CSE, CSE-AIML, CSE-IOT, CSE-CS, CSE-DS, IT, AIML, ECE, EEE)	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 Cycloid and Involutes.
Scales: Plane Scale, Diagonal 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 one reference plane.

MODULE III: Projection of Planes: Axis inclined to one reference plane.

Projection of Solids: Projections of regular solids like cube, prism, pyramid, cylinder and cone by rotatingobject method. Axis inclined one 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

3. K.L.Narayana, P.Kannaiah, "Engineering Drawing", SciTech Publishers. 2nd Edition, 2017

4. K.Venugopal,"Engineering Drawing",NewAge International Publishers, 3rd Edition, 2014.

5. 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)

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		1							3		3			
CO2	3		1							3		3			
CO3	3		1							3		3			
CO4	3		1							3		3			
CO5	3		1							3		3			

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0B10	Applied Physics (Common for ECE and EEE)	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Course Objectives:

To outline the dual nature of matter and elaborate the significance of the Kronig-Penney model in classifying the materials. To illustrate the working of p-n junction diode, photodiode, LED and solar cell and to interpret the Maxwell equations. Comparison of 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: **[12 Periods]**

LASER: Introduction, Characteristics of LASER; Absorption, 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.

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

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.

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	**2**	**2**	**1**												
CO2	**3**	**1**	**2**												
CO3	**3**	**2**	**2**												
CO4	**3**	**2**	**2**												
CO5	**2**	**2**	**1**												

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code:B0B04	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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0401	ANALOG ELECTRONICS (Common for EEE & ECE)	L	T	P
Credits: 3		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 understands 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

2020-21 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0553	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**		
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	**1**			**1**	**1**							**1**	**1**		
CO2		**1**	**2**	**3**								**3**		**1**	**1**
CO3	**1**	**1**	**1**	**1**	**2**	**1**	**1**					**3**		**2**	**3**

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I/II Semester		
Code: B0B11	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 studies.

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**	**1**	**1**												
CO2	**3**	**1**	**1**												
CO3	**3**														
CO4	**3**														
CO5	**3**														

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: B0B18	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												

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: B0402	**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	PO 12	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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0B08	COMPLEX VARIABLES AND NUMERICAL METHODS (Common for ECE & EEE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Differentiation, Partial differentiation, Integration

Course Objectives:

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

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) $\int_{-\infty}^{\infty} f(x)dx$

(a) $\int_{0}^{2\pi} f(\cos\theta, \sin\theta)d\theta$

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]

Numerical solution of Ordinary Differential Equations: 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.

Reference Books:

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

NPTEL:

4. https://www.youtube.com/watch?v=WbmLBRbp0zA (Bisection Method)
5. https://www.youtube.com/watch?v=0K6olBTdcSs (Regula Falsi and Newton Raphson Method)
6. https://www.youtube.com/watch?v=KSFnfUYcxoI (Interpolation)
7. https://www.youtube.com/watch?v=QugqSa3Gl-w&t=2254s (Numerical Solution of ODE)
8. https://www.youtube.com/watch?v=NihKCpjx2_0&list=PLbMVogVj5nJRILpJJO7KrZa8Ttj4_ZAgl (Numerical Solution of ODE)
9. https://www.youtube.com/watch?v=hizXlwJO1Ck (Numerical Integration)
10. https://www.youtube.com/playlist?list=PLNKx0RorxX44HBsItvZP5CzFX1qCQOwp5 (Complex Analysis)

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Apply the concept of analyticity of a function	Apply
CO2	evaluate the Integrals	Analyze
CO3	Find Power series expansions of complex functions and evaluation of contour integrals.	Analyze
CO4	Find the root of a given equation by various methods and estimate the value for the given data using interpolation.	Analyze
CO5	Find the numerical solutions for a given ODE"s and evaluations of integrals using numerical techniques.	Analyze

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			1
CO2	2	2	2	3	2				2			1
CO3	2	2	2	3	2				2			1
CO4	3	2	2	3	3				2			2
CO5	2	2	2	3	3				2			2

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0403	DIGITAL ELECTRONICS (Common for EEE & ECE)	L	T	P
Credits: 3		3	-	-

Pre-Requisites: 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 –

Simplification of Boolean functions: Simplification of functions: Karnaughmap (2,3,4,5,6 Variables) and Quine McCluskey method (Tabular Method) - Prime implicants, essential prime implicants.

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 looks 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 onetype of Flip flop to another, Setup time, hold time.

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 andFlip flops. Example design Sequence detector.

MODULE V: Sequential Logic Circuits - II [10 Periods]

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.

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, "Digital Design", PHI, 3rd Edition, 2009.
3 A.Anand Kumar, "Switching Theory and Logic Design", PHI 2nd Edition, 2014.
4 John F.Wakerly, "Digital Design Principles & Practices", PHI/ Pearson Education Asia, 3rd Ed., 2005.

Reference Books:

1 Stephen Brown and Zvonka Vramesic, "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
4. http://nptel.ac.in/courses/117106086/1
5. http://nptel.ac.in/courses/117105080/
6. http://nptel.ac.in/courses/117106114/

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Perform radix conversions	Apply
CO2	Minimize a given boolean function by using k-map or tabular method	Analyze
CO3	Design a combinational circuit	Analyze
CO4	Design a sequential circuit by using various flipflops	Analyze
CO5	Analyze and minimize the circuitry of a given sequential circuit and will be able to design asequence detector	Analyze

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

CO S	Programme Outcomes(POs)												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	1		1	1								2	2	1
CO2	2	3	3	1	1					1			3	2	2
CO3	3	2	3	2		1	1			1	2	1	3	3	2
CO4	2	2	3	3	1	1	1			1	3	1	2	2	2
CO5	1	1	3	3	1	1	1			1	3	1	3	2	2

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0404	SIGNAL THEORY & STOCHASTIC PROCESSES	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Nil

Course Objectives: This course is introducing the basic concepts of signals and LTI system. Introduces the Fourier series for the analysis of periodic signals, the Fourier transform for the analysis of non-periodic signals. To build an understanding of the concept of random variables, multiple random variables, random processes and their operations.

MODULE I: Signal Analysis: [10 Periods]

Signal Analysis: Introduction to signals and systems, Classification of signals and systems (both continuous and discrete); Operations on Signals, Approximation of a function by a set of mutually orthogonal functions, Evaluation of mean square error, Orthogonality in complex functions, Gibb Phenomena.

Properties of LTI systems, Transfer function of an LTI system, linear systems response to Deterministic signals and Distortion less transmission.

MODULE-II: Continuous-Time Fourier series and Fourier transform: [10 Periods]

Fourier series: Representation of periodic signals, Convergence of Fourier series, Trigonometric, Exponential forms, Properties of Fourier series.

Fourier Transforms: Representation of non-periodic signals. Fourier transform of periodic signals, Inverse Fourier transforms, Properties of the Continuous-Time Fourier transforms, Convolution and multiplication properties and their effect in the frequency domain, magnitude and phase response.

MODULE-III: Laplace Transform and Random Variables [15 Periods]

Laplace Transform: Definition , Properties of Laplace Transform, The Laplace Transform of different signals, Region of convergence, System functions, Poles and zeros of system, Solutions to differential equations, Inverse Laplace Transform.

Random Variables: Review of Probability theory, Definition of Random Variable, Classification of Random Variables, Cumulative Distribution Function (CDF) and its properties, Probability Density function (PDF) and its Properties, Types of CDF & PDF - Uniform, Gaussian and Rayleigh.

MODULE-IV: Multiple Random Variable & Operations [10 Periods]

Multiple Random variables: Joint Distribution and its Properties, Joint Density and its Properties, Conditional Distribution and Density, Statistical Independence, Sum of Two Random Variables, Central Limit Theorem (Without Proof).

Operations on Single & Multiple Random Variables: Expectation, Moments, Variance and Skew, Characteristic Function, Moment Generating Function, Transformations of a Random Variable

MODULE-V: Stochastic Processes & Linear systems response to random inputs: [10 Periods]

Temporal Characteristics: The Stochastic Processes concept, classification of Processes, Deterministic and non-Deterministic Processes, Autocorrelation function and its properties, Cross correlation and its properties.

Spectral Characteristics: Power spectrum, Power spectrum density, Properties, Cross Power spectrum, Cross Power spectrum density, Properties, Relationship between Power spectrum and Autocorrelation function.

Linear systems response to random inputs: Linear System Response of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions. Power Density Spectrum, and Cross-Power Spectral Density of random inputs.

Text Books:

1. B. P. Lathi, "Signals Systems & Communications", BSP, 2nd Edition, 2013.
2. Peyton Z. Peebles, **"Probability, Random Variables & Random Signal Principles"**, TMH, 4th Edition, 2001.
3. P Ramakrishna Rao and Shankar Parkriya, "Signals and Systems", MGH International, 2nd Edition, 2013.

Reference Books:

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.
4. Y. Mallikarjuna Reddy, **"Probability Theory and Stochastic Process"**, University Press, 4th Edition, 2013.
5. Athanasius Papoulis and S. Unnikrishna Pillai, **"Probability, Random Variables and Stochastic Processes"**, TMH, 4th Edition, 2002.

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. https://ocw.mit.edu/courses/mathematics/18-440-probability-and-random-variables-spring-2014/lecture-notes/
6. http://nptel.ac.in/courses/IIT- MADRAS/Principles of_Communication1/Pdfs/1_5.pdf
7. http://pages.ucsd.edu/~ssaiegh/Slides8.pdf

Course Outcomes:

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

1. Represent any arbitrary signal in terms of complete sets of orthogonal functions and understand

the principles of elementary signals.

2. Express periodic signals in terms of Fourier series and aperiodic signals in terms of Fourier transform.
3. Express continuous time domain signals in terms of Laplace Transform i.e. Complex frequency domain (s-plain) and waveform synthesis and apply the concepts of CDF, pdf in characterizing random variables to solve any problem;
4. Understand multiple random variables theory and will be able to perform operations on single and multiple random variables
5. Calculate random processes characteristics such as correlation, covariance and power spectral density

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Represent any arbitrary signal in terms of complete sets of orthogonal functions and understand the principles of elementary signals.	Apply
CO2	Express periodic signals in terms of Fourier series and aperiodic signals in terms of Fourier transform.	Analyze
CO3	Express continuous time domain signals in terms of Laplace Transform i.e. Complex frequency domain (s-plain) and waveform synthesis and apply the concepts of CDF, pdf in characterizing random variables to solve any problem;	Analyze
CO4	Understand multiple random variables theory and will be able to perform operations on single and multiple random variables	Understand
CO5	Calculate random processes characteristics such as correlation, covariance and power spectral density	Analyze

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

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0405	Electromagnetic Theory and Transmission Lines	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Vector Calculus, Engineering Physics, Applied Physics

Course Objectives: To analyze the fundamental concepts of

- Vector analysis,
- Electrostatics, Magneto statics laws and their applications.
- Transmission Lines

MODULE I: **[10 Periods]**

Review of coordinate systems, Coulomb's Law, Electric field due to various Charge configurations and Electric flux density, Gauss's Law and its applications, Work, Potential and Energy, The dipole, Current and Current density, Laplace and Poisson's equations, Calculation of capacitance for simple configurations.

MODULE II: **[14 Periods]**

Steady magnetic-Biot-Savart's law, Ampere's law, Stoke's theorem, Magnetic flux and magnetic flux density, Scalar and vector magnetic potentials, Electric and Magnetic fields boundary conditions, Maxwell's equations for static and time varying fields.

MODULE III: **[12 Periods]**

Uniform plane waves in free space and in conducting medium, Polarization, Instantaneous, average and complex Poynting theorem and its applications.

Reflection and Refraction: Normal and Oblique incidence on dielectrics and conducting medium.

MODULE IV: **[12 Periods]**

Overview of T and π networks, Types of Transmission Lines-Two wire lines, Primary and secondary constants, Transmission Line equations, Infinite line and characteristic impedance-Open and short circuit lines and their significance, Distortion less transmission line, Concept of loading of a transmission line, Campbell's formula.

MODULE V: **[10 Periods]**

Impedance at any point on the transmission line- Input impedance, RF and UHF lines, transmission lines as circuit elements, Properties of λ/2, λ/4 and λ/8 Lines, Reflection coefficient and VSWR, Matching: Stub matching, Smith chart and its applications.

Text Books:

1. Matthew N.O. Sadiku, Principles of Electro-magnetics, 6th edition, Oxford University Press, 2016.

2. William H. Hayt Jr. and John A. Buck, Engineering Electromagnetics, 7th edition, Tata

McGraw Hill, 2006.

3. John D. Ryder, Networks Lines and Fields, 2nd edition, Pearson, 2015.

Reference Books:

1 E.C. Jordan and K.G. Balmain, Electromagnetic Waves and Radiating Systems, 2nd edition, Pearson, 2015

2 K.D. Prasad, Antennas and Wave Propagation, Khanna Publications.

E-Resources:

1. www.dannex.se/theory/1.html
2. ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-013-electromagnetics-and-applications-spring-2009\
3. www.tandfonline.com/toc/uemg20/current
4. nptel.ac.in/courses/108104087
5. nptel.ac.in/courses/115101005
6. https://resources.altium.com/p/transmission-line-fundamentals-and-electromagnetic-fields

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Understand the different coordinate systems, vector calculus, coulombs law and gauss law for finding electric fields due to different charges and to formulate the capacitance for different capacitors	Understand
CO2	Learn basic magneto statics concepts and laws such as Biot-Savart's law and Amperes law, their application in finding magnetic field intensity, inductance and magnetic boundary conditions.	Understand
CO3	Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.	Analyze
CO4	Determine the Transmission Line parameters to characterize the distortions and estimate the characteristics for different lines.	Analyze
CO5	Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems.	Analyze

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

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0406	NETWORK THEORY AND CIRCUIT ANALYSIS	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Basic Electrical and Electronics Engineering

Course Objectives: This course introduces the basic concepts of transient analysis of the circuits, the basic two port network parameters. It also introduces the students the multistage Amplifier analysis and frequency response.

MODULE I: Network Theorems & Transient Analysis [11 Periods]

Network Theorems (A.C. & D.C): Norton's Theorem, Reciprocity Theorem, Tellegen's Theorem, Milliman's and Compensation theorems for A.C & D.C excitations.

Transient Analysis (First and Second Order Circuits): Transient Response of RL, RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

MODULE II: Two Port Networks [9 Periods]

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

MODULE III: Locus Diagrams, Resonance and Magnetic Circuits: [10 Periods]

A: Locus Diagrams, Resonance: Locus diagrams- Series and Parallel RL, RC and RLC circuits with variation of various parameters- Resonance-series and parallel circuits, concepts of Bandwidth and Quality factor.

B: Magnetic Circuits: Faraday's laws of electromagnetic induction, concept of self and mutual inductance, Dot convention coefficient of coupling, composite magnetic circuits, Analysis of series and parallel magnetic circuits.

MODULE IV: Multistage Amplifiers [9 Periods]

Multistage Amplifiers: Different Coupling Schemes used in Amplifiers, General Analysis of Cascaded RC Coupled BJT Amplifiers Choice of Transistor configuration in a Cascade Amplifier, RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled (DC) Amplifiers and Darlington Pair.

MODULE V: Frequency Response [9 Periods]

Frequency Response: General Frequency Considerations, High Frequency Hybrid π Model for Common Emitter Transistor Model, Emitter Follower at Higher Frequencies, Analysis and design of single tuned and double tuned amplifiers with BJT, Comparison of multistage, single tuned amplifiers and double tuned amplifiers.

Text Books:

1. William Hayt and Jack E. Kemmerly, "Engineering circuit analysis", Mc Graw Hill Company, 7th Edition.
2. B.L.Theraja and A.K. Theraja, "A Textbook of Electrical Technology Volume I", S.Chand publications.
3. S. Salivahanan, N Suresh Kumar, "Electronic Circuit Analysis", Tata McGraw Hill Education Private Limited, New Delhi, 2nd Edition, 2012..

Reference Books:

1. Electrical Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
2. S.N. Singh, "Basic Electrical Engineering", PHI.
3. K. S. Suresh Kumar, "Electric Circuit Analysis", Pearson Education.
3. G. K. Mithal, "Electronic Devices and Circuits", Khanna Publishers, New Delhi, 2nd Edition, 1998.

E-Resources:

1. http://nptel.ac.in/courses/108108076/
2. https://www.electrical4u.com/electrical-power-transformer-definition-and-types- of transformer/
3. www.dannex.se/theory/1.html
4. ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-013-electromagnetics-and-applications-spring-2009\
5. https://www.tutorialspoint.com/amplifiers/multi_stage_transistor_amplifier.htm
6. https://www.watelectrical.com/what-is-a-multistage-amplifier-design-types-its-applications/

Course Outcomes:

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

1. Apply network theorem to analyze the various electrical circuits.
2. Determine the transient behavior of first and second order circuits.
3. Analyze the two port networks by determining the various parameters.
4. Design multistage transistor amplifiers and analyze the gain, impedance, bandwidth of amplifiers.
5. Analyze the Frequency Response of multistage transistor.

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Apply network theorem to analyze the various electrical circuits.	Apply
CO2	Determine the transient behavior of first and second order circuits.	Analyze
CO3	Analyze the two port networks by determining the various parameters.	Analyze
CO4	Design multistage transistor amplifiers and analyze the gain, impedance, bandwidth of amplifiers.	Analyze
CO5	Analyze the Frequency Response of multistage transistor.	Analyze

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0407	DIGITAL ELECTRONICS LAB (Common for EEE & ECE)	L	T	P
Credits: 1		-	-	2

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

Implement the following using Verilog/VHDL or any equivalent software

1. Introduction to Verilog/VHDL and Design of all the logic gates
2. Design of Half adder, Full adder using 3 modeling styles
3. Design of Half Subtractor, Full Subtractor using 3 modeling styles
4. Design of 4X16 Decoder using two 3x8 Decoders
5. Design of 8-to-3 encoder (without and with priority).
6. Design of Multiplexer & Demultiplexer.
7. Design of comparator
8. Design of 4-bit binary to gray converter vice versa
9. Design of BCD to Excess-3 code converter and vice versa
10. Design of flip flops: SR, D, JK, T.
11. Design of 4-bit binary up/down counter.
12. 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, student will be able to

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Design and verify the functionality of various combinational circuits using Verilog/VHDLcoding.	Analyze
CO2	Design and verify the functionality of various flipflops and basic sequential circuits usingVerlog/VHDL coding.	Analyze

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	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3		1		1	2	2	3	3	3	2
CO2	3	3	3	3	3		1		1	2	2	3	3	3	2

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0408	SIGNALS AND STOCHASTIC PROCESSES LAB	L	T	P
Credits: 1		-	-	2

Course Objectives: To get knowledge on how to write program for various operation on signals, to verify various functions of random process.

Implement the following Programs using MATLAB/Octave/Equivalent Software

PART – A (Signals)

1. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulses, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Operation of Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
3. Verification of Linearity and Time-Invariance properties of a given continuous /discrete system.
4. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
5. Convolution between Signals and Sequences.
6. Waveform Synthesis using Laplace Transform.

PART – B (Stochastic Process)

7. Generation of random variables and plot the PDF and CDF of the following distributions Uniform, Gaussian, Rayleigh,
8. Operations on Single Random Variable: Mean, Variance, Skew of different distributions.
9. Operations on Multiple Random Variables- Correlation and Covariance of any given two random variables
10. A) Calculation of Autocorrelation Function and Power-Spectral Density of a Given Random Process
    B) Calculation of Cross-Correlation Function and Cross-Power-Spectral Density of Two Random Processes
11. Calculation of Temporal Characteristics of Response of Linear-Time Invariant Systems when input is a WSS random process.
12. Calculation of Spectral Characteristics of Response of Linear-Time Invariant Systems when input is a WSS random process..

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Generate different signals with different parameters.	Analyze
CO2	Do operations on random variables.	Analyze
CO3	Verify & do the calculation on various random processes.	Analyze

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

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code:B0554	FUNDAMENTALS OF DATA STRUCTURES LAB (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	-	4

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: C

List of Programs:

1 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

2 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.

3 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.

4 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.

5 Write a program to implements stack operations using:
   a) Arrays
   b) Linked list

6 Write a program to:
   a) Evaluate Postfix expression.
   b) Convert infix expression into postfix expression

7 Write a program to implements Linear Queue operations using:
   a) Arrays
   b) Linked list

8 Write a program to implements Circular Queue operations using Arrays

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

10 Write a recursive program to create a Binary Tree of integers, traverse the tree in preorder, in order and post order of the tree.

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

12 Write a program for implementing the following graph traversal algorithms:
a) Breadth First Search (BFS)
b) Depth First Search (DFS)

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Identify the appropriate recursive algorithms and analyze the performance of algorithms.	Analyze
CO2	Understand and implement single, double, and circular linked-lists.	Understand
CO3	Implement linear data structures such as Stacks and Queues using array and linked-listrepresentations.	Apply
CO4	Implement non-linear data structures such as trees and graphs	Apply

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	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	2										3	2	
CO2	2	2	3										2	3	
CO3		2	3											3	1
CO4		2	3										2	3	

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech III Semester		
Code:B00M2	ENVIRONMENTAL SCIENCE (Common for ALL)	L	T	P
Credits: Nil		2	-	-

Pre-Requisites: 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 e-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 renewable energy 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]

Greenhouse effect, 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

Reference Books:

1. Erach Bharucha, "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. Journal of earth science and climatic change (OMICS International Journal).
2. Journal of pollution effects & control (OMICS International Journal).
3. nptel.ac.in/courses/120108004/ (Principles of Environment Management Lectures).
4. http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html (NPTEL online video courses IIT lectures).

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	To enable the students to realize the importance of ecosystem, its structure, services. To make the students aware of Different natural functions of ecosystem, this helps to sustain the life on the earth.	Understand
CO2	To use natural resources more efficiently.	Understand
CO3	To make the students aware of the impacts of human actions on the environment, its effects and minimizing measures to mitigate them.	Understand
CO4	To educate the students regarding environmental issues and problems at local, national and international level.	Understand
CO5	To know more sustainable way of living	Understand

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

COS	Programme Outcomes(POs)												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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							

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech IV Semester		
Code:B0H08	ENGINEERING ECONOMICS AND ACCOUNTANCY	L	T	P
Credits: 3		3	-	-

Pre-Requisites: 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 – ISO quants and ISO costs, 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 rising 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.

Reference Books:

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:

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Understand the concepts of managerial economics and their application in evaluating the demand.	Understand
CO2	Evaluate the production function and identifies the least cost combination to control the costs of production	Analyze
CO3	Understand the structures of various market types and their pricing policies.	Understand
CO4	Understand the types of business forms and also be able to evaluate the investments using capital budgeting techniques.	Understand
CO5	Understand the basic concepts of financial accounting and evaluation of company performance using ratio analysis.	Understand

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0409	MICROPROCESSOR AND MICROCONTROLLERS	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Digital Electronics.

Course Objectives: Introduction of microprocessors, 8051 microcontroller and ARM Processors and understanding the programming of advanced ARM Processors**.**

MODULE I: Introduction to Processors [8 Periods]

Introduction to Microprocessors and Microcontrollers, 8-bit/16-bit Microprocessor Architectures [8085, 8086], Introduction to ARM7, ARM 9, Intel I (i3, i5, i7) Series Processors, AMD and Ryzen Processors.

MODULE II: ARM Architecture [10 Periods]

ARM Design Philosophy, Overview of ARM architecture States [ARM, Thumb, Jazelle], Registers, modes, Conditional Execution, Pipelining, Vector Tables, Exception handling.

MODULE III: ARM & Thumb Instructions and Assembly language Programming [10 Periods]

ARM Instruction- data processing instructions, branch instructions, load store instructions, SWI instruction, Loading instructions, conditional Execution, Assembly Programming. Thumb Instruction-Thumb Registers, ARM Thumb interworking, branch instruction, data processing instruction, single/multiple load store instruction, Stack instruction, SWI instruction.

MODULE IV: 8051 Microcontrollers [10 Periods]

Organization and Architecture of 8051, RAM-ROM Organization, Machine Cycle, Data Processing - Stack, Arithmetic, Logical; Branching – Unconditional and Conditional, Peripherals: I/O Ports, Timers-Counters, Serial Communication, Interrupts.

MODULE V: Interfacing [10 Periods]

LCD, LED and Keypad Interfacing, Analog-to-Digital Convertors, Digital-to-Analog Convertors, Sensor with Signal Conditioning Interface, ARM Cortex M Microcontroller- Ports, Timer, UART, ADC, I2C.

Text Books:

1. Mazidi, Mazidi&McKinlay, “The 8051 Microcontroller and Embedded Systems using Assembly and C” 2nd Edition, PHI.
2. ARM System Developers guide, Andrew N SLOSS, Dominic SYMES, Chris WRIGHT, Elsevier, 2012.
3. Ramesh Gaonkar, “Microprocessor Architecture, Programing and Application with 8085”Penram, 5th Edition, 2002.
4. A. K.Ray, “Advanced Micro processors and Peripherals” 3 rdTata McGraw-Hill, Edition.

Reference Books:

1. Joseph Liu, The Definitive guide to ARM Cortex M0, 2012, Newnes.
2. Simon Monk, Programming Arduino Next Steps: Going further with sketches, 2014, McGraw Hill.

3. Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, AVR Microcontroller and Embedded Systems Using Assembly and C, 2013, Pearson
4. A. Nagoor Kani, 8086 Microprocessors and its Applications, 2012, Second Edition, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, India.

E-Resources:

1. https://www.tutorialspoint.com › Microprocessor › Microprocessor - 8085 Architecture
2. http://www.cpu-world.com/CPUs/8086/
3. https://www.journals.elsevier.com/microprocessors-and-microsystems/
4. http://rtcmagazine.com/technologies/view/Microcontrollers
5. http://nptel.ac.in/courses/106108100/
6. http://nptel.ac.in/courses/108107029/
7. nptel.ac.in/courses/106108100/

Course Outcomes:

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

CO Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Explore the 8085, 8086 microprocessor Architecture.	Understand
CO2	Explore the ARM Architecture	Understand
CO3	Develop programs using ARM instruction set	Analyze
CO4	Get Summarize different 8051 family microcontrollers.	Understand
CO5	Design of interface input and output devices with 8051 microcontroller.	Understand

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

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0410	ANALOG AND DIGITAL COMMUNICATIONS	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Signals Theory and Stochastic Processes.

Course Objectives: This course introduces the concept of modulation and various techniques for amplitude modulation of analog signals. This course also introduces the concept of angle modulation techniques for Frequency modulation of analog signals. This course also introduces sampling, the effect of noise on communication systems and various pulse analog & digital binary modulation techniques.

MODULE I: Amplitude Modulation Techniques [13 Periods]

Introduction to communication system, Need for modulation, Amplitude Modulation, Definition, Time domain and frequency domain description of AM system, single tone modulation, power relations in AM waves. DSB-SC, SSB- VSB-SC systems. Comparison of AM Techniques, AM Transmitter, Super heterodyne Receiver.

MODULE II: Angle Modulation Techniques [10 Periods]

Phase and frequency modulation, Narrow Band and Wide band FM – Modulation index, Spectra, Power relations and Transmission Bandwidth - FM modulation –Direct and Indirect methods, FM Demodulation – FM to AM conversion, FM Discriminator - PLL as FM Demodulator, FM Transmitter, FM Receiver.

MODULE III: Noise and Sampling [12 Periods]

A: Noise: Noise sources – Noise figure, noise temperature and noise bandwidth – Noise in cascaded systems. Representation of Narrow band noise –In-phase and quadrature, Noise performance analysis in AM & FM systems.

B: Sampling: Sampling theorem, graphical and analytical proof for band limited signals, types of sampling, reconstruction of signal from its samples.

MODULE IV: Elements of Digital Communication Systems [13 Periods]

Model of Digital Communication System, Advantages of Digital Communication Systems.

Pulse Analog Modulation: Introduction, PAM, PWM, PPM Modulation and Demodulation Techniques.

Pulse Digital Modulation: PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

MODULE V: Digital Binary Carrier Modulation Schemes [12 Periods]

Introduction, ASK -Modulator, Coherent ASK Detector, FSK- Modulator, Non Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection, Principles of QPSK, Differential PSK and QAM.

Text Books:

1. H Taub& D. Schilling, GautamSahe, "Principles of Communication Systems", TMH, 3rd Edition, 2007.
2. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley, 2005

Reference Books:

2. Simon Haykin, John Wiley, "Digital Communication", 1st Edition, 2005.
3. B.P. Lathi, "Communication Systems", BS Publication, 2006.

E-Resources:

1. https://courses.engr.illinois.edu/ece458/comms2.pdf
2. http://www.ece.lehigh.edu/~jingli/teach/F2005CT/notes/AnalogCommunication.pdf
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-450-principles-of-digital-communications-i-fall-2006/
4. International Journal of Communication Systems - http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-1131
5. Lecture Series - http://nptel.ac.in/courses/117102059/
6. Lecture Series - http://nptel.ac.in/courses/117101051/

Course Outcomes:

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

CO Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Understand the concepts of modulation, demodulation of various analog modulation techniques i.e., AM, DSB and SSB.	Understand
CO2	Analyze the Frequency Modulation signal transmission and reception and calculate the Narrowband FM, Wideband FM.	Analyze
CO3	Understand the concepts and working of radio transmitters, radio receivers and noise analysis of analog communication systems.	Understand
CO4	Understand the basic components of digital communication systems.	Understand
CO5	Understand the concepts and working of various digital binary modulation techniques.	Understand

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0411	Pulse and Linear Integrated Circuits	L	T	P
Credits: 3		3	-	-

Pre-Requisites: Basic Electrical and Electronic Engineering, Analog Electronics.

Course Objectives: Analyse the behavior of Linear and non-linear wave shaping circuits along with Multivibrators and understand the operation of OP-AMP and analyze the applications of OPAMP and 555 Timer.

MODULE I: **[12 Periods]**

Linear Wave Shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe.

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators. Clamping operation, clamping circuit taking Source and Diode resistances into account, Clamping circuit theorem..

MODULE II: **[12 Periods]**

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors,

Time Base Generators: General features of a time base signal, methods of generating voltage time base waveform.

MODULE III: **[12 Periods]**

Differential amplifiers: Classification, DC and AC Analysis of Single/Dual input Balanced and Unbalanced output configurations using BJTs. Level Translator.

Operational Amplifier: OP AMP Block diagram, ideal Opamp characteristics, Opamp and its features, Op-amp parameters and Measurements, Input and Output Offset voltages and currents, Slew rate, CMRR, PSRR, Frequency response and Compensation Techniques.

MODULE IV: **[10 Periods]**

OPAMP Applications: Inverting and Non-Inverting Amplifiers, Integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications, Active filters: Low pass, high pass, band pass and band stop, Log and Anti Log Amplifiers.

MODULE V: **[10 Periods]**

555 Timer: Functional Diagram, Monostable, Astable and Schmitt Trigger Applications, Fixed and variable voltage regulators, PLL and its Applications, Data Converters: Digital-to-analog. **converters (DAC):** Weighted resistor, inverted R-2R ladder, Analog-to digital converters (ADC): dual slope, successive approximation, flash, Specifications.

Text Books:

1. J. Millman and H. Taub, Pulse, Digital and Switching Waveforms - McGraw-Hill, 1991.
2. David A. Bell, Solid State Pulse circuits - PHI, 4th Edn., 2002.

Reference Books:

1. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits" Pearson,2018, 4th edition
2. D.Roy Chowdhury, Shail B.Jain, "Linear Integrated Circuits", 4/e, New Age International (P) Ltd., 2008.
3. Anand Kumar A, "Pulse and Digital Circuits", Prentice-Hall of India private Limited, New Delhi, 2007

E-Resources:

1. http://sureshq.blogspot.in/2015/12/pulse-and-digital-circuits-unit-2-and-3.html
2. http://wps.pearsoned.com/wps/media/objects/10581/10835513/Chapter4.pdf
3. http://www.radio-electronics.com/info/circuits/
4. https://vikramlearning.com/jntuh/notes/electronic-circuits-and-pulse-circuits-lab/non-linear-wave-shaping-clippers/274
5. https://www.electronics-tutorials.ws/opamp/opamp_1.html

Course Outcomes:

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

CO Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Construct different linear networks and analyse their response to different input signals.	Understand
CO2	Understand, Analyse and design multi vibrators and sweep circuits using transistors	Understand
CO3	Distinguish different types of rectifying circuits and amplifier circuits and their performance parameters.	Analyze
CO4	Analyse DC and AC characteristics for Single/Dual input Balanced/Unbalanced output Configurations using BJTs	Understand
CO5	Distinguish various linear and non-linear applications of Op-Amp. Analyse the operation of the most commonly used D/A and A/D converter types.	Understand

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

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

2021-22 Onwards (MR 20)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0412	ANALOG AND DIGITAL COMMUNICATIONS LAB	L	T	P
Credits: 1		-	-	2

Course Objectives: To get practical knowledge on analog and digital communication concepts.

List of Experiments:

PART A: Analog Communications (AC)

1. Amplitude modulation and demodulation.
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Pre-emphasis & de-emphasis.
5. Time Division Multiplexing & De multiplexing
6. AGC Characteristics
7. Radio Receiver

PART B: Digital Communications (DC)

1. Pulse Amplitude Modulation and Demodulation
2. Pulse Width Modulation & Demodulation
3. Pulse Position Modulation & Demodulation
4. PCM Generation and Detection
5. Frequency shift keying. Generation and Detection
6. Phase shift keying. Generation and Detection
7. DPSK: Generation and Detection

Course Outcomes:

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

CO Nos.	Course Outcomes	Bloom Taxonomy
CO1	Perform analog modulation techniques like AM, DSB-SC & SSB-SC	Understand
CO2	Analyze the AGC Characteristics of Radio receiver.	Analyze
CO3	Perform Pulse and Digital Modulation techniques	Understand

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

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

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0413	**ELECTRONIC CIRCUITS AND PULSE CIRCUITS LAB**	**L**	**T**	**P**
Credits: 1		**-**	**-**	**2**

Course Objectives:

To design Multistage and Power amplifiers, linear, non-linear wave shaping circuits and multivibrators according to given specifications.

List of Experiments:

PART-A Electronic Circuits

1. Two Stage RC Coupled Amplifiers
2. Darlington Pair
3. Class A Power Amplifier (Transformer less).
4. Class B Complementary Symmetry Amplifier.

PART-B Pulse Circuits

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping - Clampers.
4. Transistor as a switch.
5. Astable Multivibrator.
6. Monostable Multivibrator.
7. Bistable Multivibrator.
8. Schmitt Trigger.

Course Outcomes:

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

CO Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Understand the design of Multistage amplifiers	Understand
CO2	Design and calculate the efficiency of power amplifiers	Analyze
CO3	Understand the different Pulse Circuits	Understand
CO4	Design and Applications of Multivibrators.	Analyze

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

2021-22 Onwards (MR-21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code:B0555	OBJECT ORIENTED PROGRAMMING LAB (Common for CE, EEE, ME, ECE, MiE)	L	T	P
Credits: 2		-	-	4

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: Java

List of Programs:

1. Write a Java Program to implement

a) Default Constructor

b) Parameterized constructor

2. Write a Java Program to implement

a) Method overloading

b) Constructor overloading

3. Write a Java program to implement

a) Single Inheritance

b) Multilevel Inheritance

c) Hierarchical Inheritance

4. Write Java programs that uses the following keywords…

a) this

b) super

5. Write Java programs that uses the following keywords…

a) static

b) final

6. Write a Java program to implement

a) Method overriding.

b) Dynamic method dispatch.

7. Write a Java program to implement

a) abstract method

b) Interfaces

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

9. Write a Java program to implement Exception Handling using

a) try-catch clause

b) Multiple Catch clauses

c) Nested try blocks

10. Write a Java program that

a) create user defined Thread by extending Thread class.
b) create user defined Thread by implementing Runnable Interface
c) create two user defined Threads i.e. Multi Threading using Thread

11. 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.

c) that reads a line if integers and then displays each integer and the sum of all integers (use string tokenizer class of java.util).

12. Write a Java program that

a) reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) reads a file and displays the file on the screen, with a line number before each line.

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 Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Differentiate structured programming and object oriented programming and know theconcepts of classes, objects, members of a class.	Understand
CO2	Apply object oriented programming features and concepts for solving given problems usinginheritance and will know how to organize files in packages and concept of interface.	Apply
CO3	Capable of handling run time errors using Exceptional Handling and exploring strings.	Understand
CO4	Develop applications for concurrent processing using Thread Concept.	Understand
CO5	Capable of handling IO operations using Files	Understand

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**	**PSO 2**	**PSO3**
CO1		2	3										3	2	
CO2			3		2								2	3	
CO3		2	2		2									2	
CO4			3		3									2	
CO5		2	2		3								2	2	

2021-22 Onwards (MR 21)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. IV Semester		
Code:B00M1	**GENDER SENSITIZATION**	**L**	**T**	**P**
Credits: NIL	(Common for EEE, ECE, CSE and IT)	**2**	**-**	**-**

Course Objectives: 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]

Gender: Why Should We Study It? *(Towards a World of Equals:* Unit -1) Socialization: Making Women, Making Men *(Towards a World of Equals:* Unit -2) Introductio, Preparing for Womanhood, Growing up Male, First Lessons in Caste, Different Masculinities, Just Relationships: Being Together as Equals *(Towards* a *World of Equals:* Unit-*12) Mary* iKorn and Onler, Love and Acid just do not Mix, Love Letters, Mothers aniJ Fathers, Further Reading: Rosa Parks-The Brave Heart.

MODULE II: Gender and Biology [6 Periods]

Missing Women: Sex Selection and Its Consequences *(Towards a World of Equals:* Unit -4) Declining Sex Ratio, Demographic Consequences. Gender Spectrum: Beyond the Binary *(Towards* a *World of Equals:* Unit -10) Two or Many? Struggles with Discrimination. Additional Reading: Our Bodies, Our Health *(Towards a World of Equals:* Unit -13)

MODULE III: Gender and Labour [7 Periods]

A: Housework: The Invisible Labour *(Towards a World* of *Equals:* Unit -3) "My Mother doesn't Work." "Share the I.oad." Women's Work: Its Politics and Economics *(Towards a* **B:** *World of Equals:* Unit -7) Fact and Fiction, Unrecognized and Unaccounted work, Further Reading: Wages and Conditions of Work.

MODULE IV: Issues of Violence [7 Periods]

Sexual Harassment: Say Nol *(Towards a World of Equals:* Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: *"Chdpulum.*

Domestic Violence: Speaking Out *(Towards a World of Equals:* Unit -5)

Is Home a Safe Place? When Women Unite (Film" Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence *(Towards a World of Equals:* Unit -11) Blaming the Victim-1 Fought for my Life " - Further Reading: The Caste Face of Violence.

MODULE V: Gender Studies [6 Periods]

Knowledge: Through the Lens of Gender *(Towards a Work/ of Equals:* Unit -5)

Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana. Whose History? Questions for Historians and Others *(Towards a World of Equals:* Unit -9) Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All the Units In the Textbook, *"Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Mina Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Thant
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.

Text Books: -

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

Reference Books: -

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. Tripti Lahiri. "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. http://harooreollins.co.in/BookDetailasp?Flook Cndet,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/10.1177/107780120000600700 4(ISSUES OF VIOLENCE)
5. http://www.nordiclabourjournal.org/emner/likestilling (GENDER AND BIOLOGY)

Course Outcomes:

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

1. Develop a better understanding of important issues related to gender in contemporary India.
2. Sensitize about the 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.
3. Attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Acquire insight into the gendered division of labour and its relation to politics and economics.
5. Develop a sense of appreciation of women in all walks of life.

CO Nos.	**Course Outcomes**	Bloom Taxonomy
CO1	Develop a better understanding of important issues related to gender in contemporary India.	Understand
CO2	Sensitize about the 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.	Understand
CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.	Understand
CO4	Acquire insight into the gendered division of labour and its relation to politics and economics.	Understand
CO5	Develop a sense of appreciation of women in all walks of life.	Understand

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

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