**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**
**DEPARTMENT OF INFORMATION TECHNOLOGY**
**COURSE STRUCTURE**

**I Year B. Tech – I Semester**

| S.No | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A0001 | English | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | R20A0021 | Mathematics – I | 3 | 1 | 0 | 4 | 30 | 70 |
| 3 | R20A0201 | Basic Electrical Engineering | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0302 | Computer Aided Engineering Graphics | 2 | 0 | 2 | 3 | 30 | 70 |
| 5 | R20A0501 | Programming for Problem Solving | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0081 | English Language Communication Skills Lab | - | 0 | 2 | 1 | 30 | 70 |
| 7 | R20A0281 | Basic Electrical Engineering Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0581 | Programming for Problem Solving Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9* | R20A0003* | Human Values and Professional Ethics | 1 | 0 | 0 | 1 | 100 | - |
| | | **TOTAL** | **14** | **1** | **10** | **20** | **340** | **560** |

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

**I Year B. Tech – II Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A0002 | Professional English | 2 | 0 | 0 | 2 | 30 | 70 |
| 2 | R20A0022 | Mathematics – II | 3 | 1 | 0 | 4 | 30 | 70 |
| 3 | R20A0011 | Applied Physics | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0401 | Analog and Digital Electronics | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0502 | Python Programming | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0082 | Applied Physics Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 7 | R20A0582 | Python Programming Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0083 | Engineering and IT Workshop | - | 0 | 2 | 1 | 30 | 70 |
| 9* | R20A0064* | Financial Institutions, Markets and Services | 1 | - | - | 1 | 100 | - |
| | | **TOTAL** | **15** | **1** | **8** | **20** | **340** | **560** |

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

**II Year B. Tech – I Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A0503 | Data Structures Using Python | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0504 | Operating Systems | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0505 | Design and Analysis of Algorithms | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A1201 | Computer Organization & Microprocessor | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0024 | Probability and Statistics | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0061 | Managerial Economics and Financial Analysis | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A0583 | Data Structures using Python Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0584 | Operating Systems Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A0004* | Foreign Language: French | 2 | - | - | 0 | 100 | - |
| | | TOTAL | 20 | 0 | 6 | 21 | 340 | 560 |

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**II Year B. Tech – II Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A0026 | Discrete Mathematics | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A1202 | Automata and Compiler Design | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0508 | Object Oriented Programming through Java | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0509 | Database Management Systems | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A0510 | Computer Networks | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | OE1 | Open Elective-I# | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A0585 | Object Oriented Programming through Java Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A0586 | Database Management Systems Lab | - | 0 | 3 | 1.5 | 30 | 70 |
| 9* | R20A0008* | Global Education & Professional Career | 2 | - | - | 0 | 100 | - |
| | | TOTAL | 20 | 0 | 6 | 21 | 340 | 560 |

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

| OPEN ELECTIVE I | | |
|---|---|---|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A1251 | WEB DESIGNING TOOLS |
| 2 | R20A0551 | INTRODUCTION TO DBMS |
| 3 | R20A0351 | INTELLECTUAL PROPERTY RIGHTS |
| 4 | R20A0051 | ENTERPRISE RESOURCE PLANNING |
| 5 | R20A0451 | BASICS OF COMPUTER ORGANIZATION |

**III Year B. Tech – I Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A6703 | Data Science | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A1203 | Web Application Development | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0513 | Artificial Intelligence | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A0511<br>R20A1204<br>R20A1205 | **Professional Elective -I**<br>Software Engineering<br>Image Processing<br>Information Theory & Coding | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A6210<br>R20A0517<br>R20A0524 | **Professional Elective-II**<br>Digital Forensics<br>Distributed Systems<br>Mobile Computing | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | OE2 | Open Elective-II | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A1281 | Artificial Intelligence and Data Science lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A1282 | Web Application Development Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A1285 | Application Development -I | - | - | 4 | 2 | 30 | 70 |
| 10 | R20A0006* | Technical Communication and Soft Skills | 2 | - | - | 0 | 100 | - |
| | | **TOTAL** | 20 | 0 | 10 | 23 | 370 | 630 |

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

| OPEN ELECTIVE II | | |
|---|---|---|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A1252 | MANAGEMENT INFORMATION SYSTEMS |
| 2 | R20A0552 | JAVA PROGRAMMING |
| 3 | R20A1253 | SOFTWARE PROJECT MANAGEMENT |
| 4 | R20A0452 | INTERNET OF THINGS & ITS APPLICATIONS |
| 5 | R20A0553 | OPERATING SYSTEM CONCEPTS |
| 6 | R20A0066 | PUBLIC POLICY & GOVERNANCE |

**III Year B. Tech – II Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A1206 | Data Warehousing and Data Mining | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A1207 | Mobile Application Development | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A6903 R20A1208 R20A6661 | **Professional Elective-III** Embedded Systems Design Edge Computing Computational Intelligence | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A7305 R20A0515 R20A0561 | **Professional Elective-IV** • Computer Vision • Scripting Languages • Software Requirements and Estimation | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | OE III | Open Elective-III | 3 | 0 | 0 | 3 | 30 | 70 |
| 7 | R20A1283 | Data Warehousing and Data Mining Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 8 | R20A1284 | Mobile Application Development Lab | 0 | 0 | 3 | 1.5 | 30 | 70 |
| 9 | R20A1286 | Application Development -II | - | - | 4 | 2 | 30 | 70 |
| 10* | R20A0007* | Constitution of INDIA | 2 | - | - | 0 | 100 | - |
| | | **TOTAL** | **17** | **0** | **10** | **20** | **340** | **560** |

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

| OPEN ELECTIVE III | | |
|---|---|---|
| S.NO | SUBJECT CODE | SUBJECT |
| 1 | R20A0453 | ROBOTICS & AUTOMATION |
| 2 | R20A1254 | BIG DATA ARCHITECTURE |
| 3 | R20A0555 | CLOUD COMPUTING FUNDAMENTALS |
| 4 | R20A6251 | INFORMATION SECURITY |
| 5 | R20A0352 | DESIGN THINKING |
| 6 | R20A0065 | BUSINESS ANALYTICS |

**IV Year B. Tech – I Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A6202 | Cyber Security | 3 | 0 | 0 | 3 | 30 | 70 |
| 2 | R20A0522 | Blockchain Technology | 3 | 0 | 0 | 3 | 30 | 70 |
| 3 | R20A0520 | Big Data Analytics | 3 | 0 | 0 | 3 | 30 | 70 |
| 4 | R20A1209 R20A0523 R20A0518 | **Professional Elective-V**<br>• Text Analytics and Natural language Processing<br>• Software Testing Methodologies<br>• Machine Learning | 3 | 0 | 0 | 3 | 30 | 70 |
| 5 | R20A1210 R20A0521 R20A6610 | **Professional Elective-VI**<br>• Augmented and Virtual Reality<br>• Cloud Computing<br>• Deep Learning | 3 | 0 | 0 | 3 | 30 | 70 |
| 6 | R20A0591 | Blockchain Technology Lab | - | - | 3 | 1.5 | 30 | 70 |
| 7 | R20A0592 | Big Data Analytics Lab | - | - | 3 | 1.5 | 30 | 70 |
| 8 | R20A1287 | Mini Project | - | - | 6 | 3 | 30 | 70 |
| | | **TOTAL** | **15** | **0** | **12** | **21** | **240** | **560** |

**IV Year B. Tech – II Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T | P | C | MAX. MARKS | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | INT | EXT |
| 1 | R20A0337 | Start-up, Innovation & Entrepreneurship | 3 | 1 | - | 4 | 30 | 70 |
| 2 | R20A1288 | Major Project | - | - | 20 | 10 | 30 | 70 |
| | | **TOTAL** | **3** | **1** | **20** | **14** | **60** | **140** |

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR I-SEM-IT**                                                           **L/T/P/C**
                                                                                        **2/-/-/2**

## (R20A001) ENGLISH

**COURSE OBJECTIVES:**

1. To enable students to enhance their lexical, grammatical and communicative competence.
2. To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3. To familiarize students with the principles of writing and to ensure error-free writing.
4. To analyze, interpret and evaluate a text and critically appreciate it.
5. To improve the writing and speaking skills, the productive skills

**UNIT –I:**

*"The Road not taken "by Robert Frost*
Grammar –Tenses and Punctuation(Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing –Paragraph Writing (Focusing on Tenses and Punctuations)
Reading –The art of skimming and scanning -Reading Exercise Type 1
(Match the statements to the text they refer to)

**UNIT –II:**

*Act II from 'Pygmalion' by G.B. Shaw*
Grammar –Direct and Indirect Speech
Vocabulary– Synonyms, Antonyms
Writing     –Essay Writing (Introduction, body and conclusion)
Reading –Comprehending the context– Reading Exercise Type 2
                (Place the missing statement)

**UNIT-III:**

*Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft*
Grammar – Voices
Vocabulary –One-Word Substitutes, Standard Abbreviations
Writing –E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading     –Reading Comprehension- Reading Exercise Type 3
                (Reading between the lines)

**UNIT –IV:**

*J K Rowling's Convocation Speech at Harvard*
Grammar – Articles, Misplaced Modifiers
Vocabulary –Phrasal Verbs
Writing – Précis Writing
Reading     –Reading Exercise Type 4
                (Cloze test)

**UNIT –V:**

*Abdul Kalam's Biography*

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement

Vocabulary – Commonly Confused Words

Writing – Memo Writing

Reading      –Reading Exercise Type 5

          (Identifying errors)

* Exercises apart from the textbook shall also be used for classroom tasks.

**REFERENCE BOOKS:**

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

**COURSE OUTCOMES:**

Students will be able to:

1. Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2. Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3. Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4. Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5. Represent old conventions with a set of the new by professional verbal communicative ability

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B. TECH - I- YEAR I-SEM-IT**                                                          **L/T/P/C**
                                                                                                       **3/1/-/4**

### (R20A0021) MATHEMATICS - I

**COURSE OBJECTIVES:**

1. The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
2. The concept of Eigen values, Eigen vectors and Diagonolisation.
3. The maxima and minima of functions of several variables.
4. The Applications of first order ordinary differential equations and methods to solve higher order differential equations.
5. The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem

**UNIT –I: Matrices**

Introduction, Rank of a matrix - Echelon form, Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss-Siedel method, Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem (without proof), Diagonalisation of a matrix.

**UNIT –II: Multi Variable Calculus (Differentiation)**

Functions of two variables, Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

**UNIT-III:  First Order Ordinary Differential Equations**

Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree-Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

**UNIT –IV: Differential Equations of Higher Order**

Linear differential equations of second and higher order with constant coefficients: non-homogeneous term of the type $f(x) = e^{ax}$, sinax, cosax, $x^n$, $e^{ax}$ V and $x^n$ V - Method of variation of parameters, Equations reducible to linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

**UNIT –V: Laplace Transforms.**

Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied and divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transform of functions when they are multiplied and divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transform

**TEXT BOOKS**

1. Higher Engineering Mathematics by  B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics  by Kreyszig ,John Wiley  & Sons .

**REFERENCE  BOOKS**

1. Advanced Engineering Mathematics  by R.K Jain & S R K Iyenger,  Narosa Publishers.
2. Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
3. Engineering Mathematics  by N.P Bali and Manish Goyal.

**COURSE OUTCOMES**:

After learning the concepts of this paper the student will be able to

- Analyze the solutions of the system of linear equations and find the Eigen values and Eigen vectors of a matrix, which are used to analyze the long term behavior of any system.
- Find the extreme values of functions of two variables with / without constraints.
- Solve first order, first degree differential equations and their applications.
- Form a differential equation for typical engineering problems and hence can solve those higher order differential equations.
- Solve differential equations with initial conditions using Laplace Transformation

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B. TECH - I- YEAR I-SEM-IT**                                                    **L/T/P/C**
                                                                                  **3/-/-/3**

## (R20A0201) BASIC ELECTRICAL ENGINEERING

**COURSE OBJECTIVES:**

1. To understand the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2. To emphasize on the basic elements in electrical circuits and analyze Circuits using Network Theorems.
3. To analyze Single-Phase AC Circuits.
4. To illustrate Single-Phase Transformers and DC Machines.
6. To get overview of basic electrical installations and calculations for energy Consumption

**UNIT –I:**

**Introduction to Electrical Circuits:** Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

**UNIT –II:**

**Network Analysis:** Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,

Network Theorems**:** Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem, Illustrative variables.

**UNIT-III:**

**Single Phase A.C. Circuits:** Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Concept of Power Factor, Real, Reactive and Complex power and Illustrative Problems.

**UNIT –IV:**

**Electrical Machines** (elementary treatment only):

Single phase transformers: principle of operation, constructional features and emf equation.

DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

**UNIT –V:**

**Electrical Installations:**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Types of Wires and Cables, Earthing. Elementary calculations for energy consumption and battery backup.

transform

**TEXT BOOKS**

1. Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2. Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3. Electrical Machines – P.S.Bimbra, Khanna Publishers.

**REFERENCE BOOKS**

1. Network analysis by M.E Van Valkenburg, PHI learning publications.
2. Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3. Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4. Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

**COURSE OUTCOMES**:

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

- Apply the basic RLC circuit elements and its concepts to networks and circuits.
- Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
- Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
- Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
- Understand the basic LT Switch gear and calculations for energy consumption.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  I-SEM-IT**                                      **L/T/P/C**
**2/-/2/3**

### (R20A0301) COMPUTER AIDED ENGINEERING GRAPHICS

**COURSE OBJECTIVES:**

1. To learn basic engineering graphic communication skills & concept.
2. To learn the 2D principles of orthographic projections And Multiple views of the same
3. To know the solid Projection and Its  Sectional Views
4. To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
5. To know the conversion of Orthographic Views to isometric Views And isometric to Orthographic views

**UNIT –I:**

**Introduction to Computer Aided Engineering Graphics**

Introduction, Drawing Instruments and their uses, BIS conventions, lettering Dimensioning & free hand practicing. AutoCAD  User Interface – Menu  system – coordinate systems, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse,– tool bars (draw, modify, annotations, layers etc.) – status bar (ortho, grid, snap, iso etc.),

Generation of points, lines, curves, polygons, dimensioning, layers, blocks, electrical symbols

**Geometrical constructions**

**Curves Used In Engineering Practice**

a)  Conic Sections (General Method only- Eccentricity Method)

b)  Cycloid, Epicycloid and Hypocycloid

**UNIT –II:**

**2D PRJECTIONS**

**Orthographic Projections**: – Conventions – First and Third Angle projections.

Projections of Points, Projections of Lines, Projections of planes, Circuits Designs **–** Basic Circuit Symbols & Sensors

**UNIT-III:**

**Projections of Solids**: Projections of regular solids prism and pyramid inclined to both planes.

**Sections of solids:** Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone, True shapes of the sections.

**UNIT –IV: Differential Equations of Higher Order**

Linear differential equations of second and higher order with constant coefficients: Non-homogeneous term of the type f(x) = $e^{ax}$, sinax, cosax, $x^n$, $e^{ax}$ V and $x^n$ V - Method of variation of parameters, Equations reducible to linear ODE with constant coefficients-Cauchy's Euler equation and Legendre's equation.

**UNIT –V:**

**Transformation of Projections:** Visualize the 2D &3D View of Engineering Objects for Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects in AutoCAD

**TEXT BOOKS**

1. Higher Engineering Mathematics by  B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics  by Kreyszig ,John Wiley  & Sons .

**REFERENCE  BOOKS**

1. Advanced Engineering Mathematics  by R.K Jain & S R K Iyenger,  Narosa Publishers.
2. Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
3. Engineering Mathematics  by N.P Bali and Manish Goyal.

**COURSE OUTCOMES**:

After learning the concepts of this paper the student will be able to

1. Analyze the solutions of the system of linear equations and find the Eigen values and Eigen vectors of a matrix, which are used to analyze the long term behavior of any system.
2. Find the extreme values of functions of two variables with / without constraints.
3. Solve first order, first degree differential equations and their applications.
4. Form a differential equation for typical engineering problems and hence can solve those higher order differential equations.
5. Solve differential equations with initial conditions using Laplace Transformation

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  I-SEM-IT**                                                                    **L/T/P/C**
                                                                                                                      **3/-/-/3**

## (R20A0501) PROGRAMMING FOR PROBLEM SOLVING

**COURSE OBJECTIVES:**

 The students will be able to

1.  Understand the use of computer system in problem solving and to build program logic with algorithms and flowcharts.
2.  Explain the features and constructs of C programming such as data types, expressions Loops, arrays, strings and pointers
3.  Learn how to write modular Programs using Functions
4.  Understand the use of Structures, Unions and Files
5.  Use basic data structures like stacks, queues and linked lists in designing applications

**UNIT - I**
**Introduction to Computing** – Computer Systems, Computing Environments, Computer Languages, Algorithms and Flowcharts, Steps for Creating and Running programs.
**Introduction to C** – History of C, Features of C, Structure of C Program, Character Set,
C Tokens - keywords, Identifiers, Constants, Data types, Variables. Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, typedef, Enum
**Control Structures:** Selection Statements (Decision Making) – if and switch statements, Repetition Statements (Loops) - while, for, do-while statements, Unconditional Statements – break, continue, goto, Command line arguments.

**UNIT-II**
Pointers – Pointer variable, pointer declaration, Initialization of pointer, accessing variables through pointers, pointer arithmetic, pointers to pointers, void pointers
**Arrays** – Definition, declaration of array, Initialization, storing values in array, two dimensional arrays, multi-dimensional arrays. Arrays and Pointers, Array of pointers
**Strings** – Declaration and Initialization, String Input / Output functions, Array of strings,
String manipulation functions, Unformatted I/O functions, strings and pointers

**UNIT-III**
**Designing Structured Programs using Functions** - Types of Functions- user defined functions, Standard Functions, Categories of functions, Parameter Passing techniques, Scope – Local Vs Global, Storage classes, Recursive functions.
Passing arrays as parameters to functions, Pointers to functions, Dynamic Memory allocation**,**

**UNIT-I**V
**Structures and Unions -** Declaration, initialization, accessing structures, operations on structures, structures containing arrays, structures containing pointers, nested structures, self-referential structures, array of structures, structures and functions, structures and pointers, unions.
**Files** – Concept of a file, Streams, Text files and Binary files, Opening and Closing files,
File input / output functions. Sequential Access and Random-Access Functions

**UNIT-**V
Basic Data Structures – Linear and Non-Linear Structures – Implementation of Stacks, Queues, Linked Lists and their applications.

**Case Studies**

**Case 1: Student Record Management System**

The main features of this project include basic file handling operations; you will learn how to add, list, modify and delete data to/from file.

Currently, listed below are the only features that make up this project, but you can add new features as you like to make this project a better one!

- Add record
- List record
- Modify record
- Delete record

**Case 2: Library Management System**

This project has 2 modules.

1.      Section for a librarian
2.      Section for a student

**A librarian** can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.
**A student** can search for the book and check the status of the book if it is available.
Here is list of features that you can add to the project.
   1. You can create a structure for a student that uniquely identify each student. When a student borrows a book from the library, you link his ID to Book ID so that librarian can find how burrowed particular book.
2. You can create a feature to bulk import the books from CSV file.
3. You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.
4. You can add the student login section.

**TEXT BOOKS:**

1. Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Career Monk publications, 2017

**REFERENCE BOOKS:**

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4. Programming in *C, Ashok Kamthane*. Pearson Education India.
5. Let us C ,Yashwanth Kanethkar, 13th Edition, BPB Publications.
6. Data Structures using C by Aaron M. Tenenbaum, Pearson Publications
7. Data Structures using C by Puntambekar

**COURSE OUTCOMES:**

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

1. Understand a problem and build an algorithm/flowchart to solve it
2. Define variables and construct expressions using C language
3. Construct C programs using various conditional statements and loops
4. Develop efficient, modular programs using functions
5. Utilize arrays, structures and unions for storing and manipulating data
6. Make use of files and file operations to store and retrieve data
7. Design applications using basic data structures like stacks, queues and linked lists

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  I-SEM-IT**                                                   **L/T/P/C**
**-/-/3/1.5**

### (R20A0581) PROGRAMMING FOR PROBLEM SOLVING LAB

**COURSE OBJECTIVES:**

1. To understand the various steps in Program development.
2. To understand the basic concepts in C Programming Language.
3. To learn how to write modular and readable C Programs.
4. To learn to write programs (using structured programming approach) in C to solve problems.
5. To introduce the students to basic data structures such as lists, stacks and queues

**Week 1:**
a) Write a program to find sum and average of three numbers
b) Write a program to calculate simple interest (SI) for a given principal (P), time (T), and rate of interest (R) (SI = P*T*R/100)

**Week 2:**
a) Write a program to swap two variables values with and without using third variable
b) Write a program to find the roots of a quadratic equation.

**Week 3:**
a) Write a program to find the sum of individual digits of a given positive integer.
b) Write a program, which takes two integer operands and one operator from the user, performs the operation and then prints the result.
(Consider the operators +,-,*, /, % and use Switch Statement)

**Week 4:**
a) Write a program to find both the largest and smallest number in a list of integers.
b) Write a program to find the sum of integer array elements using pointers

**Week 5:**
a) Write a program to perform addition of two matrices.
b) Write a program to perform multiplication of two matrices.

**Week 6:**
a) Write a program to find the length of the string using Pointer.
b) Write a program to count the number of lines, words and        characters in a given text.

**Week 7:**
a) Write a program to find factorial of a given integer using non-recursive function and recursive function.

b) Write program to find GCD of two integers using non-recursive function and recursive function.

**Week 8:**

a) Write a program using user defined functions to determine whether the given string is palindrome or not.

b) Write a Program to swap the values of two variables using

i) Call by Value ii) Call by Reference

**Week 9:**

a) Write a program to find the sum of integer array elements using pointers, use dynamic memory allocation to allocate memory.

b) Write a program to perform subtraction of two matrices, Design functions to perform read, display and subtract

**Week 10:**

a) Write a program to create a structure named book and display the contents of a book.

b) Write a Program to Calculate Total and Percentage marks of a student using structure.

**Week 11:**

a) Write a program that uses functions to perform the following operations:

 i) Reading a complex number          ii) Writing a complex number

 iii) Addition of two complex numbers      iv) Multiplication of two complex numbers

b) Write a program to reverse the first n characters in a file.

 (Note: The file name and n are specified on the command line.)

**Week 12:**

a) Write a program to copy the contents of one file to another.

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

**Week 13:**

a) Write a program for static implementation of stack

b) Write a program for static implementation of Queue

**Week 14:**

Write a program to perform various operations on single list

**Week 15:**

a) Write a program for dynamic implementation of stack

b) Write a program for Dynamic implementation of Queue

**Case Studies**

**Case 1: Student Record Management System**

The main features of this project include basic file handling operations; you will learn how to add, list,

modify and delete data to/from file.

Currently, listed below are the only features that make up this project, but you can add new features as you like to make this project a better one!

- ◊      Add record
- ◊      List record
- ◊      Modify record
- ◊      Delete record

**Case 2: Library Management System**

This project has 2 modules.

3.      Section for a librarian
4.      Section for a student

**A librarian** can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.

**A student** can search for the book and check the status of the book if it is available.

Here is list of features that you can add to the project.

1. You can create a structure for a student that uniquely identify each student. When a student borrows a book from the library, you link his ID to Book ID so that librarian can find how burrowed particular book.

2. You can create a feature to bulk import the books from CSV file.

3. You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.

4. You can add the student login section.

## TEXT BOOKS

1. C Programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer programming in C.V. Rajaraman, PHI Publishers.
3. C Programming, E. Balagurusamy, 3rd edition, TMHPublishers.
4. C Programming, M.V.S.S. N Venkateswarlu and E.V. Prasad, S. Chand Publishers
5. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

## Course Outcomes:

- ▪   Ability to apply solving and logical skills to programming in C language.
- ▪   Able to apply various conditional expressions and looping statements to solve problems associated with conditions.
- ▪   Acquire knowledge about role of Functions involving the idea of modularity.
- ▪   Understand and apply the Concept of Array, Strings and pointers dealing with memory management.
- ▪   Acquire knowledge about basic data structures and their implementation.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  I-SEM-IT**                                                    **L/T/P/C**
                                                                                  **-/-/4/1.5**

### (R20A0281) BASIC ELECTRICAL ENGINEERING LAB

**COURSE OBJECTIVES:**

1. To design electrical systems.
2. To analyze a given network by applying various network theorems.
3. To expose the students to the operation of dc generator.
4. To expose the students to the operation of dc motor and transformer.
5. To examine the self excitation in dc generators

**CYCLE – I**

1. Verification of KVL and KCL.
2. Verification of Thevenin's theorem.
3. Verification of Norton's theorem.
4. Verification of Super position theorem.
5. Verification of Maximum power transfer theorem.
6. Verification of Reciprocity theorem.

**CYCLE - II**

7. Magnetization characteristics of DC shunt generator.
8. Swinburne's test on DC shunt machine.
9. Brake test on DC shunt motor.
10. OC &SC tests on single phase transformer.
11. Load test on single phase transformer.

**NOTE:** Any 10 of above experiments are to be Conducted

*COURSE OUTCOMES:*
*At the end of the course, students would be able to*

- Calculate the branch currents and mesh voltages by conducting KCL and KVL test on given circuit.
- Prove the various circuit theorems like Superposition, Thevenin's, Norton's, Maximum power transfer and Reciprocity theorems.
- Plot the Magnetization characteristics of DC shunt generator.
- Plot the characteristics of DC shunt motor by conducting Brake Test.
- Determine the Efficiency of single-phase transformer by conducting OC, SC and Load tests

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  I-SEM-IT**                                                    **L/T/P/C**
**-/-/3/2**

### (R20A0081) ENGLISH COMMUNICATION SKILLS LAB

**COURSE OBJECTIVES:**

1. To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4. To improve the fluency in spoken English and neutralize mother tongue influence
5. To train students to use language appropriately for interviews, group discussions and public speaking

English Language 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

**UNIT –I**

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

**ICS Lab:** Ice-Breaking activity - JAM session

**UNIT –II**

**CALL Lab:** Pronunciation: Past Tense Markers and Plural Markers

**ICS Lab:** Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

**UNIT–III**

**CALL Lab:** Syllable and Syllabification

**ICS Lab:** Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice

**UNIT –IV**

**CALL Lab:** Word Stress and Intonation

**ICS Lab:** Information transfer – from visual to verbal - maps, charts, tables and graphs

**UNIT –V**

**CALL Lab:** Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)

**ICS Lab:** Making a Short Speech - Extempore

**ELCS Lab:**

1. **Computer Assisted Language Learning (CALL) Lab:**
   The computer aided Language Lab for 60 students with 60 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:
   
   i) P –IV Processor
   
   a) Speed –2.8 GHZ
   
   b) RAM –512 MB Minimum
   
   c) Hard Disk –80 GB
   
   ii) Headphones of High quality

2. **2. Interactive Communication Skills (ICS) 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.

*COURSE OUTCOMES:*

- *After completion of the course the students will be able to:*
- Learn with precision through computer-assisted individualized and independent language learning to work independently in an engineering set-up.
- Improve conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Acquire accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
- Imbibe appropriate use of language in situations where one works as an individual and as a leader/team player.
- Display professional behaviors and body language.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - I- YEAR  I-SEM-IT**                                                    L/T/P/C
                                                                                            2/-/-/0

**(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS**

**COURSE OBJECTIVES:**
This introductory course input is intended:
1. To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with

**UNIT - I:**

**Course Introduction -** Need, Basic Guidelines, Content and Process for Value Education:

Understanding the need, basic guidelines, content and process for Value Education.

Self-Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential

Validation -  as the mechanism for self-exploration. Continuous Happiness and Prosperity

A look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities -

the basic requirements for fulfillment of aspirations of every human being with their correct

priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current

scenario. Method to fulfill the above human aspirations: understanding and living in harmony

at various levels.

**UNIT - II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human

being as a co-existence of the sentient 'I' and the material 'Body'.

 Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body

as an instrument of 'I' ( I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of

Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**UNIT - III:**

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect ( Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.

Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society ( Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

**UNIT - IV:**

Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.

Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

**UNIT - V:**

**Implications of the above Holistic Understanding of Harmony on Professional Ethics:** Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

   a) Ability to utilize the professional competence for augmenting universal human order.
   b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
   c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

**TEXT BOOKS:**

1. R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

**REFERENCE BOOKS:**

1. Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2. E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3. A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5. P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth - Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics ( including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

**Relevant CDs, Movies, Documentaries & Other Literature:**

1. Value Education website, http://www.uptu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. AI Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charle Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

**COURSE OUTCOMES**:

- The students will be able to obtain happiness and prosperity in their life.
- They will develop harmony at all levels.
- They can have satisfying human behavior throughout their life.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                               **L/T/P/C**
                                                                                                              **2/-/-/2**

### (R20A0002) PROFESSIONAL ENGLISH

**COURSE OBJECTIVES:**

1. To enrich students to express themselves appropriately and fluently in professional contexts.
2. To enhance their employability through regular participation in group discussions and interview skills.
3. To lay foundation with writing strategies for the future workplace needs.
4. To acquaint students with different components of professional presentation skills.
5. To equip students with necessary training in listening to comprehend dialects of English language.

**SYLLABUS:**

**UNIT-I**

Listening            - Listening for General Details.

Speaking            - Description of Pictures, Places, Objects and Persons

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the

examinations.

Extract             - The summary of Asimov's *Nightfall*

Grammar           - If clauses

Vocabulary         - Technical Vocabulary

Writing             - Paragraph Writing

**Unit –II**

Listening            -Listening for Specific Details

Speaking            - Oral presentations

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the

examinations.

Extract             - A literary analysis of Asimov's *Nightfall*

Grammar           - Transformation of Sentences

Vocabulary         - Idioms

Writing             -Abstract Writing

**Unit –III**

Listening          - Listening for Gist

Speaking          - Mock Interviews

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract            - Character sketches of Asimov's *Nightfall's* - protagonists and antagonists -

Dr.      Susan Calvin, Mike Donovan, Stephen Byerley, Francis Quinn

Grammar         - Transitive and Intransitive Verbs

Vocabulary      - Standard Abbreviations (Mini Project)

Writing            - Job Application – Cover letter

**Unit – IV**

Listening          - Listening for Vocabulary

Speaking          - Telephonic Expressions

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract            - Theme of Asimov's *Nightfall*

Grammar         - Auxiliary verbs, Degrees of Comparison

Vocabulary      - Word Analogy

Writing            - Job Application - Resume

**Unit – V**

Listening          - Critical Listening (for attitude and Opinion)

Speaking          - Group discussion

NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.

Extract            -Asimov's *Nightfall*: A Science Fiction

Grammar         - Common Errors, Prepositions

Vocabulary      - Homonyms, homophones and homographs

Writing            - Report Writing

* Isaac Asimov's *Nightfall* for intensive and extensive reading

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

**REFERENCE BOOKS:**

1. Nightfall, Isaac Asimov; Robert Silverberg, 1990
2. Practical English Usage. Michael Swan. OUP. 1995.
3. Remedial English Grammar. F.T. Wood. Macmillan.2007
4. On Writing Well. William Zinsser. Harper Resource Book. 2001
5. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
6. Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
7. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

**COURSE OUTCOMES:**

Students will be able to:

- Analyze and interpret a diverse range of engineering concepts through the synthesis of information
- Understand the impact of professional engineering solutions is societal contexts and demonstrate its knowledge
- Achieve communicative ability in their personal and professional relations with clarity of speech and creativity in content
- Function effectively as an individual and a team; and would be able to prepare themselves to be market ready
- Comprehend and write effective reports and design documentation, manage projects and make effective presentations.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                          **L/T/P/C**
                                                                                                        **3/1/-/4**

## (R20A0022) MATHEMATICS-II

**COURSE OBJECTIVES:**

1. The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data, also used to find the roots of an equation and to solve differential equations.
2. The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y  from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
3. PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
4. Evaluation of multiple integrals.
5. In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

**UNIT –I: Solutions of algebraic, transcendental equations and Interpolation**

**Solution of algebraic and transcendental equations:** Introduction, Bisection Method, Method of false position, Newton-Raphson method and their graphical interpretations.

**Interpolation:** Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, Central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation

**UNIT – II: Numerical Methods**

**Numerical integration :** Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

**Numerical solution of ordinary differential equations:**  Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

**Curve fitting :** Fitting a straight line, second degree curve, exponential curve, power curve by method of least variables.

### UNIT-III: Partial Differential Equations

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional equation (Heat equation).

### Unit IV: Double and Triple Integrals

Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar).

### Unit V: Vector Calculus

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

### TEXT BOOKS:

1. Higher Engineering Mathematics by  B V Ramana ., Tata McGraw Hill.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

### REFERENCE BOOKS:

1. Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
2. Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3. Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

**COURSE OUTCOMES:** After learning the concepts of this paper the student will be able to independently
- Find the roots of algebraic, non algebraic equations and predict the value at an intermediate point from a given discrete data.
- Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
- Solve first order linear and non-linear partial differential equations which are very important in engineering field.
- Evaluate multiple integrals; hence this concept can be used to evaluate Volumes and Areas of an object.
- Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                         **L/T/P/C**
                                                                                        **3/-/-/3**

### (R20A0401)ANALOG AND DIGITAL ELECTRONICS

**COURSE OBJECTIVES:**
The main COURSE OBJECTIVES of the course are:
1. To familiarize the student with the principal of operation, analysis and design of junction diode and BJT.
2. To understand basic number systems codes and logical gates.
3. To introduce the methods for simplifying Boolean expressions
4. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits

**UNIT-I**

**P-N Junction diode:** Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, diode equivalent circuits, Zener diode characteristics.

**UNIT-II**

**BIPOLAR JUNCTION TRANSISTOR:** The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

**UNIT-III**

**FIELD EFFECT TRANSISTOR AND FET AMPLIFIER:** JFET-Construction, principle of Operation, Volt –Ampere characteristics, Pinch- off voltage. Small signal modelofJFET.       FET       as Voltage Variable Resistor, Comparison of BJT andFET. MOSFET-Construction, Principle of Operation and symbol, MOSFET characteristics in Enhancement and Depletionmodes.

**UNIT IV:**

**Number System and Boolean Algebra:** Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

**UNIT-V**

**Minimization Techniques:** The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don't Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

**Combinational Circuits:** Design procedure – Half adder, Full Adder, Half subtractor, Full subtractor, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

**TEXT BOOKS:**

1. "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications,2017.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
3. Electronic Devices and Circuits, S.Salivahanan,N.Sureshkumar, McGrawHill.
4. M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 Pearson Education (Singapore) Pvt. Ltd., New Delhi,2003.
5. Switching and Finite Automata Theory- ZviKohavi& Niraj K. Jha, 3rdEdition,Cambridge.

**REFERENCE BOOKS:**

1. Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2. Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.
3. John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI,2006
4. John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning,2002.
5. Charles H.Roth. Fundamentals of Logic Design, Thomson Learning,2003.

**COURSE OUTCOMES:**

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

- Understand and Analyze the PN and Zener diodes, operation and its characteristics
- Understand and analyze the BJT Transistor.
- Understand the basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- Learn the methods for simplifying Boolean expressions
- Understand the formal procedures for the analysis and design of combinational circuits and sequential circuits

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - I- YEAR  II-SEM-IT**                                                      **L/T/P/C**
                                                                                     **3/-/-/3**

## (R20A0502) PYTHON PROGRAMMING

**COURSE OBJECTIVES:**
1. To read and write simple Python programs.
2. To develop Python programs with conditionals and loops.
3. To define Python functions and call them.
4. To use Python data structures –- lists, tuples, dictionaries.
5. To do input/output with files in Python.

**UNIT I**
**Introduction to Python Programming Language:** Introduction to Python Language and installation, overview on python interpreters, working with python, Numeric Data Types: int, float, Boolean, complex and string and its operations, Standard Data Types: List, tuples, set and Dictionaries, Data Type conversions, commenting in python.

**UNIT II**
**Variables and Operators:** Understanding Python variables, Multiple variable declarations, Python basic statements, Python basic operators: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

**UNIT III**
**Control Flow And Loops**

Conditional (if), alternative (if-else), chained conditional (if- elif -else), Loops: For loop using ranges, string, Use of while loops in python, Loop manipulation using pass, continue and break

**UNIT IV**
**Functions**

Defining Your Own Functions, Calling Functions, passing parameters and arguments, Python Function arguments: Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda functions in python.

**UNIT V**
**I/O and Error Handling in Python**

Introduction, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods introduction to Errors and Exceptions, Handling IO Exceptions, Run Time Errors, Handling Multiple Exceptions.
**Introduction to Data Structures**: What are Data structures, Types of Data structures, Introduction to Stacks and Queues.


**TEXT BOOKS**

1. R. Nageswara Rao, "Core Python Programming", dream tech
2. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition,Updated for Python 3, Shroff/O'Reilly Publishers, 2016.
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

**REFERENCE BOOKS:**

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly


**COURSE OUTCOMES:**

Upon completion of the course, students will be able to

1. Read, write, execute by hand simple Python programs.
2. Structure simple Python programs for solving problems.
3. Decompose a Python program into functions.
4. Represent compound data using Python lists, tuples, and dictionaries.
5. Read and write data from/to files in Python Programs

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                                    **L/T/P/C**
                                                                                                           **3/-/-/3**

### (R20A0011) APPLIED PHYSICS

**COURSE OBJECTIVES:**

1. To analyze the ordinary light with a laser light and realize the transfer of light through optical fibers.
2. To identify dual nature of the matter and behavior of a particle quantum mechanically.
3. To explore band structure of the solids and classification of materials.
4. To acquire the basic knowledge of various types of semiconductor devices and find the applications in science and technology.
5. To Compare dielectric and magnetic properties of the materials and enable them to design and apply in different

**UNIT –I: LASERS & FIBER OPTICS**                                                          **(9Hours)**

Lasers: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers. Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers ,Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

**UNIT –II: QUANTUM MECHANICS**                                                          **(7 Hours)**

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

**UNIT-III: ELECTRONIC MATERIALS**                                                          **(7 Hours)**

Free electron theory(Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

## UNIT –IV: SEMICONDUCTOR PHYSICS                                    (10Hours)

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: mechanism of diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

## UNIT –V: DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS          (10 Hours)

**Dielectrics**: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

**Magnetism:** Introduction, origin of magnetism, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials

**TEXT BOOKS:**

1. Engineering Physics by Kshirsagar & Avadhanulu, S Chand publications.
2. Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

**REFERENCE BOOKS:**
1. Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2. Engineering Physics, S Mani Naidu- Pearson Publishers.
3. Engineering physics 2$^{nd}$ edition –H.K. Malik and A.K. Singh.
4. Engineering Physics – P.K. Palaniswamy, Scitech publications.
5. Physics by Resnick and Haliday.

*COURSE OUTCOMES:*

*After completion of studying Applied Physics the student is able to*
   - Observe the properties of light and its engineering applications of laser in fiber optic communication systems.
   - Apply the basic principles of quantum mechanics and the importance of behavior of a particle.
   - Find the importance of band structure of solids and their applications in various electronic devices.
   - Evaluate concentration & estimation of charge carriers in semiconductors and working principles of PN diode.
   - Examine dielectric, magnetic properties of the materials and apply them in material technology.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                   **L/T/P/C**
                                                                                   **/-/4/1.5**

## (R20A0082) APPLIED PHYSICS LAB

**COURSE OBJECTIVES:**

Students can be able to

1. Identify the specific types of elastic and electrical nature of materials in physics lab.
2. Observe concepts of magnetism in physics lab.
3. Analyze propagation of light in various optical devices practically.
4. Examine various opto electronic devices practically
5. Well-equipped with the properties of semiconductor devices in physics lab

**LIST OF EXPERIMENTS: ``**

1. Torsional pendulum-Rigidity modulus of given wire.

2. Melde's experiment –Transverse and Longitudinal modes.
3. Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4. Spectrometer-Dispersive power of the material of a prism
5. Diffraction grating-using laser -Wave length of light.
6. Newton's Rings –Radius of curvature of Plano convex lens.
7. LED -Characteristics of LED.
8. Solar cell -Characteristics of a Solar cell.
9. Optical fiber- Evaluation of numerical aperture of optical fiber.
10. Hall effect –To study Hall effect in semiconducting samples.

**REFERENCE BOOKS:**

1. Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S.Publications.
2. Engineering physics practical lab manual – MRCET.

**COURSE OUTCOMES:**

- Students are able to measure the elastic constants of the given material of the wire and also determine the ac frequency of vibrating bar.
- Students are able to determine the magnetic induction of a circular coil carrying current by applying the principles of terrestrial magnetism.
- Students are able to frame relativistic ideas of light phenomenon
- Students are able to achieve the analysis of V-I characteristics of opto electronic devices
- Students are able to determine the carrier concentration and identify the given
- semiconductor material with the help of hall effect

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - I- YEAR  II-SEM-IT**                                                    **L/T/P/C**
                                                                                   **3/-/-/3**

### (R20A0582) PYTHON PROGRAMMING LAB

#### COURSE OBJECTIVES:

1. Syntax and Semantics and create Functions in Python.
2. Different data types Lists, Dictionaries in Python.
3. how to execute the programs using loops and control statements
4. Decision Making and Functions in Python
5. Files and exception Handling in Python

**Week 1:**

A)  Write python program to print Hello World
B)  Write a python program to get string, int, float input from user
C)  Write a python program to add 2 numbers

**Week 2:**

A) Create a list and perform the following methods

   1) insert()    2) remove()    3) append()    4) len()    5) pop()    6) clear()
B) Write a python program to find the length of list?
C) Write a python program to find the smallest and largest number in the list?

**Week 3:**

A) Create a tuple and perform the following methods

   1) Add items    2) len()    3) check for item in tuple    4)Access iems
B) Write a python program using the following methods: 1) count 2) index
C) Write a python program using "+" and "*" operations which resulting a new tuple?

**Week 4:**

A) Create a dictionary and apply the following methods

   1) Print the dictionary items    2) access items  3) use get()  4)change values  5) use len()
B) Write a python code to convert list of tuples into dictionaries?
C) Write python program to store data in list, tuple, set, dictionary and then try to print them.

**Week 5:**

A) Write a python program to perform arithmetic, assignment, logical and comparisonoperators?

B) Write a Python program to add two positive integers without using the '+' operator. (usebitwise operator)

C) Write a Python program to perform the basic four operators (+, -, *, /)

**Week 6:**

A) Write a simple python program to declare a variable in different possible ways?

B) Write a python program to show precedence of operators using the expression: z = (v+w) * x
/ y

C) Write a python program to check whether the values of a list exist or not (use membershipoperator) and also perform identity operation?

**Week 7:**

A) Write a python program to print a number is positive/negative using if-else.

B) Write a python program to find largest number among three numbers.

C) Write a python Program to read a number and display corresponding day usingif_elif_else?

D) Write a python program to print list of numbers using range and for loop

**Week 8:**

A) Write a python code to print the sum of natural numbers using while loop?

B) Write a python program to print the factorial of given number?

C) Write a python program to find the sum of all numbers stored in a list using for loop?

**Week 9:**

A) Write a Python function that takes two lists and returns True if they are equal otherwise false

B) Write python program in which an function is defined and calling that function prints HelloWorld

C) Write python program in which an function(with single string parameter ) is defined andcalling that function prints the string parameters given to function.

D) Write a python program using with any one of python function argument?

**Week 10:**

A) Write a program to double a given number and add two numbers using lambda()?

B) Write a program for filter() to filter only even numbers from a given list.

C) Write a program for map() function to double all the items in the list?

D) Write a program to find sum of the numbers for the elements of the list

by usingreduce()?

**Week 11:**

A) Write a python program to open and write "hello world" into a file?

B) Write a python program to write the content "hi python programming" for the existing

file.

C) Write a python program to read the content of a file?

**Week 12:**

A) write a program to implement stack using array.

B) write a program to implement Queue using array.

**TEXT BOOKS:**

1. R. Nageswara Rao, "Core Python Programming", dream tech
2. Allen B. Downey , " Think Python: How to Think Like a Computer Scientist", Second
   Edition,
   Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

**COURSE OUTCOMES:**

After completion of the course, Students will be able to**:**

1. Evaluate Problem solving and programming capability
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
3. Implement conditional and loop for python programs
4. Express different Decision Making statements and Functions
5. Understand and summarize different File handling operations and exceptions

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - I- YEAR  II-SEM-IT**                                                                    **L/T/P/C**
                                                                                                          **-/-/3/2**

### (R20A0083) ENGINEERING AND IT WORKSHOP

It is consisting of 3 parts:        Part I: IT Workshop;
                                     Part-II: Electrical & Electronics Workshop;
                                     Part III: Auto CAD Workshop

## Part I: IT Workshop:

**Objectives:**

- Understand the internal structure and layout of the computer system.
- Learn to diagnose minor problems with the computer functioning.
- Know the proper usage and threats of the world wide web.
- Study in detail about the various features of Ms-Word, Excel, PowerPoint.
- Gain an awareness about the tools of LibreOffice.

**Task- 1: PC HARDWARE**

Identification of the peripherals of a computer, components in a CPU and its functions.

Block diagram of the CPU along with the configuration of each peripherals. Functions of

Motherboard. Assembling and Disassembling of PC. Installing of OS.

**Task- 2: TROUBLESHOOTING**

**Hardware Troubleshooting:** Students are to be given a PC which does not boot due to proper

assembly or defective peripherals and the students should be taught to identify and correct

the problem.

**Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system

software problems. They should identify the problem and fix it to get the computer back to

working condition.

**Task 3: INTERNET**

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web

browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads,

Protection from various threats.

**MS OFFICE**

**Task 4: MICROSOFT WORD**

Introduction to Word Processor, Editing and Formatting features, overview of toolbars,

saving files, Using help and resources, rulers, fonts, styles, format painter, Drop Cap in word,

Applying Text effects, Using Character Spacing, Borders and colors, Inserting Header and

Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

**Task 5: MICROSOFT EXCEL**

Excel Orientation: The importance of Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Excel formulae &Functions : formulae, logical functions, text functions, statistical functions, mathematical functions, lookup functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.

Creating a Scheduler ( Features:- Gridlines, Format Cells, Summation, auto fill, Formatting)

Calculating GPA (Features:- Cell Referencing, Formulae and functions in excel)

**Task 6: MICROSOFT POWER POINT**

Basic power point utilities and tools, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Drawing toolbar-Lines and Arrows, Text boxes, Clipart, Insertion of images, slide transition, Custom animation, Hyperlinks.

**Task 7: LIBRE OFFICE**

Overview of LibreOffice and its features of Writer, Calc, Impress, Draw, Base, Math, Charts.

**Libre office Math:** Introduction , Creating & Editing Formulas, formulas as separated documents or files, formulas in office document, Creating formulas, Formula layout

**Libre Office Draw :** Introduction, Basic shapes, working with objects, flowcharts, organization charts.

**Text Books:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education

2. PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)

3. Excel Functions and Formulas, Bernd held, Theodor Richardson, Third Edition

4. Libre Office Documentation : https://documentation.libreoffice.org/en/english-documentation

**Outcomes:**

- Ability to identify the major components of a computer and its peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
- Students can detect and perform minor hardware and software level troubleshooting.
- Capacity to work on Internet & World Wide Web and make effective usage of the internet for academics.
- Ability to prepare professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.

### PART II:ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

**Course Objectives:**

1. To get acquaintance with Residential house wiring procedure.
2. To obtain the knowledge about fluorescent lamp wiring procedure.
3. To get familiarized with staircase wiring.
4. To perform soldering and disordering practice.

**List of Experiments:**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lampwiring
3. Stair casewiring
4. Soldering and Disordering practice – components, devices and circuits using general purpose PCB.

**Course Outcomes:**

- Students will able to understand domestic wiring procedurespractically.
- Students will able to do Fluorescent lamp wiring.
- Students will able to do staircasewiring.
- Student will able to soldering and disordering practice.

### PART III: AUTOCAD WORKSHOP

1. Introduction to AutoCAD
2. Design Process, AutoCAD Installation Process, AutoCAD user Interface, Function Keys
3. Commands:  Drawing Commands, Editing Commands, Drawings aids
4. D Wireframe Modeling
5. CAD Practice Exercises

        CAD -2D, CAD - Isometric

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
B.TECH - I- YEAR  II-SEM-IT                                                                        L/T/P/C
                                                                                                                          2/-/-/0

### (R20A0064) FINANCIAL INSTITUTIONS, MARKETS AND SERVICES

**COURSE OBJECTIVES:**
1. To expose students towards a clear understanding of Financial Markets in India, their operations and relevant development.
2. To lay foundation and equip them with the knowledge of Financial Services, related institutions and their functions.
3. To provide awareness of operations of Financial Markets, Regulators and Shareholders
4. To Provide knowledge in Innovations and technologies of Financial Instruments and Financial Services.
5. To allow them to understand Banking and Non-Banking Institutions operations and their services.

**UNIT-I:**
INTRODUCTION
Financial System and Economic Development - Indicators of Financial Development - Concepts related to Financial Markets, Institutions and Services
Regulatory and Promotional Institutions: Functions and Roles of RBI, IRDA, SEBI.

**UNIT II:**
COMMERCIAL BANKS
Functions of Commercial Banks. Performance and Competition of Public and Private Sector banks- NPA's Non-Banking Financial Institutions- Structure and Functions LIC - GIC & Mutual Funds.

**UNIT-III:**
 FINANCIAL AND SECURITIES MARKETS
Structure and Functions of Call Money Market. Government Securities Market: T-bills Market - Commercial Bills Market. Securities Market: Organization and Structure - Listing - Trading and Settlement.

**UNIT-IV:**
ASSET/FUND BASED FINANCIAL SERVICES
Lease Finance - Hire Purchase Finance- Bills Discounting - Housing Finance - Venture Capital Financing. Fee-based Advisory Services: Stock Broking - Credit Rating Agencies.

**UNIT-V:**
INVESTMENT BANKING
Introduction, Functions and activities, underwriting, bankers to an issue, debenture trustees, portfolio managers.

REFERENCE BOOKS:
1. L. M. Bhole, Financial Institutions and Markets, TMH.
2. M. Y. Khan, Financial Services, TMH.
3. Vasant Desai: Financial Markets and Financial Services, Himalaya.
4. Justin Paul and Padmalatha Suresh: Management of Banking and Financial Services, Pearson.
5. Gomez, Financial Markets, Institutions and Financial Services, PHI.

**COURSE OUTCOMES**
1. The students will get enormous knowledge on Financial Institutions, Securities Markets, and Financial Services.
2. It allows clear understandings of Banking and Non-Banking Financial Institutions operations.
3. Adequate knowledge to indulgence in Investments of financial products and services.
4. Comprehend various policy reforms that impact Financial Markets and Investments.
5. Availability of various fund based and Fee based financial services to get more exposure.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - II- YEAR  I-SEM-IT**                                                     L/T/P/C
                                                                                    3/-/-/3

**(R20A0503) DATA STRUCTURES USING PYTHON**

**COURSE OBJECTIVES:**

This course will enable students to
1. Implement Object Oriented Programming concepts in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understanding how searching and sorting is performed in Python.
4. Understanding how linear and non-linear data structures works.
5. To learn the fundamentals of writing Python scripts.

**UNIT – I**

**Oops Concepts** - class, object, constructors, types of variables, types of methods. **Inheritance:** single, multiple, multi-level, hierarchical, hybrid, **Polymorphism:** with functions and objects, with class methods, with inheritance, **Abstraction:** abstract classes.

**UNIT – II**

**Data Structures –** Definition, Linear Data Structures, Non-Linear Data Structures, Python Specific Data Structures, List, Tuples, Set, Dictionaries, Comprehensions and its Types, Strings, slicing.

**UNIT - III**

**Arrays -** Overview, Types of Arrays, Operations on Arrays, Arrays vs List.
**Searching -** Linear Search and Binary Search.
**Sorting -** Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort.

**UNIT - IV**

**Linked Lists –** Implementation of Singly Linked Lists, Doubly Linked Lists, Circular Linked Lists.
**Stacks -** Overview of Stack, Implementation of Stack (List & Linked list), Applications of Stack
**Queues**: Overview of Queue, Implementation of Queue(List & Linked list), Applications of Queues, Priority Queues.

**UNIT -V**
**Graphs -** Introduction, Directed vs Undirected Graphs, Weighted vs Unweighted Graphs, Representations, Breadth First Search, Depth First Search.
**Trees -** Overview of Trees, Tree Terminology, Binary Trees: Introduction, Implementation, Applications. Tree Traversals, Binary Search Trees: Introduction, Implementation, AVL Trees: Introduction, Rotations, Implementation.

**TEXTBOOKS:**

   1. Data structures and algorithms in python by Michael T. Goodrich
   2. Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

**REFERENCE BOOKS:**

   1. Hands-On Data Structures and Algorithms with Python: Write complex and powerful code using the latest features of Python 3.7, 2nd Edition by Dr. Basant Agarwal, Benjamin Baka.
   2. Data Structures and Algorithms with Python by Kent D. Lee and Steve Hubbard.
   3. Problem Solving with Algorithms and Data Structures Using Python by Bradley N Miller and David L. Ranum.
   4. Core Python Programming -Second Edition,R. Nageswara Rao, Dreamtech Press

**COURSE OUTCOMES:**

The students should be able to:

   1. Examine Python syntax and semantics and apply Python flow control and functions.
   2. Create, run and manipulate Python Programs using core data structures like Lists,
   3. Apply Dictionaries and use Regular Expressions.
   4. Interpret the concepts of Object-Oriented Programming as used in Python.
   5. Master object-oriented programming to create an entire python project using objects and classes

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                                                **L/T/P/C**

**3/-/-/3**

### (R20A0504) OPERATING SYSTEMS

**COURSE OBJECTIVES:**
- ➢ To understand the fundamental concepts and techniques of Operating Systems.
- ➢ To study the concepts of LINUX OS and process scheduling.
- ➢ To understand the concepts in deadlocks and process management.
- ➢ To understand the techniques in memory managements and IPC mechanism.
- ➢ To study file system concepts and sockets.

**UNIT - I**

**Operating System-Introduction**, Structures-Simple Batch, Multi-programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services.

Introduction to Linux operating system, Linux file system, Linux Utilities

**UNIT - II**

**Linux:**  Introduction to shell, Types of Shell's, example shell programs.

**Process and CPU Scheduling -** Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, Scheduling Criteria, Scheduling Algorithms, Multiple - Processor Scheduling.

**UNIT - III**

**Deadlocks -** System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

**Process Management and Synchronization -** The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors

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Malla Reddy College of Engineering and Technology (MRCET)

**UNIT - IV**

**Inter process Communication Mechanisms:** IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory implementation in Linux. Corresponding system calls.

**Memory Management and Virtual Memory -** Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

**UNIT - V**

**File System Interface and Operations** -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, kernel support for files, system calls for file I/O operations open, create, read, write, close, l seek, stat, ioctl

**Disk Management**: Disk Scheduling Algorithms-FCFS, SSTF, SCAN, C-SCAN

**TEXT BOOKS:**

- ➢ Beginning Linux Programming –Neil Mathew, Richard Stones 4th Edition, Wiley
- ➢ Operating System Principles- Abraham Silberschatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
- ➢ Unix System Programming using C++, T. Chan, PHI.
- ➢ Unix Concepts and Applications, 4th Edition, SumitabhaDas,TMH,2006.
- ➢ Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

**REFERENCE BOOKS:**

- ➢ Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
- ➢ Operating System A Design Approach- Crowley, TMH.
- ➢ Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
- ➢ UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
- ➢ UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

**COURSE OUTCOMES:**

At the end of the course students should have:

- ➢ Ability to apply concepts of operating system.
- ➢ Ability to write shell programs and simulate process scheduling algorithms.
- ➢ Skills to analyze memory management and deadlocks situations.
- ➢ An ability to develop programs using system calls and utilities.
- ➢ Capability to compare various file systems.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - II- YEAR  I-SEM-IT**                                                    **L/T/P/C**
                                                                                                        **3/-/-/3**

### (R20A0505) DESIGN AND ANALYSIS OF ALGORITHMS

**COURSE OBJECTIVES:**

1. To analyze performance of algorithms.
2. To choose the appropriate data structure and algorithm design method for a specified application.
3. To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
5. To understand the differences between tractable and  intractable problems  and to introduce P and NP classes.

**UNIT I**

**Introduction:** Algorithms, Pseudo code for expressing algorithms, performance analysis-Space complexity, Time Complexity, Asymptotic notation- Big oh notation, omega notation, theta notation and little oh notation.

**Divide and Conquer:** General method. Applications- Binary search, Quick sort, merge sort, Strassen's matrix multiplication.

**UNIT II**

Disjoint set operations, Union and Find algorithms, AND/OR graphs, Connected components, Bi-connected components.

**Greedy method:** General method, applications- Job sequencing with deadlines, Knapsack problem, Spanning trees, Minimum cost spanning trees, Single source shortest path problem.

**UNIT III**

**Dynamic Programming:** General method, applications- Matrix chained multiplication, Optimal binary search trees, 0/1 Knapsack problem, all pairs shortest path problem, Traveling sales person problem, Reliability design.

**UNIT IV**

**Backtracking:** General method, Applications- n-queue problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.

**UNIT V**

**Branch and Bound:** General method, applications- Travelling sales person problem, 0/1 Knapsack problem- LC branch and Bound solution, FIFO branch and Bound solution.

**NP-Hard and NP-Complete Problems**: Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, NP-Hard problems, Cook's theorem.

**TEXT BOOKS:**

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, Universities press
2. Design and Analysis of Algorithms, P. h. Dave,2ndedition, Pearson Education.

**REFERENCES:**

1. Introduction to the Design and Analysis of Algorithms A Levitin Pearson Education
2. Algorithm Design foundations Analysis and Internet examples, M.T. Goodrich and R Tomassia John Wiley and sons
3. Design and Analysis of Algorithms, S. Sridhar, Oxford Univ.Press
4. Design and Analysis of Algorithms, Aho, Ulman and Hopcraft, Pearson Education.
5. Foundations of Algorithms, R. Neapolitan and K. Naimipour, 4th edition

**COURSE OUTCOMES:**

1. Ability to analyze the performance of algorithms.
2. Ability to choose appropriate algorithm design techniques for solving problems.
3. Ability to understand how the choice of data structures and the algorithm design methods to impact the performance of programs.
4. Describe the dynamic programming paradigm and explain when an algorithmic design situation calls for it. Synthesize dynamic programming algorithms and analyze them.
5. Describes the greedy paradigm and explain when an algorithmic design situation calls for it. Synthesize greedy algorithms and analyze them.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                          **L/T/P/C**
                                                                              **3/-/-/3**

## (R20A1201) COMPUTER ORGANIZATION AND MICROPROCESSOR

**COURSE OBJECTIVES:**
This course will enable students to
1. To understand the basic components of computers.
2. To learn the architecture of 8086 processor, instruction sets, instruction formats and various addressing modes of 8086.
3. To understand the representation of data at the machine level and how computations are performed at machine level.
4. To gain knowledge about the memory organization and I/O organization.
5. To comprehend the parallelism both in terms of single and multiple processors.

### UNIT -I

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization.
**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.
**Micro Programmed Control:** Control memory, Address sequencing, micro program example, design of control unit.

### UNIT -II

**Central Processing Unit:** The 8086 Processor Architecture, Register organization, Physical memory organization, Minimum and Maximum mode system and timings.
**8086 Instruction Set and Assembler Directives**- Addressing modes, Instruction set of 8086, Assembler directives.

### UNIT- III

**Assembly Language Programming with 8086**- Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Passing parameters to procedures, Macros.

### UNIT -IV

**Computer Arithmetic:** Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms.

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**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP).

**UNIT -V**

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.
**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

**TEXT BOOKS:**
1. Computer System Architecture, M. Morris Mano, Third Edition, Pearson. (UNITS-I , IV , V).
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A.K Ray 3rd edition,McGraw Hill India Education Private Ltd. (UNITS - II, III).

**REFERENCE BOOKS:**
1. Microprocessors and Interfacing, D V Hall, SSSP Rao, 3rd edition, McGraw Hill IndiaEducation Private Ltd.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, TataMcGraw Hill, 2002.
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware /Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

**COURSE OUTCOMES:**
1. Ability to illustrate basic components and the design of CPU, ALU and Control Unit.
2. Ability to analyze memory hierarchy and its impact on computer cost/performance.
3. Ability to compare the advantage of instruction level parallelism and pipelining for highperformance Processor design.
4. Ability to demonstrate the instruction set, instruction formats and addressing modes 8086.
5. Ability to write assembly language programs to solve problems.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                                          **L/T/P/C**
                                                                                          **3/-/-/3**

## (R20A0024) PROBABILITY AND STATISTICS

**COURSE OBJECTIVES:**

1. To identify a random variable that describes randomness or an uncertainty in certain realistic situation. It can be either discrete or continuous type.
2. To learn important probability distributions like: in the discrete case, study of the Binomial and the Poisson Distributions and in the continuous case the Normal Distributions.
3. To build the linear relationship between two variables and also to predict how a dependent variable changes based on adjustments to an independent variable.
4. To interpret the types of sampling, sampling distribution of means and variance, Estimations of statistical parameters.
5. To give comprehensive knowledge of probability theory to make inferences about a population from large and small samples

**UNIT –I:**

Single Random Variables -Discrete and Continuous, Probability distribution function, Probability mass and density functions, mathematical expectation and variance.

Multiple Random variables: Discrete and Continuous, Joint probability distribution, Marginal probability density functions, conditional probability distribution function and density functions.

**UNIT-II: Probability Distributions**

Binomial distribution – properties, mean, variance and recurrence formula for Binomial distribution, Poisson distribution – Poisson distribution as Limiting case of Binomial distribution, properties, mean variance and recurrence formula for Poisson distribution, Normal distribution – mean, variance, median, mode and characteristics of Normal distribution.

**UNIT -III: Correlation and Regression**

Correlation -Coefficient of correlation, Rank correlation, Regression- Regression coefficients, Lines of regression.

Multiple correlation and regression- Coefficient of multiple Correlation, multiple regression, multiple linear regression equations.

**UNIT –IV: Sampling and Testing of Hypothesis for Large Samples**

Sampling: Definitions - Types of sampling - Expected values of sample mean and variance, Standard error - Sampling distribution of means and variance. Estimation - Point estimation and Interval estimation.

Testing of hypothesis: Null and Alternative hypothesis - Type I and Type II errors, Critical region - confidence interval - Level of significance, One tailed and Two tailed test.

Large Sample Tests: Test of Significance – Large Sample Test for single mean, difference of means, single proportion, and difference of proportions.

**Unit-V: Testing of Hypothesis for Small Samples**

Small samples: Test for single mean, difference of means, paired t-test, test for ratio of variances (F-test),Chi- square test for goodness of fit and independence of attributes.

**TEXT BOOKS:**

1. Fundamental of Statistics by S.C. Gupta, 7$^{th}$Edition,2016.
2. Fundamentals of Mathematical Statistics by SC Gupta and V.K.Kapoor
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers, 35$^{th}$Edition,2000.

**REFERENCE BOOKS:**

1. Introduction to Probability and Statistics for Engineers and Scientists by Sheldon M.Ross.
2. Probability and Statistics for Engineers by Dr. J. Ravichandran

**COURSE OUTCOMES**:
After completion of the course, the student will be able to

- Evaluate randomness in certain realistic situation which can be either discrete or continuous type and compute statistical constants of these random variables.
- Provide very good insight which is essential for industrial applications by learning probability distributions.
- Higher up thinking skills to make objective, data-driven decisions by using correlation and regression.
- Assess the importance of sampling distribution of a given statistic of a random sample.

Analyze and interpret statistical inference using samples of a given size which is taken from a population.

**B.TECH - II- YEAR  I-SEM-IT**                                          **L/T/P/C**
                                                                         **3/-/-/3**

### (R20A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

**COURSE OBJECTIVES:**

1. To enable the student with a practical insight upon the importance of certain basic issues governing the business operations which are needed for sound economic decision making.
2. The main purpose is to provide inputs on overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
3. To understand and analyse the financial formats of the organisation for smooth functioning of the business activities.

**UNIT-I**

**Introduction to Managerial Economics:** Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

**Demand Analysis:** Demand Determinants, Law of Demand and exceptions.

**Elasticity of Demand:** Definition, Types, Measurement and Significance of elasticity of Demand.

**Demand Forecasting:** Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

**UNIT-II**

**Production & Cost Analysis:** Production Function- Iso cost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

**Cost Analysis:** Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

**UNIT-III**

**Markets:** Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

**Pricing:** Objectives, Methods of Pricing;

**Business:** Features of different forms of Business Organisation (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

**UNIT-IV**

**Introduction to Capital and Financial Accounting:** Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

**Accounting:** Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

**UNIT-V**

**Investment Decision:** Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

**Financial Analysis:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

**References:**
1. Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4. P. L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

**COURSE OUTCOMES:**

Students should be able,

- To apply the basic economic principles, forecast the demand and supply.
- To estimate cost, analyse the market structure and pricing practices.
- To interpret the financial results of the organisation.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                                          **L/T/P/C**
                                                                                             **-/-/3/1.5**

### (R20A0583) DATA STRUCTURES USING PYTHON LAB

**COURSE OBJECTIVES:**

1. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
2. To know the concept of  linear data structures.
3. To introduce the working of non-linear data structures
4. To explain how searching and sorting work.
5. To illustrate how Trees and Graphs work in DS.

1. Write a Python program for class, Flower, that has three instance variables of type str ,int, and float, that respectively represent the name of the flower, its number of petals, and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.

2. Write a Python program for class that extends the Progression class so that each value in the progression is the absolute value of the difference between the previous two values. You should include a constructor that accepts a pair of numbers as the first two values, using 2 and 200 as the defaults.

3. Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter.

4. Write a Python program that inputs a list of words, separated by whitespace, and outputs how many times each word appears in the list.

5. Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. **Example:** Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5]  [7, 8] [7, 9] [8, 9].

6. Write a Python program for Linear Search and Binary search

7.  Write a program to implement Bubble Sort and Selection Sort

8.  Write a program to implement  Merge sort and Quick sort

9.  Write a program to implement  stacks and Queues

10. Write a program to implement  linked list

11. Write a program to implement  Double Linked list

12. Write a program to implement  Binary search Tree

**COURSE OUTCOMES:**

- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To analyze  how linear data structures works
- To understand the how non-linear data structures works
- To understand the how searching sorting works.
- To understand the how Trees and Graphs works in DS.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                                          **L/T/P/C**
                                                                                          **-/3/-/1.5**

## (R20A0584) OPERATING SYSTEMS LAB
### (Using UNIX / LINUX)

**COURSE OBJECTIVES:**

1. To provide an understanding of the design aspects of operating system concepts through simulation
2. Introduce basic Linux commands, system call interface for process management, inter-process communication and I/O in Unix.
3. Student will learn various process and CPU scheduling Algorithms through simulation programs
4. Student will have exposure to System calls and simulate them.
5. Student will learn deadlocks and process management & Inter Process communication and simulate them

**LIST OF EXPERIMENTS:**

**Week 1:**

Practice File handling utilities, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

**Week 2:**

Write a shell script that receives any number of file names as arguments checks if every argument  supplied is a file or directory and reports accordingly. Whenever the argument is a file, it reports no of lines present in it.

**Week 3:** Simulate the following CPU scheduling algorithms.

a) FCFS b) SJF c) Round Robin d) Priority.

**Week 4:** Simulate Bankers Algorithm for Dead Lock Avoidance; Simulate Bankers Algorithm for Dead Lock Prevention.

**Week 5:** Write a C program to simulate the concept of Dining-philosophers problem.

Write a C program to simulate producer-consumer problem using Semaphores

**Week 6:**

a) Write a C program to implement kill (), raise () and sleep () functions.

b) Write a C program to implement alarm (), pause () and abort () functions

c)  Write a program that illustrate communication between two process using unnamed pipes

**Week 7:**

a) Write a program that illustrates communication between two process using named pipes or FIFO.

b) Write a C program that receives a message from message queue and display them.

**Week 8:**

Write a C program that illustrates two processes communicating using Shared memory.

**Week 9:**

Simulate all page replacement algorithms a) FIFO b) LRU c) OPTIMAL

**Week 10:**

Write a C program that takes one or more file/directory names as command line input and reports following information

A) File Type B) Number of Links      C) Time of last Access D) Read, write and execute permissions

**Week 11:**

a) Implement in c language the following UNIX commands using system calls

i) cat    ii) ls      iii) Scanning Directories (Ex: opendir (), readdir (), etc.)

b) Write a C program to create child process and allow parent process to display "parent" and the child to display "child" on the screen

**Week 12:**

Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN


**TEXT BOOKS:**

1.  Operating  System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley

2.  Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

**REFERENCE BOOKS:**

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–
   2005, Pearson Education/PHI

2. Operating System - A Design Approach-Crowley, TMH.

3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI

4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education

5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

**COURSE OUTCOMES:**

- To provide an understanding of the design aspects of operating system concepts
  through simulation
- Introduce basic Linux commands, system call interface for process management,
  inter process communication and I/O in Unix.
- Student will learn various process and CPU scheduling Algorithms through simulation
  programs
- Student will have exposure to System calls and simulate them.
- Student will learn deadlocks and process management & Inter Process
  communication and simulate them

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  I-SEM-IT**                                                  **L/T/P/C**
                                                                                  **2/-/-/0**

## (R20A0004) FOREIGN LANGUAGE - FRENCH

**COURSE OBJECTIVES:**

1. To inculcate the basic knowledge of the French language
2. To hone the basic sentence constructions in day to day expressions for communication in their vocation
3. To form simple sentences that aids in day-to-day communication
4. To prepare the students towards DELF A1
5. To develop in the student an interest towards learning languages.

**UNIT - I:**

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

        alphabet - Introducing people

Writing:          Understand and fill out a form

Grammar:        The verbs "to be ' and "to have '' in the present tense of the indicative

  Vocabulary:        The numbers from 1 to 20 - Professions- Nationalities

**UNIT - II:**

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

possession - express negation

Writing:          Write and understand a short message

Grammar:        Nouns (gender and number) - Articles - The–erverbs in the present-

        Possessive adjectives - Qualifying adjectives

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

**UNIT - III**

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

sports and recreation - express the frequency

Writing:          A letter to a friend

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

        Adverbs-Reflexive verbs

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

**UNIT - IV**

Speaking:      Express the quantity - ask and give the price - express the need, the will and

the capacity - compare (adjective) - speak at the  restaurant / in the shops

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

Grammar:      Verbs "to want", "to can"- Express capacity / possibility- Express will / desire           –

the future tense

Vocabulary:    The food – Meals-Fruits and vegetables– The parts of the body

**UNIT - V**

Speaking:      Express the prohibition and the obligation - describe an apartment - talk

about the weather / ask the weather - ask the opinion - give your opinion -                express

your agreement or disagreement

Writing:       Descriptions

Grammar:       Demonstrative adjectives-      Prepositions- The verb 'must' to indicate

obligation and necessity in the present

Vocabulary:    Seasons – Holidays-The city– Furniture

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

**REFERENCE BOOKS**

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

**COURSE OUTCOMES**

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

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                            **L/T/P/C**
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### (R20A0026) DISCRETE MATHEMATICS

**COURSE OBJECTIVES:**

1. Describe mathematical concepts as applied in computer science for solving logical problems.
2. Understanding the concepts of sets, functions, relations, recurrence relations and Lattices.
3. Understand the concepts on elementary combinations and permutations.
4. To develop the mathematical skills needed for advanced quantitative courses.
5. Analyze the properties of graphs and trees.

**UNIT –I:**

Mathematical Logic: Statements and notations, connectives, well-formed formulas, truth tables, tautology, equivalence implication; Normal forms: Disjunctive normal forms, conjunctive normal forms, principle disjunctive normal forms, principle conjunctive normal forms.

Predicates: Predicative logic, statement functions, variables and quantifiers, free and bound variables, rules of inference, consistency, proof of contradiction, automatic theorem proving.

**UNIT –II:**

Posets and Lattices: Relations and their properties, Properties of binary relations, equivalence, compatibility and partial ordering relations, lattices, Hasse diagram; Functions-Inverse function, composition of functions, recursive functions.

Lattices as partially ordered sets; Definition and examples, properties of lattices, sub lattices, some special lattices.

**UNIT-III:**

Groups: Algebraic structure, Groupoid, Monoid, Semi groups, Group, Sub groups, Homomorphism and Isomorphism of groups.

Elementary Combinatorics: Basics of counting, The permutations, disarrangements, combinations, permutations and combinations with repetitions, constrained repetitions, the principal of Inclusion-Exclusion, Pigeon hole principle.

**UNIT –IV:**

Advanced Counting Techniques: Generating Function of Sequences, Recurrence relations, Solving Recurrence Relations by substitution and Generating function, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

**UNIT –V:**

Graphs Theory: Introduction to Graphs, Isomorphic graphs, Euler graphs, Hamiltonian graphs, Planar graphs, Graph coloring, directed graphs, Weighted digraphs, chromatic numbers. Trees and their properties, spanning trees, Directed trees, Binary trees Minimal Spanning Trees.

**TEXT BOOKS:**
1. L. Liu, D. P. Mohapatra, —Elements of Discrete Mathematics, Tata McGraw-Hill, India, 3$^{rd}$Edition,2008.
2. J. P. Tremblay, R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, India, 1stEdition,1997.
3. Joel. Mott, Abraham Kandel, Theodore P. Baker, —Discrete Mathematics for Computer Scientists and Mathematicians, Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd Edition,2010.

**REFERENCE BOOKS:**
1. Kenneth H. Rosen, —Discrete Mathematics and Its Applications, Tata McGraw-Hill, New Delhi, India,6thEdition,2012.
2. Ralph P. Grimaldi, B. V. Ramana, —Discrete and Combinatorial Mathematics - An Applied Introduction, Pearson Education, India, 5thEdition,2011.
3. S. Malik, M. K. Sen, —Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, India, 1stEdition,2004.

**COURSE OUTCOMES:**

After learning the concepts of this course, the student will be able to:

- Apply Propositional and Predicate logic for a variety of problems in various domains.
- Understand Set Theory, Venn Diagrams, relations, functions and apply them to Real-world Scenarios.
- Understand General properties of Algebraic systems and study lattices as partially ordered sets and their applications.
- Solve the recurrence relations and can be used to optimize algorithms.
- To identify the basic properties of graphs and trees and use these concepts to model simple applications.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                               **L/T/P/C**
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### (R20A1202) AUTOMATA AND COMPILER DESIGN

**COURSE OBJECTIVES:**

1. To provide an understanding of automata ,grammars and language translators.
2. To describe the various techniques used in compiler construction
3. To have insight the process of semantic analysis
4. To understand the code optimization techniques
5. To apprehend the code generation techniques

**UNIT - I**

Formal Language and Regular Expressions**:** Languages, Definition Languages regular expressions, Finite Automata - DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Context Free grammars and parsing, derivation,  parse trees, Application of Finite  Automata.

**UNIT - II**

Introduction To Compiler, Phases of Compilation, ambiguity LL(K) grammars and LL(1) parsing. Bottom  up  parsing,  Handle  pruning,  LR  Grammar  Parsing,  LALR  parsing,  parsing  ambiguous grammars, YACC programming specification.

Semantics: Syntax directed translation, S-attributed and L-attributed grammars.

**UNIT - III**

Intermediate code - abstract syntax tree, translation of simple statements and control flow statements.

Context Sensitive features -Chomsky hierarchy of languages and recognizers.  Type  checking, type conversions, equivalence of type expressions, overloading of functions and operations.

**UNIT - IV**

Run time storage: Storage organization, storage allocation strategies scope access to now local names.

Code optimization: Principal sources of optimization, optimization of basic blocks, peephole optimization.

**UNIT - V**

Code generation: Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

**TEXT BOOKS:**
1. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravi Sethi, Pearson Education.

**REFERENCE BOOKS:**
1. Modern Compiler Implementation in C- Andrew N. Apple, Cambridge University Press.
2. Lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'Reilly
3. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
4. Engineering a Compiler-Cooper & Linda, Elsevier.
5. Compiler Construction, Louden, Thomson.
6. Introduction to Automat a Theory Languages and Computation". Hopcroft H.E. and Ullman J.D. Pearson Education.

**COURSE OUTCOMES:**
 At the end of the course the students are able to:

- Express the necessity and types of different language translators in use.
- Apply the techniques and design different components (phases)of a compiler.
- Implement practical aspects of automata theory.
- Classify the different optimization techniques
- Use the tools Lex, Yacc in compiler construction

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                        **L/T/P/C**
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### (R20A0508) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

**COURSE OBJECTIVES:**

- To understand object-oriented principles like abstraction, encapsulation, inheritance, polymorphism and apply them in solving problems.
- To understand the implementation of packages and interfaces.
- To understand the concepts of exception handling, multithreading and collection classes.
- To understand how to connect to the database using JDBC.
- To understand the design of Graphical User Interface using applets and swing controls.

**UNIT –I:**

Java Programming- History of Java, comments, Java Buzz words, Data types, Variables, Constants, Scope and Lifetime of variables, Operators, Type conversion and casting, Enumerated types, Control flow- block scope, conditional statements, loops, break and continue statements, arrays, simple java stand alone programs, class, object, and its methods constructors, methods, static fields and methods, access control, this reference, overloading constructors, recursion, exploring string class, garbage collection

**UNIT –II:**

Inheritance – Inheritance types, super keyword, preventing inheritance: final classes and methods.

Polymorphism – method overloading and method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface, inner class.

Packages- Defining, creating and accessing a package, importing packages.

**UNIT-III:**

Exception handling-Benefits of exception handling, the classification of exceptions - exception hierarchy, checked exceptions and  unchecked exceptions, usage of try, catch, throw, throws and finally, creating own exception subclasses.

Multithreading – Differences between multiple processes and multiple threads, thread life cycle, creating threads, interrupting threads, thread priorities,

synchronizing threads, inter-thread communication, producer consumer problem.

**UNIT-IV**

Collection Framework in Java – Introduction to java collections, Overview of java collection framework, commonly used collection classes- Array List, Vector, Hash table, Stack, Lambda Expressions.

Files- Streams- Byte streams, Character streams, Text input/output, Binary input/output, File management using File class.

Connecting to Database – JDBC Type 1 to 4 drivers, Connecting to a database, querying a database and processing the results, updating data with JDBC,Data Access Object (DAO).

**UNIT-V**

GUI Programming with Swing - The AWT class hierarchy, Introduction to Swing, Swing Vs AWT, Hierarchy for Swing components, Overview of some Swing components – Jbutton, JLabel, JTextField, JTextArea, simple Swing applications, Layout management – Layout manager types – border, grid and flow

Event Handling- Events, Event sources, Event classes, Event Listeners, Delegation event model, Examples: Handling Mouse and Key events, Adapter classes.

**TEXT BOOKS:**
1. Java Fundamentals– Comprehensive introduction, Herbert Scheldt & DalesKrien, TMH
2. Core Java: An Integrated Approach – Dr R Nageswara Rao

**REFERENCE BOOKS:**
1. Java for Programmers, P.J. Deitel and H.M. Deitel, PEA (or) Java: How to Program, P.J. Deitel and H.M. Deitel, PHI
2. Object Oriented Programming through Java, P. RadhaKrishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.
5. Design Patterns Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides.

**COURSE OUTCOMES:**

At the end of this course, students will be able to:
- Understand the use of OOP's Concepts
- Implement Packages and interfaces in java
- Develop and Understand exception handling, multithreaded applications with synchronization
- Understand the use of Collection Framework
- Design GUI based applications using AWT and Swings

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                   **L/T/P/C**
                                                                                **3/-/-/3**

## (R20A0509) DATABASE MANAGEMENT SYSTEMS

**COURSE OBJECTIVES:**

1. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
2. To understand and use data manipulation language to query, update, and manage a database
3. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

**UNIT –I:**

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction –Instances and Schemas – Database Languages – database Access for applications Programs – Database Users and Administrator – Transaction Management – Database Architecture – Storage Manager – the Query Processor.

Data Models: Introduction to the Relational Model – Structure – Database Schema, Keys – Schema Diagrams. Database design– Other Models, ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – ER Design Issues – Concept Design – Conceptual Design with relevant Examples. Relational Query Languages, Relational Operations.

**UNIT –II:**

Relational Algebra – Selection and projection set operations  – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple Relational Calculus (TRC) – Domain relational calculus (DRC). Overview of the SQL Query Language – Basic Structure of SQL Queries, Set Operations, Aggregate Functions – GROUPBY – HAVING, Nested Sub queries, Views, Triggers, Procedures.

**UNIT III:**

Normalization – Introduction, non loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyce/Codd normal form.

Higher Normal Forms - Introduction, Multi-valued dependencies and fourth normal form, Join dependencies and fifth normal form

**UNIT IV:**

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock – Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

**UNIT V:**

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Check Points - Buffer Management – Failure with loss of nonvolatile storage.

**TEXT BOOKS:**

1. Database System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition. (All UNITS except III th)
2. Database Management Systems, Raghu Ramakrishna, Johannes Gehrke, TATA McGraw-Hill 3rd Edition.

**REFERENCE BOOKS:**

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A. Kannan, S. Swami Nadhan, Pearson, Eight Edition for UNIT III.

**COURSE OUTCOMES:**

- Demonstrate the basic elements of a relational database management system
- Ability to identify the data models for relevant problems
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data
- Apply normalization for the development of application software's
- Understand the basic LT Switch gear and calculations for energy consumption.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                            **L/T/P/C**
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### (R20A0510) COMPUTER NETWORKS

**COURSE OBJECTIVES:**

1. To understand the fundamentals of computer networks, TCP/IP & OSI model.
2. To know Data link layer Issues & Protocols.
3. To learn Network layer Protocols & IP addressing concepts.
4. To identify end to end communication & various aspects of Transport layer.
5. To understand various user services in a network.

**UNIT - I:**
**Introduction:** Network, Uses of Networks, Types of Networks, And Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model.

**Physical Layer:** Guided transmission media, Wireless transmission media, Switching.

**UNIT - II:**
**Data Link Layer** - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols.

**Multiple Access Protocols** - ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision free protocols, Ethernet-Physical Layer & Mac Sub layer.

**UNIT - III:**
**Network Layer:** Network Layer Design issues, Store and Forward Packet Switching Connection less and Connection-oriented networks, Routing algorithms: Optimality principle, Shortest path, Flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms, IP addresses, CIDR, Sub netting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol, Transition from IPv4 to IPv6, ARP, RARP.

**UNIT - IV:**
**Transport Layer:** Services provided to the upper layers, Elements of transport protocol, Addressing, Connection Establishment, Connection Release, Error Control & Flow Control, Crash Recovery.

**The Internet Transport Protocols:** UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.

**UNIT - V:**

**Application Layer**- Introduction, Providing services, Applications layer paradigms:
Client server model, HTTP, E-mail, WWW, TELNET, DNS.

**TEXT BOOKS:**

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH,2013.

**REFERENCES BOOKS:**

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition,Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K.W. Ross, 3rd Edition, Pearson Education.

**COURSE OUTCOMES:**

At the end of this course, students will be able to:
• Describe basics of Computer Networks and Reference Models.
• Apply the Datalink Layer Concepts.
• Know allotment of IP addresses, best routing path calculations in network.
• Analyze TCP, UDP working and know how to handle congestion
• Observe & Apply in Application Layer issues in various internet services.

# OPEN ELECTIVE - I

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B.TECH - II- YEAR  II-SEM-IT                                                                    L/T/P/C
                                                                                                              3/-/-/3

### OPEN ELECTIVE - I
### (R20A1251) WEB DESIGNING TOOLS

**COURSE OBJECTIVES:**

Students should be able:

1. To understand the basics of web & html programming
2. To introduce CSS and its style
3. To brief on Java Scripting & Dynamic Html
4. To get acquainted with web server software AJAX
5. To peruse PHP and study the developing environments

**UNIT –I:**

Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser, HTML-Introduction HTML-Basic Formatting Tags , HTML-Grouping Using Div Span, HTML-Lists,: HTML-Images, HTML-Hyperlink, HTML-Table, HTML-Iframe,HTML – Form HTML – Headers, HTML-Miscellaneous using tool Dreamweaver/ Visual studio

**UNIT –II:**

CSS –Introduction, Syntax, CSS-Selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS-Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool using tool Dreamweaver/ Visual studio, Net Bean

**UNIT-III:**

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script. XMLHttpRequest- Introduction, XMLHttpRequest, The XMLHttpRequest Object, Events for the XMLHttpRequest Object, Request Object for XMLHttpRequest, Response Object for XMLHttpRequest. Using tool using tool Visual studio, Net Bean & Eclipse

**UNIT –IV:**

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, CSS to Define Look and Feel, Understand the XML Mark-up, XMLHttpRequest. AJAX using XML and XML HTTP Request- Introduction, Ajax Using XML and XMLHttpRequest, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an

HTML Page, Receiving XML Responses, Handling Response XML. Using tool using tool Visual studio, Net Bean & Eclipse

**Unit V**

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query. Using tool using tool Visual studio, Net Bean & Eclipse


**TEXT BOOKS:**

1. Web Programming, Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2. Programming world wide web, SEBESTA, PEARSON.


**REFERENCE BOOKS:**

1. Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson
2. Ajax: The Complete Reference By Thomas Powell
3. PHP: The Complete reference-steven Holzner Tata McGraw-Hill.
4. An Introduction to web Design and Programming –Wang-Thomson
5. Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
6. Beginning Web Programming-Jon Duckett WROX


**COURSE OUTCOMES:**
Students will be able:
- To design a web application.
- To build creative style sheets using CSS
- To write java scripts for web application.
- To frame web template using Ajax
- To associate AJAX with PHP

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                               **L/T/P/C**
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## OPEN ELECTIVE – I
## (R20A0551) INTRODUCTION TO DBMS

**COURSE OBJECTIVES:**

1. To understand the basic concepts and the applications of database systems
2. To Master the basics of SQL and construct queries using SQL
3. To understand the relational database design principles
4. To become familiar with the basic issues of transaction processing and concurrency control
5. To become familiar with database storage structures and access techniques

### UNIT –I: INTRODUCTION

**Database**: Purpose of Database Systems, File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA

### UNIT –II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship Set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set-Views.

### UNIT-III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated-Aggregate Functions- Null values. Views, Triggers.

### UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design: - Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FDs, - Minimal Covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties-

**UNIT –V:**

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability, Serializability by Locks-Locking Systems with Several Lock Modes- Concurrency Control by Timestamps, validation.

*TEXT BOOKS:*

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, McGraw- Hill, 6th Edition ,2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

*REFERENCE BOOKS:*

1. Raghu Ramakrishnan, JohannesGehrke,DatabaseManagementSystem, McGraw Hill., 3rd Edition2007.
2. Elmasri&Navathe, Fundamentals of Database System, Addison-Wesley Publishing, 5th Edition,2008.
3. Date.C. J,—AnIntroductiontoDatabase, Addison-WesleyPubCo,8th Edition,2006.
4. Peterrob, Carlos Coronel, Database Systems Design, Implementation, and Management, 9th Edition, Thomson Learning, 2009.

**COURSE OUTCOMES:**

- Understand the basic concepts and the applications of database systems
- Master the basics of SQL and construct queries using SQL
- Understand the relational database design principles
- Familiarize with the basic issues of transaction processing and concurrency control
- Familiarize with database storage structures and access techniques

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                                **L/T/P/C**
                                                                                                        **3/-/-/3**

### OPEN ELECTIVE – I
### (R20A0051) ENTERPRISE RESOURCE PLANNING

**COURSE OBJECTIVES:**

1. To know the basics of ERP
2. To understand the key implementation of ERP
3. To know the business modules of ERP
4. To learn about the post implementation of ERP
5. To evaluate the current and future trends in ERP

**UNIT –I:**

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

**UNIT II**

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

**UNIT III**

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

**UNIT IV**

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

**UNIT V**

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc.- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

**TEXT BOOKS:**

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill,2008
2. Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi,2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India,2009.

**REFERENCE BOOKS:**

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill,2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition,2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA,2001.

**COURSE OUTCOMES:**

- Understand the basics of ERP
- Understand the key implementation of ERP
- Learn the business modules of ERP
- Learn about the post implementation of ERP
- Evaluating the current and future trends in ERP

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

**3/-/-/3**

### OPEN ELECTIVE - I
### (R20A0351) Intellectual Property Rights

COURSE OBJECTIVES:
- To understand the concepts IPR
- To understand Trademarks, Trade Secretes and GI of goods.
- To understand Copyrights, Patents and Industrial Designs.
- To learn about how to manage IP rights and legal aspects.
- To understand the concepts of Cyber laws in IPR.

**UNIT – I:**
**Introduction**: Introduction to Intellectual Property Rights, types of intellectual property, importance of intellectual property rights, Evolution of IP acts and treaties, Agencies responsible for IPR registrations, Role and value of IP in international commerce, Issues affecting IP internationally.

**UNIT – II**
**Trade Marks**: Purpose and function of trademarks, Acquisition of trade mark rights, transfer of rights, Selecting and evaluating trademark, registration of trademarks, claims.
**Trade Secrets**: Trade secret law, determination of trade secret status, liability for misappropriation of trade secrets, trade secret litigation.
**Geographical Indication of Goods:** Basic aspects and need for the registration

**UNIT – III**
**Copyrights:** Fundamentals of copyright law, originality of material, right of reproduction, right to performthe work publicly, copyright ownership issues, notice of copyright.
**Patents:** Foundation of patent law, patent searching process, Basic Criteria of Patentability
**Industrial Designs:** Kind of protection provided in Industrial design
**UNIT – IV:**
**Managing IP Rights:** Acquiring IP Rights: letters of instruction, joint collaboration agreement,
**Protecting IP Rights:** Non-disclosure agreement, cease and desist letter, settlement memorandum.
**Transferring IP Rights**: Assignment contract, license agreement, deed of assignment
**UNIT- V**
**Introduction to Cyber law:** Information Technology Act, cyber-crime and e-commerce, data security, confidentiality, privacy, international aspects of computer and online crime.

**COURSE OUTCOMES:**
- Learner should be able to demonstrate understanding of basic concepts of IPR.
- Able to differentiate between Trademarks, Trade secrets and GI of goods.
- Able to understand Copyrights, Patents and Industrial Designs.
- Able to manage and protect IP
- Willgain Knowledge on Cyber law

**TEXT BOOKS:**
1. **Intellectual property right by Deborah E Bouchoux**
2. **Cyber law, Text and cases South westernspecial topics collection.**
3. **Intellectual property rights by N.K Acharya**
4. **Fundamentals of IPR for engineers, BY komal bansal**
**REFERENCES:**
**Intellectual property rights by P. Radhakrishnan.**

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                                **L/T/P/C**
**3/-/-/3**

### OPEN ELECTIVE – I
### (R20A0451) BASICS OF COMPUTER ORGANIZATION

**COURSE OBJECTIVES:**

1. To understand basic components and operations in a system
2. To understand the execution of an instruction in a computer.
3. To acquire the knowledge to design of CPU.
4. To explore the memory organization.
5. To explore I/O organization and parallel processing in-depth

**UNIT –I:**

Basic Structure of Computers: Computer Types, Functional Units, Computer Registers, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers. Data Representation: Fixed Point Representation, Floating – Point Representation.

Register Transfer Language and Micro Operations: RTL- Register transfers, Bus and Memory Transfers. Micro operations: Arithmetic, Logic, Shift micro-operations, Arithmetic logic shift unit.

**UNIT –II:**

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division

Algorithms. Error detection and Correction Codes

Basic Computer Organization and Design: Instruction codes, Timing and Control, Computer

Instructions: Memory Reference Instructions, Register Transfer Instructions, Input

– Output Instructions, Instruction cycle. Interrupt and Interrupt cycle, Complete Computer

Description

**UNIT-III:**

Central Processing Unit organization: General Register Organization, Stack organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, CISC and RISC processors.

Control Unit Design: Control Memory, Address sequencing, Design of CU: Micro Programmed Control, Hardware Control, Micro Program example. Case Study- Introduction to x86architecture.

Malla Reddy College of Engineering and Technology (MRCET)

**UNIT –IV:**

Memory Organization: Memory Hierarchy, Memory Interleaving, Main Memory-RAM and ROM chips, Associative Memory-Hardware Organization, Match logic. Mapping functions-Associate, Direct, Set Associative Mapping. Cache Memory: Hit Ratio, Cache Coherence, Cache writes policies. Auxiliary memory: Magnetic Disks, Magnetic Tapes Optical devices, Page Replacement Algorithms.

**UNIT –V:**

Input –Output Organization: Peripheral Devices, Input-Output Subsystems, I/O Device Interface, I/O Processor, I/O Transfers–Program Controlled, Interrupt Driven, and DMA, Interrupts and Exceptions. I/O Device Interfaces – SCII, USB.

Pipelining and Vector Processing: Basic Concepts, Instruction level Parallelism Throughput and Speedup, Pipeline hazards. Vector Processing: Applications, an Example for Vector Processing.

**TEXT BOOKS:**

1. "Computer System Architecture" by M. Morris Mano, 3$^{rd}$Edition.
2. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
3. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher, McGraw Hill Higher Education.

**REFERENCE BOOKS:**

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes,WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

**COURSE OUTCOMES:**
- Able to understand functional components and micro-operations in a computer.
- Able to understand arithmetic operations and computer instructions.
- Able to understand CPU organization and design of control unit.
- Able to understand the Memory organization.
- Able to understand I/O Transfer and Parallel Processing.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - II- YEAR II-SEM-IT**                                        **L/T/P/C**
                                                                                                    **-/-/3/1.5**

**(R20A0585) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

**COURSE OBJECTIVES:**
1. To prepare students to become familiar with the Standard Java technologies ofJ2SE
2. To prepare students to excel in Object Oriented programming and to succeed as a Java Developer through global rigorous education.
3. To provide Students with a solid foundation in OOP fundamentals required to solve programming problems and also to learn Advanced Java topics like J2ME, J2EE, JSP, JavaScript
4. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate Java programming issues to broader application context.
5. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

Week 1:
a) Write a java program to find the Fibonacci series using recursive and non-recursive functions
b) Write a   program to multiply two given matrices.
c) Write a   program for Method overloading and Constructor overloading

Week 2:
a) Write a  program to demonstrate execution of static blocks ,static variables & static methods.
b) Write a   program to display the employee details using Scanner class
 c) Write a program for sorting a given list of names in ascending order

Week 3:
a) Write a program to implement single and Multi level inheritance
b) Write a program to implement Hierarchical Inheritance.
c) Write a program to implement method overriding.

Week 4:
a)  Write a   program to create an abstract class named Shape that contains two integers and an empty method named printArea (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
b) Write a   program to implement Interface .
c) Write a program to implement multiple and Hybrid Inheritance

Week 5:
a) Write a    program to create inner classes
b) Write a    program to create user defined package and demonstrate various access modifiers.
c) Write a    program to demonstrate the use of super and final keywords.


Week 6 :
a) Write a    program  if number is less than 10 and greater than 50 it generate the exception
   out of range. else it displays the square of number.
b) Write a    program with multiple catch Statements.
c) write a    program to implement nested try

Week 7:
a) Write a    Program to implement simple Thread by extending Thread class and
   implementing runnable interface.
b) Write a    program that implements a multi-thread application that has three threads
c) write a  program to set and print thread priorities

Week 8:
Write a    program to implement following collections
a) array List b) Vector
c)Hash table d)Stack

Week 9:
a)  Write a program to demonstrate lambda expressions.
 b) Write a    program for producer and consumer problem using Threads

Week 10:
 a) Write a    program to list all the files in a directory including the files present in all its
subdirectories.
b) Write a    Program to Read the Content of a File Line by Line

Week 11:
a) Write a    program that connects to a database using JDBC display all records in a table.
b) Write a    program to connect to a database using JDBC and insert values into it.
c) Write a    program to connect to a database using JDBC and delete values from it

Week 12:
Write a    program that works as a simple calculator. Use a Grid Layout to arrange Buttons for
digits and for the + - * % operations. Add a text field to display the result.

**COURSE OUTCOMES:**

Upon successful completion of this course, the students will be able to:
1. Analyze the necessity for Object Oriented Programming paradigm and over structured programming and become familiar with the fundamental concepts in OOP.
2. Demonstrate an ability to design and develop Java programs, analyze, and interpret object oriented data and report results.
3. Analyze the distinguish between various types of inheritance.
4. Demonstrate an ability to design an object oriented system, AWT components or multithreaded process as per needs and specifications.
5. Demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks like console and windows applications for standalone programs.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - II- YEAR  II-SEM-IT**                                                        **L/T/P/C**
                                                                                          **-/3/-/1.5**

## (R20A0586) DATABASE MANAGEMENT SYSTEMS LAB

**COURSE OBJECTIVES:**

1. To familiarize database design concepts using ER modeling and Relational model.
2. To enable students to use SQL to query database and perform all types of operations and understanding normalization and effective database design principles
3. To enable students to use Non-Relational DBMS and understand the usage of Document oriented and distributed databases.
4. To enable the students to use TCL and DCL Commands and perform all states of Transaction operations
5. To familiarize issues of concurrency control and transaction management

**A.      Practice on SQL Queries to acquire knowledge on RDBMS.**

**B.      Case Study:**

**Objective:** This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, develop ing and querying a database in the context of example database - Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels:** "Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservations and Ticketing
- Cancellations
- **Reservations &Cancellation**:

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family). Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above Process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model, 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels.

Examples are given at every experiment for guidance to students.

Experiment 1: E-R Model

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example:

Entities:

> B U S
>
> Ticket
>
> Passenger

Relationships:
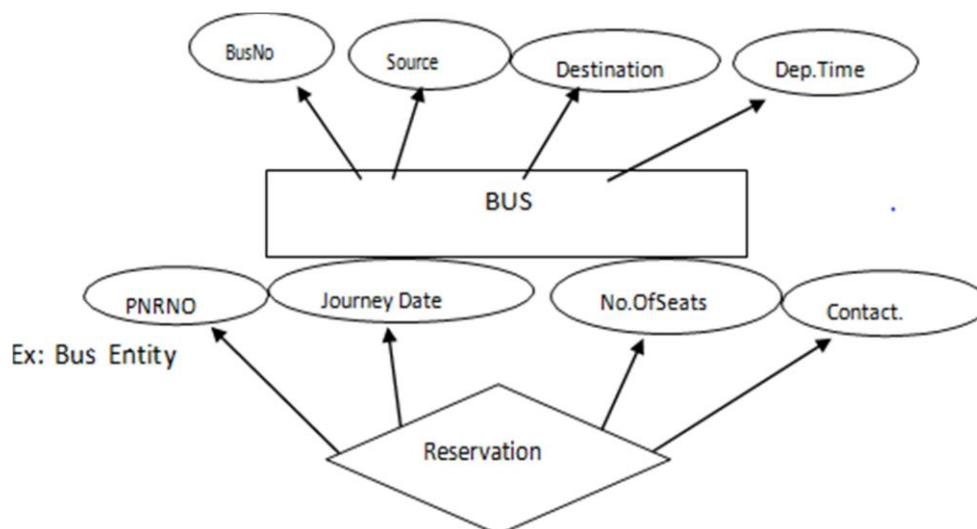
> Reservation
>
> Cancellation

PRIMARY KEY ATTRIBUTES:

> Ticket ID (Ticket Entity)
>
> Passport ID (Passenger Entity)
>
> Bus NO (Bus Entity)

Apart from the above-mentioned entities you can identify more. The above mentioned are few.



Ex: Bus Entity

Ex: Reservation relationship

**Note: The student is required to submit a document by writing the Entities and Keys to the lab teacher**

**Experiment 2: Concept design with E-R Model Note**: -

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total/partial). Try to incorporate Generalization, Aggregation,

Specialization etc. wherever required.

**Note**: The student is required to submit a document by drawing the E-R diagram to the lab teacher.

**Experiment 3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion.

Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attribute as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued and derived) have different way of Representation.

Example: The passenger looks as below. This is an example. You can add more attributes based on your E-R-Model

This is not normalized table.

Passenger Name Age Sex Address Ticket_id PassportID

---

**Note: The student is required to submit a document by represent relationships in a tabular fashion to the lab teacher.**

**Experiment 4: Normalization**

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only

For the above table in the First normalization, we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.

**First Normal Form: The above table can be divided into two tables as shown below.**

Passenger Name Age Sex Address PassportID

Passport_id Ticket_id

You can do the second and third normal forms if required. Anyhow Normalized tables are given at the end.

**Experiment5:InstallationofMysql/MongoDB/NoSQLandpracticingDDL,** commands Installation of MySQL / MongoDB / NoSQL . In this week you will learn Creating databases, how to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

5.a) Example for creation of a normalized "Passenger" table. CREATE TABLE Passenger (Passport_id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL, Age Integer Not NULL,Sex Char, Address VARCHAR (50) Not NULL);

Similarly create all other tables.

Note: Detailed creation of tables is given at the end**.**

**5.b) Installation of MongoDB**

Installation of MongoDB on Windows, MongoDB is a cross-platform, document-oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document. In this week You will Learn with MongoDB. How to create Database, Collection, Document, Field, Embedded Documents. Relationships in MongoDB represent how various documents are logically related to each other. Relationships can be modeled via Embedded and Referenced approaches.

Ex: MongoDB db. createCollection (name, options) is used to create collection.

**Basic syntax of createCollection () method**

```
>use test
switched to db test
>db. createCollection("mycollection")
```

{ "ok" : 1 }

>created collection by using the command show collections.

>show collections mycollection system. indexes

### 5.c) Installation of NoSQL

NoSQL is a non-relational database management Systems, different from traditional relational database management systems. It is designed for distributed data stores where very large scale of data storing needs. For example, Google or Facebook which collects terabits of data every day for their users. Stands for Not Only SQL, No declarative query language, No predefined schema, Key- Value pair storage, Column Store, Document Store, Graph databases, Eventual consistency rather ACID property, Unstructured and unpredictable data, CAP Theorem, Prioritizes high performance, high availability and scalability, BASE Transaction

**Key Value Pair Based**

Data is stored in key/value pairs. It is designed in such a way to handle lots of data and heavy load. Key-value pair storage databases store data as a hash table where each key is unique, and the value can be a JSON, BLOB (Binary Large Objects), string, etc.

For example, a key-value pair may contain a key.

| Key | Value |
|---|---|
| Name | Joe Bloggs |
| Age | 42 |
| Occupation | Stunt Double |
| Height | 175cm |
| Weight | 77kg |

Redis, Dynamo, Riak are some examples of key-value store Databases. They are all based on Amazon's Dynamo paper.

**Column-based NoSQL databases** are widely used to manage data warehouses, business intelligence, CRM, Library card catalogs,

HBase, Cassandra, HBase, Hypertable are examples of column based database.

**Document-Oriented:**

Document-Oriented NoSQL DB stores and retrieves data as a key value pair but the value part is stored as a document. The document is stored in JSON or XML formats. The value is understood by the DB and can be queried.
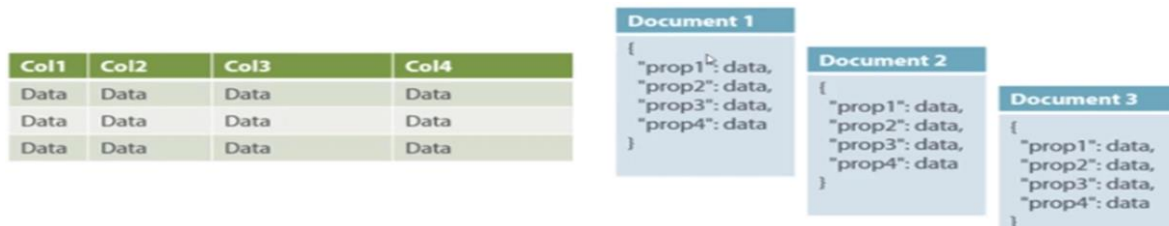


**Graph-Based**

A graph type database stores entities as well the relations amongst those entities. The entity is stored as a node with the relationship as edges. An edge gives a relationship between nodes. Every node and edge has a unique identifier.
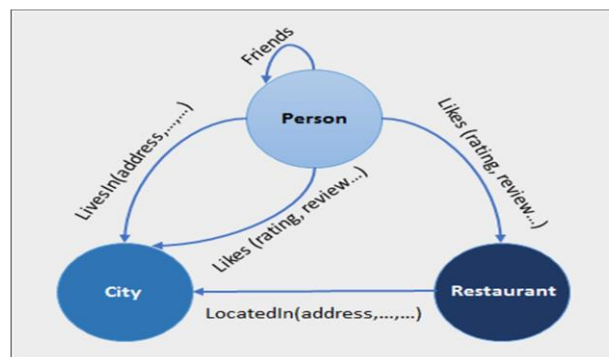


**Experiment 6: Practicing DML commands**

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into atable
- UPDATE - updates existing data within atable
- DELETE - deletes all records from a table, the space for Therecordsremain

**Inserting values into "Bus" table:**

Insert into Bus values(1234,'hyderabad', 'tirupathi'); Insert into Bus values (2345,'hyderabd' 'Banglore'); Insert into Bus values (23,'hyderabd','Kolkata');

Insert into Bus values (45,'Tirupathi,'Banglore'); Insert into Bus values(34,'hyderabd','Chennai');

**Inserting values into "Passenger" table:**

Insert into Passenger values (1, 45,'ramesh', 45,'M', 'abc123'); Insert into Passenger values

(2, 78,'geetha', 36,'F','abc124'); Insert into Passenger values (45, 90,' ram', 30,'M','abc12');   InsertintoPassengervalues(67,89,'ravi',50,'M','abc14');Insertinto Passenger values (56, 22,'seetha',32,'F','abc55');

**Few more Examples of DML commands:**

Select * from Bus; (selects all the attributes and display) UPDATE BUS SET Bus No

=1 WHERE BUSNO=2;

**Experiment 7: Querying**

Inthisweekyouare goingtopractice queries (along with sub queries) using ANY,

ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT,onstraintsetc

**Practice the following Queries:**

Display unique PNR_no of all Passengers. Display all the names

of male passengers. Display the ticket numbers and names of

all the passengers.

Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'. Find

the names of passengers whose age is between 30 and 45.

Display all the passengers names beginning with 'A' Display the sorted

list of passengers names

**Experiment 8 and Experiment 9: Querying (continued...)**

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

Write a Query to display the Information present in the Passenger and cancellation tables.

Hint: Use UNION Operator.

Display the number of days in a week on which the 9W01 bus is available.

Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.

Find the distinct PNR numbers that are present.

Find the number of tickets booked by a passenger where the number of seats is greater than 1.Hint: Use GROUP BY, WHERE and HAVING CLAUSES.

Find the total number of cancelled seats.

**Experiment 10: Triggers**

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

**Eg: CREATE TRIGGER updcheck BEFORE UPDATE ON passenger FOR EACH ROW BEGIN**

IF NEW.Tickent N0 > 60 THEN SET New.Tickent no = Ticket no; ELSE SET New.Ticket no = 0;

END IF;

END;

**Experiment 11: Stored Procedures**

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

**Eg: CREATE PROCEDURE myProc()**

BEGIN

SELECT COUNT(Tickets) FROM Ticket WHERE age>=40; End;

**Experiment 12: PL/SQL**

In this session you are going to learn PL/SQL programs with Oracle Database

**Experiment 13: DCL Commands**

DCL commands are used to for granting the permissions for security of data
within the users.

**REFERENCE BOOKS:**

1. Introduction to SQL,Rick F.Vander Lans,Pearsoneducation..
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova,Pearsoneducation.
3. Oracle PL/SQL Programming,StevenFeuerstein,SPD.
4. SQL&PL/SQLforOracle10g,BlackBook,Dr.P.S.Deshpande,DreamTech.
5. Ora cle D atab a se 11 g P L/S QL P ro gra m ming, M .M cLaughlin,TMH.
6. SQL Fundamentals, J.J.Patrick,PearsonEducation.

**COURSE OUTCOMES:**

   The students will be able:

- To design a database based on the requirements by applying ER and Relational model.
- To use normal forms for Schema Refinement and Transaction Management and SQL to interact with database to perform all types of DB operations.
- To analyze the business requirements and produce a viable model for the implementation of document oriented and distributed databases.
- To apply TCL and DCL Commands and to visualize all states of transaction        operations.
- Analyze and Select storage and recovery techniques of database system

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**B.TECH - II- YEAR  II-SEM-IT**                                                          **L/T/P/C**
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### (R20A0008) GLOBAL EDUCATION AND PROFESSIONAL CAREER

**COURSE OBJECTIVES:**

1. To assist students to understand the broad scope of engineering.
2. To equip the students to study the academic subjects with better perspective of the expectations of the international standards
3. To familiarize students with the financial requirements and ways to receive monetary aid
4. To enable students' understanding of the various admission tests
5. To acquaint them with their own skill set and train the students towards skills development

**Unit 1**

Importance and relevance of Engineering in today's and futuristic contexts.

The jobs that will thrive in the market in the coming decades. For eg., Robot Manufacturer &service

Management, Big Data & AI Scientists, Artificial Bodies Manufacturer, Gene Designers, etc

**Unit 2**

Countries and their entry requirements

Non-immigrant student visas, Work Permit visas

**Unit 3**

Admission tests to colleges and universities world-over

PSAT, SAT, TOEFL, AP, IELTS…

**Unit 4**

Financial capacity requirements

Scholarships, Full scholarships, merit scholarships, on-campus jobs

**Unit 5**

Skills Mapping

Match one's skills with jobs, Skills development

**COURSE OUTCOMES**

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

- Comprehend the usage of engineering in various fields and disciplines.
- Identify the right college and country to pursue higher education.
- Prepare themselves for the skill-oriented academics and prospective growth.
- Plan for their future education with the precise financial management.
- Discover and discuss their skill set and the jobs that map their skills

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**B.TECH - III- YEAR  I-SEM-IT**                                                    L/T/P/C
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### (R20A6703) DATA SCIENCE

**COURSE OBJECTIVES:**

The students should be able to:
1. Understand the data science process.
2. Conceive the methods in R to load, explore and manage large data.
3. Choose and evaluate the models for analysis.
4. Describe the regression analysis.
5. Select the methods for displaying the predicted results.

**UNIT I:**

Introduction to Data Science and Overview of R

Data Science Process: Roles in a data science project, Stages in a data science project, Setting expectations. Basic Features of R, R installation, Basic Data Types: Numeric, Integer, Complex, Logical, Character. Data Structures: Vectors, Matrix, Lists, Indexing, Named Values, Factors. Subsetting R Objects: Sub setting a Vector, Matrix, Lists, Partial Matching, Removing NA Values. Control Structures: if-else, for Loop, while Loop, next, break. Functions: Named Arguments, Default Parameters, Return Values.

**UNIT II:**

Loading, Exploring and Managing Data

Working with data from files: Reading and Writing Data, Reading Data Files with read.table (), Reading in Larger Datasets with read.table. Working with relational databases. Data manipulation packages: dplyr, data.table, reshape2, tidyr, lubridate.

**UNIT III:**

Modelling Methods-I: Choosing and evaluating Models
Mapping problems to machine learning tasks: Classification problems, Scoring problems, Grouping: working without known targets, Problem-to-method mapping, Evaluating models: Over fitting, Measures of model performance, Evaluating classification models, Evaluating scoring models, Evaluating probability model.

**UNIT IV:**

Modelling Methods-II: Linear and logistic regression

Using linear regression: Understanding linear regression, Building a linear regression model, making predictions.

Using logistic regression: Understanding logistic regression, Building a logistic regression model, making predictions.

**UNIT V:**

Data visualization with R:Introduction to ggplot2: A worked example, Placing the data and mapping options, Graphs as objects, Univariate Graphs: Categorical, Quantitative.

Bivariate Graphs- Categorical vs. Categorical, Quantitative vs Quantitative, Categorical vs. Quantitative, Multivariate Graphs : Grouping, Faceting.

**TEXT BOOKS:**

1. Practical Data Science with R, Nina Zumel & John Mount , Manning Publications

NY, 2014.

2. Beginning Data Science in R-Data Analysis, Visualization, and Modelling for the Data

Scientist - Thomas Mailund –Apress -2017.

**REFERENCE BOOKS:**

1. The Comprehensive R Archive Network- https://cran.r-project.org.

2. R for Data Science by Hadley Wickham and Garrett Grolemund , 2017 , Published by O

Reilly Media, Inc.

3. R Programming for Data Science -Roger D. Peng, 2015 , Lean Publishing.

4. https://rkabacoff.github.io/datavis/IntroGGPLOT.html.

**COURSE OUTCOMES:**

The students will be able to:

- Analyze  the basics in R programming in terms of constructs, control statements, Functions.

- Implement Data Preprocessing using R Libraries.
- Apply the R programming from a statistical perspective and Modeling Methods.
- Build regression models for a given problem.
- Illustrate R programming tools for Graphs.

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**B.TECH - III- YEAR  I-SEM-IT**                                                           **L/T/P/C**
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### (R20A0513) ARTIFICIAL INTELLIGENCE

**COURSE OBJECTIVES:**

1. To train the students to understand different types of AI agents.
2. To understand various AI search algorithms.
3. Fundamentals of knowledge representation, building of simple knowledge-based systems and to apply knowledge representation.
4. Fundamentals of reasoning
5. Study of Markov Models enable the student ready to step into applied AI.

**UNIT - I:**

**Introduction:** AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

**UNIT - II:**

Advanced Search: Constructing Search Trees, Stochastic Search, AO* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

**UNIT - III:**

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes

Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

**UNIT - IV:**

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples- Winston's Learning Program, Decision Trees.

**UNIT - V:**
Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation,
KnowledgeAcquisition.

**TEXT BOOKS:**

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition,
   Prentice Hall, 2010.

**REFERENCES:**

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The
   McGraw Hillpublications, Third Edition, 2009. 2. George F. Luger,
2. Artificial Intelligence: Structures and Strategies for Complex Problem Solving,
   PearsonEducation, 6th ed., 2009.

**COURSE OUTCOMES:**

1. Understand the informed and uninformed problem types and apply search
   strategies tosolve them.
2. Apply difficult real-life problems in a state space representation so as to solve
   thoseusing AI techniques like searching and game playing.
3. Design and evaluate intelligent expert models for perception and prediction from
   intelligent environment.
4. Formulate valid solutions for problems involving uncertain inputs or outcomes by
   usingdecision making techniques.
5. Demonstrate and enrich knowledge to select and apply AI tools to synthesize
   information and develop models within constraints of application area

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                          **L/T/P/C**
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### (R20A1203) WEB APPLICATION DEVELOPMENT

**COURSE OBJECTIVES:**

1. To study the insights of the Web architecture and PHP Frame work.

2. To gain knowledge in interfacing Java Servlet Program with JDBC Connection.

3. To be trained to dynamically generate the web pages using Java Server Pages.

4. To understand the designing applications over web using Spring Framework.

5. To get acquainted with applications over the web using 'Django' Framework.

**UNIT-I:**

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL , HTTP.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions. MVC Framework and Design Pattern, Types of PHP MVC framework.

**UNIT-II**

Servlets: Introduction to Servlets, Benefits of Servlets, use as controller in MVC, servlet lifecycle, basic HTTP, Reading Servlet parametersservlet session, cookies , Servlets API.

JDBC:JDBCArchitecture,JDBCAPI,Connecting to a Database Using JDBC.

**UNIT-III**

Java Server Pages: Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects. Conditional Processing – Displaying Values, setting attributes, Error Handling and Debugging.

**UNIT-IV**

Java Script: Introduction to Java Script, Declaring variables, Functions, Event handlers (onclick, on submit, etc.,) and Form Validation.

Spring Framework: Overview, Controllers, Handler Methods, and Developing Web Application using spring.

**UNIT-V**

Django: Introduction to Django, Django architecture, Django Models and Database Backends, Developing Web Application using Django.

**TEXT BOOKS**

1. Hans Bergsten , Java Server Pages, O'Reilly, 2003

2. Jason Hunter, William Crawford , Java Servlet Programming, Second Edition, , O'Reilly Media

**REFERENCE BOOKS**

1. Joseph J. Bambara, Paul R. Allen, Mark Ashnault, Ziyad Dean, Thomas Garben, Sherry Smith J2EE UNLEASHED — SAMS Techmedia 5 StepahnieBodoff, Dale Green, Kim Hasse, Eric Jendrock, Monica Pawlan, Beth Stearns , The J2EE Tutorial, Pearson Education , Asia.

2. Learning Django Web Development, SanjeevJaiswalRatanKumar,PACKT Publishing.

 3. https://www.djangoproject.com/ spring framework (IBM)


**Course Outcomes:**

1. Analyze a web page and identify its elements and attributes of PHP Frame Work.

2. Installation and usage of Server Software's & Web.xml Deployment.

3. Database Connectivity to web applications.

4. Build web applications using Servlet and JSP.

5. Build web applications using to Django.

# Professional Elective - I

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                    **L/T/P/C**
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## PROFESSIONAL ELECTIVE - I

## (R20A0511) SOFTWARE ENGINEERING

**COURSE OBJECTIVES:**

1. To learn the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To understand software process models such as waterfall and evolutionary models and software requirements and SRS document.
3. To understand different software design and architectural styles & software testing approaches such as unit testing and integration testing.
4. To understand quality control and how to ensure good quality software through quality assurance .
5. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a real time software projects.

**UNIT -I:**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software ,Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models ,The Unified process**.**

**UNIT-II:**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility       studies,       Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models,       Behavioral       models,       Data models,       Object models, structured methods, UML Diagrams.

**UNIT-III:**

**Design Engineering:** Design process and Design quality, Design concepts, the design model.

**Creating an architectural design:** Software architecture, Data design, Architectural styles and patterns, Architectural Design.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis,       interface       design  steps,  Design evaluation.

**UNIT-IV:**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing,the art of Debugging.

**Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification,Risk projection, Risk refinement RMMM, RMMM Plan.

**UNIT-V:**

**Quality Management:** Software Quality, Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000quality standards.

Case Study – ATM Management System.

## TEXT BOOKS:
1. Software Engineering A practitioner's Approach,
   Roger SPressman, 6thedition. McGraw Hill
   International Edition.
2. Software Engineering, Ian Sommerville,7<sup>th</sup> edition, Pearson Education.

## REFERENCE BOOKS:
1. Software Engineering, A Precise Approach, Pankaj Jalote, WileyIndia,2010.
2. Software Engineering: A Primer, Waman S Jawadekar, TataMcGraw-Hill,2008
3. FundamentalsofSoftwareEngineering,RajibMall,PHI,2005
4. Software Engineering, Principles and Practices,DeepakJain, Oxford University Press.
5. Introduction to Software Engineering, R.J.Leach, CRC Press.

## COURSE OUTCOMES:
- Ability to identify the minimum requirements for the development ofan application.
- Ability to develop & maintain efficient, reliable and cost effective software solutions for given problems.
- Ability to build design models for a system.
- Ability to write test cases.
- Ability to assess different types of risks & analyse quality parameters.

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**B.TECH - III- YEAR  I-SEM-IT**                                                          **L/T/P/C**
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## PROFESSIONAL ELECTIVE - I
## (R20A1204) IMAGE PROCESSING

**Course Objectives**

- To introduce the concepts of image processing and basic analytical methods to be used in image processing.
- To familiarize students with image enhancement and restoration techniques
- To explain different image compression techniques.
- To introduce various segmentation techniques.

**UNIT - I**
**Digital Image Fundamentals:** Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

**UNIT - II**
Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering,Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

**UNIT - III**
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, LeastMean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

**UNIT - IV**
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding,Region Oriented Segmentation.

**UNIT - V**
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image CompressionModels, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

**TEXT BOOK:**

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education,2$^{nd}$ Ed, 2004.

**REFERENCE BOOKS:**

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.

**Course Outcomes**

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

- Understand the knowledge of the basic concepts of two-dimensional signal acquisition,sampling, and quantization.
- Analyze the knowledge of filtering techniques.
- Apply the knowledge of 2D transformation techniques.
- Understand the knowledge of image enhancement, segmentation, restoration andcompression techniques.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - III- YEAR  I-SEM-IT**                                                    **L/T/P/C**
                                                                                  **3/-/-/3**
### PROFESSIONAL ELECTIVE - I
### (R20A1205) INFORMATION THEORY & CODING

## Course Objectives:
- To acquire the knowledge in measurement of information and errors.
- Understand the importance of various codes for communication systems
- To design encoder and decoder of various codes.
- To known the applicability of source and channel codes

Course Outcomes: Upon completing this course, the student will be able to
- Learn measurement of information and errors.
- Obtain knowledge in designing various source codes and channel codes
- Design encoders and decoders for block and cyclic codes
- Understand the significance of codes in various applications.

**UNIT – I**

Coding for Reliable Digital Transmission and storage Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies.

**Source Codes:** Shannon-fano coding, Huffman coding

**UNIT – II**

**Linear Block Codes**: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system

**UNIT – III**

**Cyclic Codes:** Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes.

**UNIT – IV**

**Convolutional Codes:** Encoding of Convolutional Codes- Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority-logic decoding of Convolution codes.

Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.

## UNIT – V

BCH Codes: Minimum distance and BCH bounds, Decoding procedure for BCH codes, Syndrome computation and iterative algorithms, Error locations polynomials for single and double error correction.

## TEXT BOOKS

1.  Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello,Jr, Prentice Hall, Inc 2014.

2. Error Correcting Coding Theory-Man Young Rhee, McGraw – Hill Publishing 1989

## REFERENCE BOOKS

1. Digital Communications- John G. Proakis, 5th ed., , TMH 2008.
2. Introduction to Error Control Codes-Salvatore Gravano-oxford
3. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
4. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Edition, 2009, TMH

## Course Outcomes:

Upon completing this course, the student will be able to

 • Learn measurement of information and errors.

• Obtain knowledge in designing various source codes and channel codes

• Design encoders and decoders for block and cyclic codes

• Understand the significance of codes in various applications

# Professional Elective - II

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                                        **L/T/P/C**
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## PROFESSIONAL ELECTIVE - II
## (R20A0517) DISTRIBUTED SYSTEMS

**COURSE OBJECTIVES:**

1. To learn the principles, architectures, algorithms and programming models used in distributed systems.
2. To analyze the algorithms of mutual exclusion, election & multicast communication.
3. To evaluate the different mechanisms for Interposes communication and remote invocations.
4. To design and implement sample distributed systems.
5. To apply transactions and concurrency control mechanisms in different distributed environments

**UNIT –I:**

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource Sharing and Web, Challenges.

System Models: Introduction, Architectural models, Fundamental models

**UNIT II**

Time and Global States: Introduction, Clocks, Events and Process states, Synchronizing Physical clocks, Logical time and Logical clocks, Global states.

Coordination and Agreement: Introduction, Distributed mutual exclusion, Elections, Multicast Communication, Consensus and Related problems.

**UNIT-III:**

Inter process Communication: Introduction, Characteristics of Inter process communication, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX.

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case study: Java RMI.

**UNIT –IV:**

Distributed File Systems: Introduction, File service Architecture, Case Study: 1: Sun Network File System , Case Study 2: The Andrew File System.

Distributed Shared Memory: Introduction, Design and Implementation issues, Consistency Models.

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**UNIT V**

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

**TEXT BOOKS:**

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education. 2009.

**REFERENCE BOOKS**

1. Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van teen, Second Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor & Fransis Group, 2007.

**COURSE OUTCOMES:**

- Able to compare different types of distributed systems and different models.
- Able to analyze the algorithms of mutual exclusion, election & multicast communication.
- Able to evaluate the different mechanisms for Interprocess communication and remote invocations.
- Able to design and develop new distributed applications.
- Able to apply transactions and concurrency control mechanisms in different distributed environments

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                    **L/T/P/C**
                                                                    **3/-/-/3**

## PROFESSIONAL ELECTIVE - II
### (R20A0524) MOBILE COMPUTING

**COURSE OBJECTIVES**

1. To make the student understand the concept of mobile computing paradigm, its novel applications and limitations.
2. To understand the typical mobile networking infrastructure through a popular GSM protocol.
3. To understand the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer
4. To understand the database issues in mobile environments & data delivery models.
5.  To understand the ad hoc networks and related concepts.
6. To understand the platforms and protocols used in mobile environment.

### UNIT I

**Introduction:** Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

### UNIT II

**(Wireless) Medium Access Control (MAC):** Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11) Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

### UNIT III

**Mobile Transport Layer:** Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

**UNIT IV**

**Data Dissemination and Synchronization:** Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

**UNIT V**

**Mobile Ad hoc Networks (MANETs):** Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, XML,J2ME, Java Card, Palm OS, Windows CE, Symbian OS, Linux for Mobile Devices, Android.

**TEXT BOOKS:**

1. Jochen Schiller, ―Mobile Communications‖, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, ―Mobile Computing‖, Oxford University Press, 2007, ISBN: 0195686772.

**REFERENCE BOOKS:**

1. Jochen Schiller, ―Mobile Communications‖, Addison-Wesley, Second Edition, 2004.
2. Stojmenovic and Cacute, ―Handbook of Wireless Networks and Mobile Computing‖,
   Wiley, 2002, ISBN 0471419028.
3. Reza Behravanfar, ―Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML‖, ISBN: 0521817331, Cambridge University Press, Oct 2004.

**COURSE OUTCOMES:**

Students will be able to:

1. Able to think and develop new mobile application.
2. Able to take any new technical issue related to this new paradigm and come up with asolution(s).
3. Able to develop new ad hoc network applications and/or algorithms/protocols.
4. Able to understand & develop any existing or new protocol related to mobile environment

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## PROFESSIONAL ELECTIVE - II
## (R20A6210) DIGITAL FORENSICS

**COURSE OBJECTIVES:**

1. This *course* will cover the fundamentals of *digital forensics.*
2. Provides an in-depth study of the rapidly changing and fascinating field of computerforensics.
3. Combines both the technical expertise and the knowledge required to investigate,detect and prevent digital crimes.
4. Knowledge on digital forensics legislations, digital crime, forensics processes andprocedures, data acquisition and validation, e-discovery tools E-evidence collection
5. It provides preservation, investigating operating systems and file systems, networkforensics, art of steganography and mobile device forensics.

**UNIT – I:**

Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, challenges faced by digital forensics.

**UNIT – II:**

Cyber Crime Scene Analysis: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene.

**UNIT – III:**

Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Types of Evidence, Define who should be notified of a crime, parts of gathering evidence.

**UNIT – IV:**

Computer Forensics: Preparing a computer case investigation, Procedures for corporate hi-tech investigations, conducting an investigation, Complete and critiquing the case.
Network Forensics: Overview of network forensics, open-source security tools for network forensic analysis.

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**UNIT – V:**

Mobile Forensics: mobile forensics techniques, mobile forensics tools, recent trends in mobile forensic technique and methods to search and seizure electronic evidence. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008.

**TEXT BOOKS:**

1. B. Nelson, A. Phillips, and C. Steuart, Guide to Computer Forensics and Investigations,4th Edition, Course Technology, 2010

**REFERENCE BOOKS:**
1. John Sammons, The Basics of Digital Forensics, 2nd Edition, Elsevier, 2014
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, 2nd Edition,Laxmi Publications, 2005.


**COURSE OUTCOMES:**
1. Understand relevant legislation and codes of ethics.
2. Investigate computer forensics and digital detective and various processes, policies andprocedures data acquisition and validation, e-discovery tools.
3. Analyze E-discovery, guidelines and standards, E-evidence, tools and environment.
4. Apply the underlying principles of Email, web and network forensics to handle real lifeproblems
5. Use IT Acts and apply mobile forensics techniques

# OPEN ELECTIVE - II

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                                         **L/T/P/C**
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### OPEN ELECTIVE - II
### (R20A1252) MANAGEMENT INFORMATION SYSTEMS

**COURSE OBJECTIVES:**

Students will be able:

1. To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
2. To get acquainted with the business applications of Information Systems
3. To imbibe how to plan for information systems & implementation
4. To list the System Development stages
5. To study about security aspects of information systems

**UNIT –I:**

Introduction: MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

**UNIT –II:**

Business Applications of Information Systems: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

**UNIT-III**

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

**UNIT-IV**

Building of  Information Systems: System Development   Stages,                System Development Approaches. Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination. Structured Analysis Tools, System Design – Design COURSE OBJECTIVES, Conceptual Design, Design Methods. Detailed system design.

**UNIT –V:**

Introduction to Cyber Crime: Cyber Crime Definition and origin of the word, cybercrime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cybercrimes and Indian ITA 2000, Global perspective on cybercrime-Cybercrime era. (Refer: Nina Godbole et al)

*TEXT BOOK:*

1. D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

*REFERENCES:*

1. Nina Godbole & Sunit Belapure "Cyber Security" Wiley india2012.
2. Jawadekar, MIS Text and Cases, TMH,2012.
3. Dr Milind M Oka "Cases in Management Information system 'Everest,2012.
4. A K Gupta, Sharma "Management of Systems" Macmillan,2012.
5. Sandra Senf "Information Technology Control and Audit" 3e, CRC Press,2012.
6. Apache OFBiz for Ecommerce and ERP –https://ofbiz.apache.org/
7. Magneto for Ecommerce (B2B Commerce) –https://magento.com/
8. Adempiere – ERP :http://www.adempiere.net/web/guest/welcome
9. Analytica – DSS –http://www.lumina.com
10. 10.OpenRules – Business Rules and Decision Management system – http://openrules.com/

**COURSE OUTCOMES**:

Students will be able:

- To summarize the concepts & applications of Management Information Systems.
- To point out the business applications of Information Systems
- To perform Information Systems Planning &Implementations.
- To analyze the stages in System Development
- To adapt Cybercrime and information security procedures.

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### OPEN ELECTIVE - II
### (R20A0552) JAVA PROGRAMMING

**COURSE OBJECTIVES:**

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

1. To create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
2. Use data types, arrays and strings;
3. Implement error-handling techniques using exception handling
4. To know about Applets and Event Handling
5. Create an event-driven GUI using AWTcomponents.

**UNIT I**

OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object-oriented programming paradigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, Buffered Reader class, Scanner class, String Tokenizer class, inner class.

**UNIT II**

Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

**UNIT III**

Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

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Multi-threading: Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

**UNIT IV**

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

**UNIT V**

GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics. AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow.

Swing – Introduction, limitations of AWT, Swing vs AWT.

**TEXT BOOKS**

1. Java- the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.
3. Core Java an integrated approach, dreamtech publication, Dr. R. Nageswara Rao

**REFERENCE BOOKS**

1. Java for Programmers, P.J. Deitel and H.M. Deitel, PEA (or) Java: How to Program, P.J. Deitel and H.M. Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

**COURSE OUTCOMES**:

- An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high-level language;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to make use of members of classes found in the JavaAPI.
- Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.

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**OPEN ELECTIVE - II**
**(R20A1253) SOFTWARE PROJECT MANAGEMENT**

**COURSE OBJECTIVES:**

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning and project management
4. Understand the steps involved in quality assurance
5. Understand the process management and their relationships

**UNIT –I:**

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

**UNIT-II**

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases.

**UNIT-III**

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

**UNIT –IV:**

Flows of the Process: Software Process Workflows, Iteration workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cocomo Cost Estimation model.

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**UNIT-V**

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

**TEXT BOOKS:**

1. Walker Royce, "Software Project Management", 1998, PEA.
2. Henry, "Software Project Management", Pearson.

**REFERENCE BOOKS:**

1. Richard Thayer." Software Engineering Project Management", 1997, IEEE Computer Society.
2. Shere K.D.: "Software Engineering and Management", 1998, PHI.
3. S.A. Kelkar, "Software Project Management: A Concise Study", PHI.
4. Hughes Cotterell, "Software Project Management", 2e, TMH. 88 5. Kaeron Conway, "Software Project Management" from Concept toD

**COURSE OUTCOMES:**

At the end of the course, the student shall be able to:

- Understanding the specific roles within a software organization as related to project and process management
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)
- Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships
- Understanding the Flow Process and Check points of the process.
- Understanding the Project Organizations and Responsibilities

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**B.TECH - III- YEAR  I-SEM-IT**                                          **L/T/P/C**
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## OPEN ELECTIVE - II
## (R20A0452) INTERNET OF THINGS AND ITS APPLICATIONS
**COURSE OBJECTIVES:**

1. To study IoT Networking Core
2. To study IoT related network fundamentals
3. To study IoT Architecture.
4. To study IoT Application Development procedure
5. To study various case studies and IoT applications

## UNIT I: FUNDAMENTALS OF IoT

Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT eco system, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

## UNIT II: IoT PROTOCOLS

IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks, 6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

## UNIT III: DESIGN AND DEVELOPMENT

Design Methodology, Embedded computing logic, Micro controller, Systemon Chips, IoT system building blocks

IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberrypi, Arduino Board details

## UNIT IV: DATA ANALYTICS AND SUPPORTING SERVICES:

Data Analytics: Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M, Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.

**UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS:**

IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments, Industry 4.0 concepts.

**Text Books:**

- IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet

- Of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

- Internet of Things– Ahands –on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015

- Internet of Things: Architecture, Design Principles And Applications, Raj Kamal, Mc Graw Hill Higher Education

**Reference Books:**

- The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012(forUnit2).

- "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence", JanHo¨ller,Vlasios Tsiatsis,Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.

- Architecting the Internet of Things, Dieter Uckelmann, Mark Harrison, Michahelles and Florian(Eds),Springer,2011.

- Recipesto Begin, Expand, and Enhance Your Projects, 2ndEdition, Michael Margolis, Arduino Cookbook and O"Reilly Media,2011.

**Course Outcomes:**

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

- Understand the basics of IoT.

- Implement the state of the Architecture of an IoT.

- Understand design methodology and hardware platforms involved in IoT.

- Understand how to analyze and organize the data.

- Compare IOT Applications in Industrial & real world.

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**B.TECH - III- YEAR  I-SEM-IT**                                                       **L/T/P/C**
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## OPEN ELECTIVE - II
## (R20A0553) OPERATING SYSTEM CONCEPTS

**COURSE OBJECTIVES:**

1. To understand the basic concepts and functions of operating systems.
2. To understand Processes and Threads
3. To understand the concept of Deadlocks.
4. To analyze various memory management schemes.
5. To understand I/O management and File system

**UNIT –I:**

**Introduction:** Concept of Operating Systems, OS Services, Structure of an Operating Systems

**Processes:** Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

**Thread:** Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

**UNIT-II**

**Process Scheduling**: Foundation and Scheduling COURSE OBJECTIVES, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR

**Inter-process Communication:** Critical Section, Race Conditions, Mutual Exclusion. Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem, The Producer/Consumer Problem, Semaphores, Monitors.

**UNIT-III**

**Memory Management:** Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation; **Paging**: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages of paging.

**Virtual Memory**: Basics of Virtual Memory, Page fault , Demand paging; **Page Replacement algorithms:** Optimal,  First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

**UNIT-IV**

**File Management**: Concept of File, Access methods, File types, File operation, File System structure, Allocation methods (contiguous, linked, indexed), Directory structure, directory implementation (linear list, hash table), efficiency and performance.

**UNIT-V**

**Deadlocks:** Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

**Disk Management:** Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

**TEXT BOOKS:**

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin,Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

**REFERENCE BOOKS:**

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice- Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

**COURSE OUTCOMES:**
At the end of the course the students are able to:

- Create processes and threads.
- Implement algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- Develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- Analyze various disk scheduling schemes

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## B.TECH - III- YEAR I-SEM-IT                                       L/T/P/C
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### OPEN ELECTIVE - II
### (R20A0066) PUBLIC POLICY & GOVERNANCE

**Course objectives:**

➤ To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.

➤ To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.

➤ To make understand the process and various approaches in public policy making

➤ To understand the theories and issues of social coordination and the nature of all patterns of rule.

➤ To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

**Unit-I**

**Introduction of Public Policy:** Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration.

**Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

**Unit-II**

**Theories and Process of Public Policy Making:** Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

**Unit-III**

**Policy Implementation and Evaluation:** Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

**Unit-IV**

**Introduction of Governance**: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

**Unit-V**

**Citizen and Techniques of Governance:** Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

**Text and Reference books**

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.

2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.

3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton

4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.

5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.

6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.

7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.

8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

**Course outcomes**

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.

2. Understand the public policy and governance on the largest gamut of its canvas.

3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making

4. Understands various concepts, and techniques of governance and its policy-making decisions

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### (R20A1281) ARTIFICIAL INTELLIGENCE AND DATA SCIENCE LAB

**COURSE OBJECTIVES:**

The students will be able:

1. To understand the Prolog programming environment
2. To perceive how to develop a logical system
3. To identify core principles of R programming for data science
4. To get the idea regarding installation of packages in R
5. To imbibe the functions for data manipulation

*Prolog Programming*

1) Write a Prolog program for the usage of all arithmetic Operators.

2) Write a Prolog program for solving the Towers of Hanoi problem.

3) Write a Prolog program to solve Monkey and banana problem.

4) Write a Prolog program for depicting and inferring from the given Family relationship diagram.
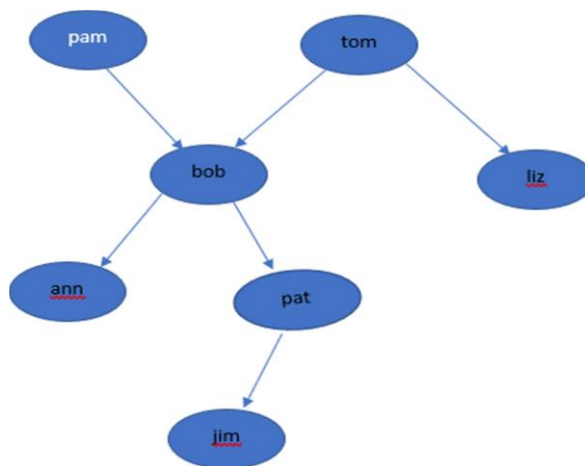


**Sample family Tree**

Facts:
    female(pam)
    male(tom)
    male(bob)
    female(liz)
    female(pat)
    female(ann)
    male(jim)

5) Write a Prolog program for implementing the solution for 8-Puzzle problem.

6) Construct Prolog program to implement Depth first and Breadth first Search.


### R Programming

1.a. Write a R program to create a list containing strings, numbers, vectors and logical values.

  b. Write a R program to merge two given lists into one list.

2.a. Write a R program to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list.

  **b.Write a R program to Read the data from same and different  directory.**

3.  Write a R Program to read and load data from larger datasets.

4.  Install the necessary R packages and apply data manipulation packages- dplyr, data.table, reshape2,  tidyr, Lubridate.

5. Write R Programs to implement decision tree and K-Nearest Neighbor algorithms.

6. Build a linear regression model and logistic regression model, check the model on a test data and predict the numerical quantities.


**Reference Books:**
1. Practical Data Science with R, NinaZumel & John Mount , Manning Publications, NY, 2014
2. R for Data Science by Hadley Wickham and Garrett Grolemund , 2017 , Published by OReilly Media, Inc.,
3. R Programming for Data Science - Roger D. Peng, 2015 , Lean Publishing.

**COURSE OUTCOMES:**

The students will be able:

- To write Prolog programs
- To develop a logical system
- To install packages and apply data manipulation packages
- To build model using sample datasets
- To predict the functions for data manipulation

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**B.TECH - III- YEAR  I-SEM-IT**                                    **L/T/P/C**
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## (R20A1282) WEB APPLICATION DEVELOPMENT LAB

**COURSE OBJECTIVES:**

The student should be able:

1. To study the insights of HTML, JavaScript and XML usage
2. To gain understanding regarding the use of Tomcat Server
3. To get an idea about the working of Servlets and JSP
4. To identify the usage of Beans and Spring framework
5. To get acquainted with applications over the web using 'Django' Framework and 'CodeIgniter' Framework.

1. Write an **XML** file to display the Book information which includes the following:

1) Title of the book 2) Author Name 3) ISBN number
4) Publisher name 5)Edition6) Price

2. Design an **XML** document to store information about a student in an engineering college affiliated to JNTU

3. SERVLETS:

a. Write a program to generate a plain text.
b. Write a program to display cookie id.

4. JDBC:

a. Write a program to select a query usingJDBC.
b. Write a program to update customer information usingJDBC

5. JAVA SERVER PAGES:

a. Write a program to represent basic arithmeticfunctions.

b. Writea program to display astring.
c. Write a program to create checkboxes.

6. JAVA BEANS:

a. Write a program to generate plaintext.

b. Write a simple web-based Hello World application using Spring MVCframework.

c. Write a simple web-based Hello World application usingSpring Django framework.

**Outcomes:**

1. Using XML Scripting display the college details.

2. Use Tomcat Server for Servlets andJSPs

3. Write simple applications with Technologies like HTML, JavaScript, PHP

4. Servlets andJSPs  Connect to Database and get results

5. Deploying Java Beans in a JSPpage & Django

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  I-SEM-IT**                                        **L/T/P/C**
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## (R20A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

**COURSE OBJECTIVES:**

1. To make the students recognize the role of technical English in their academic and professional fields
2. To improve language proficiency and to develop the required professional ethics
3. To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method
4. To facilitate communication about projects and ideas throughout the industry and also to the non-technical people
5. To display professional behaviors and body language

**UNIT I** – **Effective Presentations**

Just-a-Minute sessions, Formal versus informal communication, Non-verbal communication;

Concord**:** Subject-verb agreement

**UNIT 2** - **Professional Communication**

Role Plays, Persuasion techniques, Presentation aids, Body language, Importance of listening in effective communication; Email Writing, Business Letter Writing, Letters of complaint, enquiry, responses; Memo Writing; Transformation of Sentences

**UNIT 3** – **Career Planning**

Oral Presentations, Techniques of Listening Skills, types of Group discussions; Etiquette, Protocol; Resume Writing, Cover letter, Writing a  statement of purpose; Tenses

**UNIT 4** - **Technical Writing**

Group Discussion, Principles of Effective Writing, Paragraph writing, Advanced Essay Writing, Expansion for or against the essay, Narrative essay, Descriptive essay; Technical Report Writing, Format &Style; Active & Passive Voice

**UNIT 5** – **Academic Writing**

Mock Interview sessions, facing interviews; Correction of Sentences

**REFERENCE BOOKS:**

1. R.K. Narayan, The Guide, Viking Press, 1958
2. David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004
3. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
4. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
5. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
6. Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
7. Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
8. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
9. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

**COURSE OUTCOMES:**

After completion of the course, the Students will be able to

- Understand information which assists in completion of the assigned job tasks more successfully.
- Communicate his ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Adhere to ethical norms of scientific communication.
- Strengthen their individual and collaborative work strategies.
- Successfully market themselves and sell themselves to the employer of their choice.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - III- YEAR II-SEM-IT**                                      **L/T/P/C**
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## (R20A1206) DATA WAREHOUSING AND DATA MINING

**COURSE OBJECTIVES:**

Students will be able:
1. To study the data warehouse principles
2. To understand the working of data mining concepts
3. To identify the association rules in mining
4. To define the classification algorithms
5. To imbibe the clustering techniques

**UNIT-I:**

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

**UNIT-II:**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.
Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration &Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT-III:**

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

**UNIT-IV**

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Algorithm for Decision TreeInduction; Naive-Bayes Classifier, Bayesian Belief Networks; K-Nearest Neighbor Classification-Algorithm and Characteristics.

**UNIT-V**

Clustering: Clustering Overview, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Partitioning Clustering-K-Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.

**TEXT BOOKS:**

1. Data Mining- Concepts and techniques- Jiawei Han, MichelineKamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2. Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education.

**REFERENCE BOOKS:**

1. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2. Data Warehousing Fundament's, Pualraj Ponnaiah, Wiley Student Edition.
3. The Data Warehouse Life Cycle Toolkit — Ralph Kimball, Wiley Student Edition.
4. Data Mining, Vikram Pudi, P Radha Krishna, Oxford University Press

**COURSE OUTCOMES:**

**The students will be able:**

- To comprehend the data warehouse in addition to database systems.
- To perform the pre-processing of data
- To apply mining techniques on the data
- To categorize the association rules, classification and clusters in large data sets
- To solve real world problems in business and scientific information using data mining

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B.TECH - III- YEAR II-SEM-IT                          L/T/P/ C

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## (R20A1207) MOBILE APPLICATION DEVELOPMENT

**Course Objectives:**

1. To understand the basics of Android Operating System
2. To illustrate the essentials of mobile app development using Android Operating System.
3. To understand the core modules like designing, developing, testing, signing, packaging which helps in distributing high-quality mobile apps.
4. To illustrate mobile app development using Android as the development platform.
5. To demonstrate their ability to deploy database to mobile devices using Android

### UNIT-I

**Introduction to Android Operating System :**Android OS and Features–Android development framework , Installing and running applications on Android Studio, Creating AVDS , Types of Android Application , Creating Activities, Activity Life Cycle, Activity states, monitoring state changes

### UNIT-II

**Android application components**– Android Manifest file, Gradle, Externalizing resources like Simple Values , Drawable Layouts, Menus, etc.,

**Building User Interfaces:** Fundamental Android UI design, Form Widgets, Layouts – Linear, Relative, Grid and Table Layouts. User Interface (UI)Components.

### UNIT-III

**Fragments** – Creating fragments, Lifecycle of fragments, Fragment states, adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities.

### UNIT-IV

**Intents and Broadcasts:** Using intents to launch Activities, Types of Intents, passing data toIntents, getting results from Activities, Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters.

**UNIT-V**

**Database:** Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data.

**TEXTBOOKS:**
1. Professional Android 4 Application Development, RetoMeier,WileyIndia,(Wrox),2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,2013

**REFERENCEs:**
1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox),2013
2. Android Application Development (with Kitkat Support), Black Book, PradeepKothari,2014,Dreamtech Press publisher, Kogent Learning Inc.,2014
3. Android Programming: Pushing the Limits, Erik Hellman, 1st Edition,WileyPublications,2014

**CourseOutcomes:**
1. Install and configure Android studio
2. Analyze architecture of android and current trends in mobile operating systems.
3. Apply suitable software tools and APIs for the development of User Interface for a particular mobile application.
4. Apply intents and broadcast receivers in android application.
5. Develop and design apps for mobile devices using SQLite Database.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B. TECH - III- YEAR II-SEM-IT**                                                 **L T/P/D C**
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## Professional Elective - III
## (R20A6903) EMBEDDED SYSTEMS DESIGN

**COURSE OBJECTIVES:**

For embedded systems, the course will enable the students to:
1. Understand micro controllers architecture and it functionalities
2. Perceive the core of an embedded system
3. Learn the internal and external communication interface
4. Learn the embedded firmware design and development
5. Know the embedded programming concepts.

**UNIT-I:**

**INTRODUCTION TO MICROCONTROLLERS:**

8051 Microcontroller: Overview of 8051 Microcontroller, 8051 Architecture, Pin diagram, Memory Organization, Addressing Modes, Instruction setof8051.

Arduino: Overview of Arduino, Introduction to ATMEGEA 328P, Arduino board.

Introduction Arduino Programming: Setup (), loop (), Digital Read (), Digital Write ()

AnalogRead(), AnalogWrite().

**UNIT-II:**

**INTRODUCTION TO EMBEDDED SYSTEMS:**

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

**UNIT-III:**

**TYPICAL EMBEDDED SYSTEM:**

Core of the embedded system, Sensors and actuators, Onboard communication interfaces-I2C,SPI,UART,parallelinterface;Externalcommunicationinterfaces RS232,USB,infrared,Bluetooth,Wi-Fi,Zig-Bee,GPRS.

**UNIT-IV:**

**EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT:**

Embedded firmware design approaches - super loop-based approach, operating system based approach; embedded firmware development languages- assembly language based development, high-level language based development.

**UNIT-V:**

**EMBEDDED PROGRAMMING:**

Assembly language: Interfacing LED, LCD and Keypad to 8051 Microcontroller.

Embedded C: Interfacing LED, RGB LED, LCD, switch, Sensors, Buzzer to Arduino uno, serial communication programming with Arduino

**TEXTBOOKS:**
1.      Introduction to Embedded Systems-shibu k v, McGraw Hill Education.
2.      Kenneth. J.Ayala, The 8051 Microcontroller, 3rd Edition Cengage Learning
**REFERENCEBOOKS:**
1.      The 8051 Microcontroller and Embedded Systems Second Edition Muhammad Ali Mazidi Janice Gillispie Mazidi Rolin D. McKinlay
2.      Embedded Systems- An integrated approach - Lyla B Das, Pearsoneducation2012.

**COURSEOUTCOMES:**
After going through this course, the student will be able to

1.      Analyze the internal organization of popular 8051microcontroller.
2.      Get to know the core of the embedded systems.
3.      Compare the internal and external communication interface.
4.      Build and apply Embedded Firmware design approaches.
5.      Develop the programs for Embedded Systems.

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**Professional Elective - IV**

**(R20A0515) SCRIPTING LANGUAGES**

**COURSE OBJECTIVES:**

Student should be able:

1. To study the basics of scripting languages like Java script, Perl, PHP and Ruby.
2. To understand the requirements of Scripting Languages.
3. To identify the uses of Scripting Languages.
4. To introduce in-depth knowledge of programming features of Perl and PHP.
5. To state the implementation and applications of Scripting.

## UNIT- I

Introduction to Scripts and Scripting Languages – Scripts and Programs,Uses for Scripting Languages, Web Scripting.

JavaScript: Variables,DataTypes,Operators, Conditional statements, Loops, Arrays, Functions, Objects- Predefined objects,Accessing objects, Object Methods.

## UNIT- II

JavaScript programming of reactive web pages elements:

JavaScript Events- Mouse events, Keyboard events, Form events,window events, Event handlers, Frames, Form object, JavaScript Form Validation.

## UNIT- III

PERL :Data Types, Variables, Scalars,Operators,Conditional statements ,Loops,Arrays , Strings , Hashes , Lists , Built-in Functions, Pattern matching and regular expression operators.

## UNIT -IV

PHP :Data Types, Variables, Operators, Conditional statements ,Loops ,Arrays - Indexed Array, Associative Array, String Functions, Functions- Parameterized Function, Call By Value,Call By Reference , File Handling, PHP Form handling.

## UNIT- V

Ruby :Data types, Variables, Operators, Conditional statements, Loops, Methods, Blocks, Modules, Arrays, Strings, Hashes, File I/O,Ruby Form handling.

**TEXT BOOKS:**

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites 3rd Edition, O'Reilly Publications.

**REFERENCE BOOKS:**

1. The Ruby Programming Language, David Flanagan and Yukihiro Matsumoto, O'Reilly Publications.
2. Beginning JavaScript with Dom scripting and AJAX, Russ Ferguson, Christian Heilmann, Apress.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.

**COURSE OUTCOMES:**

The students will be able:

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. To implement the design of programs for simple applications.
3. To write and apply Perl& PHP scripts.
4. Gain knowledge of the strengths and weakness of Perl, and Ruby.
5. To create software systems using scripting languages such as Perl, PHP, and Ruby.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B. Tech - III - Year  II- SEM - IT**                                              **L/T/P/C**

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**OPEN ELECTIVE - III**
**(R20A0453) ROBOTICS AND AUTOMATION**

**COURSE OBJECTIVES:**
1) To study the overview of Embedded Systems, Robots, Microprocessors &Microcontrollers.
2) To learn in detail about Robotics and sensors.
3) To understand AVR RISC Microcontroller architecture in detail.
4) To  get an understanding of  ARM Processor in detail.
5) To learn about Artificial Intelligence in Robotics.

**UNIT -I**
Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

**UNIT - II**
**Robotics:** Classification of Robots, Links and Joints, Degrees of freedom, Motors-DC motor, Stepper Motor, Servo Motor; Power Transmission-Type of Gears, Robotic Sensors, Applications of Robot, S/w used for Robot programming.

**UNIT- III**
**The AVR RISC microcontroller architecture:** Introduction, AVR family architecture, register file, Pin diagram of AVR, Memory organization, I/O ports, timers, USART, Interrupt structure.

**UNIT-IV**
**ARM Processor:** Fundamentals, Registers , current program status register , pipeline concept , Interrupts and the vector table.

**UNIT V**
**AI IN ROBOTICS**: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

**TEXT BOOKS:**
1) Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
2) Stuart Russell, Peter Norvig, "Artificial Intelligence: A modern approch", Pearson Education, India2003.
3) ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

**REFERENCE BOOKS:**
1) M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems",Pearson.
2) Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming",Dreamtech.
3) Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

**COURSE OUTCOMES:**
At the end of the course, the students will be able to
1) Understand in detail the internal components of Embedded systems and various types of Embedded systems.
2) The usage and application of various sensors, actuators and Software tools for Programming a Robot.
3) Write programs to interface various I/O devices to AVR  Microcontroller.
4) Write simple programs on ARM processor.
5)  Understand the implementation of Artificial Intelligence in Automating the Robots.

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### (R20A1283)DATA WAREHOUSING AND DATA MINING LAB

**COURSE OBJECTIVES:**

Student should be able:

1. To identify how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics)
2. To get an understanding of data mining tasks using a data mining toolkit (such as open source WEKA)
3. To understand the data sets and data preprocessing
4. To study the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression
5. To get acquainted to the data mining techniques with varied input values for different parameters

**LIST OF EXPERIMENTS**:

Experiments using Weka / Clementine Tools

1. Installation of WEKA Tool

2. Creating new Arff File

3. Data Processing Techniques on Data set.

4. Data cube construction – OLAP operations

5. Implementation of Apriori algorithm

6. Implementation of FP – Growth algorithm

7. Implementation of Decision Tree Induction

8. Calculating Information gain measures

9. Classification of data using Bayesian approach

10. Classification of data using K – Nearest Neighbor  Approach.

11. Implementation of K – means algorithm

**COURSE OUTCOMES:**

Students will be able:

1. To specify which data processing technique can be applied
2. To construct a Data cube
3. To implement mining algorithms as a component to the existing tools
4. To differentiate the approaches based on classification
5. To associate mining techniques for realistic data

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B.TECH - III- YEAR II-SEM-IT              L/T/P/ C

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# (R20A1284) MOBILE APPLICATION DEVELOPMENT LAB

**COURSE OBJECTIVES:**

**Students will be able to:**

- To develop Applications in android environment.

- To develop user interface applications.
- Create a mobile application by using various components like activity, views, services, content providers and receivers.
- To develop URL related applications.
- To develop storing, sharing and retrieving the data in Android Applications.

**List of Experiments**

1. Installation of Android Studio.

2. Development of Hello World Application.

3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.

4. Create a screen that has input boxes for UserName, Password, Address, Gender (radio buttons for male and female), Age(numeric),Date of Birth(DatePicket),    State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).

5. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity.

6. Design an android application Send SMS using Intent.

7. Create an android application using Fragments.

8. Design an android application Using Radio buttons.

9. Design an android application for menu.

10. Create a user registration application that stores the user details in a database table.

**TEXTBOOKS:**

1. Professional Android 4 Application Development, RetoMeier,WileyIndia,(Wrox),2012
2. Android Application Development for Java Programmers, James C Sheusi,
   Cengage Learning,2013

**REFERENCES:**

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox),2013
2. Android Application Development (with Kitkat Support), Black Book, PradeepKothari,2014,DreamtechPresspublisher,KogentLearningInc.,2014
3. Android Programming: Pushing the Limits, Erik Hellman, 1st Edition,WileyPublications,2014

**COURSE OUTCOMES:**

1. The Mobile Application Development course exposes the students to the essentials of mobile app development using Android Operating System.
2. The core modules of this subject include designing, developing, testing, signing, packaging and distributing high-quality mobile apps.
3. This course aims to teach mobile app development using Android as the development platform.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                       **L/T/P/C**

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### (R20A0007) CONSTITUTION OF INDIA

**COURSE OBJECTIVES:**

1. To enrich the students' understanding of the constitution's origin and its power
2. To facilitate students to analyze the political principles
3. To assist the students to be aware of their fundamental rights and duties
4. To enable learning about the federal structure Parliamentary form of government
5. To be acquainted with the historical perspectives of the constitutional amendments

**UNIT –I**

Meaning of constitution law and constitutionalism

Historical perspective of the constitution of India

Salient features and characteristics of the constitution of India

**UNIT –II**

Scheme of fundamental rights

The scheme of the fundamental duties and its legal status

The Directive Principles of State Policy-its importance and implementation

**UNIT–III**

Federal structure and distribution of legislative and financial powers between the Union  and the States, Parliamentary Form of Government in India-the constitution powers and status of the president of India, Amendment of the Constitutional Powers and Procedure

**UNIT –IV**

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

**UNIT –V**

Scheme of fundamental Right to Equality

Scheme of fundamental Right to certain Freedom under Article 19

Scope of the Right to Life and Personal Liberty under Article 21

**COURSE OUTCOMES**:

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

- Improve their knowledge about Indian constitution
- Value their identity and exercise their fundamental rights
- Comprehend how differently government bodies function
- Define their rights as voters of the country
- Analyze the constitution and become responsible citizens

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B. TECH - III- YEAR II-SEM-IT**                                    **L T/P/D C**

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## (R20A1208) EDGE COMPUTING

**COURSE OBJECTIVES:**

1. To understand edge computing architecture and technologies.
2. To explain SCADA Architecture for Edge computing.
3.  To describe various Operating Systems on Raspberry.
4. To understand MQTT protocol to connect disparate devices to supervisory control and data acquisition (SCADA).
5. To design Edge computing models for Industrial and Commercial IoT.

**UNIT- I**

**IoT and Edge Computing Definition and Use Cases**

Introduction to Edge Computing Scenario's and Use cases - Edge computing purpose and definition,

Edge computing use cases, Edge computing hardware architectures, Edge platforms,

Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.

**UNIT-II**

IoT Architecture and Core IoT Modules-A connected ecosystem, IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with Examples-Example use case and deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use case retrospective.

**UNIT-III**

RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout and Pinouts, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi, Connecting Raspberry Pi via SSH, Remote access tools, Interfacing DHT Sensor with Pi, Pi as Webserver, Pi Camera, Image & Video Processing using Pi.

**UNIT- IV**

Implementation of Microcomputer Raspberry and device Interfacing, Edge to Cloud Protocols, MQTT, MQTT publish-subscribe, MQTT architecture details, MQTT state transitions,

MQTT packet structure, MQTT data types, MQTT communication formats, MQTT 3.1.1 working example.

**UNIT- V**

Edge computing with RaspberryPi, Industrial and Commercial IoT and Edge, Edge computing and solutions.

**COURSE OUTCOMES:**

1. Understand the foundations of edge networks and different architectures.
2. Integration of SCADA with Edge-device (Raspberry Pi) apply knowledge and skills to solve complex multi-disciplinary problems.
3. Iimplement an edge computing prototypes using Raspberry Pi devices.
4. To aanalyse MQTT protocol working In IoT.
5. Student will be able to use different IoT Platforms to Integrate with Raspberry Pi.

**TEXT BOOKS**

1. IoT and Edge Computing for Architects - Second Edition, by Perry Lea, Publisher: Packt

Publishing, 2020, ISBN: 9781839214806

2. Raspberry Pi Cookbook, 3rd Edition, by Simon Monk, Publisher: O'Reilly Media, Inc.,

2019, ISBN: 978149204322.

**REFERENCES**

1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana

Srirama, wiley publication, 2019, ISBN: 9781119524984.

2. David Jensen, "Beginning Azure IoT **Edge Computing**: Extending the Cloud to the

Intelligent **Edge**, MICROSOFT AZURE.

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B. TECH - III- YEAR II-SEM-IT                                                     L T/P/D C

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## (R20A6661) COMPUTATIONAL INTELLIGENCE

**Course Objectives:** Students will be able:

- To know the context of Computational Intelligence .
- To understand the special benefits in certain areas like Classification, Regression, Pattern Matching, Control, Robotics, Data Mining etc.
- To acquire knowledge about the basic tools and techniques in Computational Intelligence such as NeuralNetworks and Genetic Algorithms.
- To learn the concepts of Fuzzy Systems.
- To gain an application perspective of the performance metrics.

**UNIT I**

**Introduction to Computational Intelligence:** Myths and Applications areas of Computational Intelligence. Adaptation, Self organization and Evolution, Historical Views of Computational Intelligence, Adaptation and Self organization for Computational Intelligence, Ability to Generalize, Computational Intelligence and Soft Computing Vs Artificial Intelligence and Hard Computing.

**UNIT II**

**Review of evolutionary computation theory and concepts:** History of Evolutionary Computation, Evolution Computation Overview, Genetic algorithms, Evolutionary programming, Evolution strategies, genetic programming, and particle swarm optimization.

**UNIT III**

**Review of basic neural network theory and concepts:** Neural Network History, What Neural Networks are and Why they are useful, Neural Networks Components and Terminology, Neural Networks Topology, Neural Network Adaptation, Comparing Neural Networks and Other information Processing Methods, Preprocessing and Post Processing.

**UNIT IV**:

**Fuzzy Systems Concepts and Paradigms:** Fuzzy sets and Fuzzy Logic, Theory of Fuzzy sets , Approximate Reasoning , Fuzzy Systems Implementations , Fuzzy Rule System Implementation.

**UNIT V:**

**Computational Intelligence Implementations:** Implementation Issues, Fuzzy Evolutionary Fuzzy Rule System Implementation, Best tools, Applying Computational Intelligence to Data Mining.

**Performance Metrics:** General Issues, Percent Correct, Average Sum-squared Error.

**Textbooks:**

    1. Computational Intelligence - Concepts to Implementations by Dr. Russel Eberhart & Dr. Yuhui Shi

**References:**
1. Introduction to Genetic Algorithms by Melanie Mitchell
2. Handbook of Genetic Algorithms by Davis
3. Machine Learning by Tom Mitchell

**Course Outcomes:** At the end of the course students will have the ability:

1. To compare and contrast soft computing & hard computing applications.
2. To devise solution using optimization.
3. To build a neural network for a given system
4. To design a fuzzy rule system
5. To implement computational intelligence concepts using the best tools.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - III- YEAR  II-SEM-IT**                                               **L/T/P/C**
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**(R20A7305) COMPUTER VISION**

**COURSE OBJECTIVES:**
The students will be able:
1. To review image processing techniques for computer vision.
2. To understand shape and region analysis.
3. To study Hough Transform and its applications to detect lines, circles, ellipses.
4. To imbibe three-dimensional image analysis techniques.
5. To get acquainted with motion analysis and some applications of computer vision algorithms.

**UNIT-I**

**IMAGE PROCESSING FOUNDATIONS**

Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

**UNIT- II**

**SHAPES AND REGIONS**

Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments.

**UNIT -III**

**HOUGH TRANSFORM**

Line detection – Hough Transform (HT) for line detection – foot-of-normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection – accurate center location – speed problem – ellipse detection – Case study: Human Iris location – hole detection – generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation.

**UNIT -IV**

**3D VISION AND MOTION**

Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations –point-based representation – volumetric representations – 3D object recognition – 3D reconstruction introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

**UNIT -V**

**APPLICATIONS**

Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foreground-background separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras –human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

**TEXT BOOKS:**

1. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Projects‖, Packt Publishing, 2012.
2. R. Davies, ―Computer & Machine Vision‖, Fourth Edition, Academic Press, 2012.

**REFERENCE BOOKS:**

1. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms for analyzing images‖, O'Reilly Media, 2012.
2. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision‖, Third Edition, Academic Press, 2012.
3. R. Szeliski, ―Computer Vision: Algorithms and Applications‖, Springer 2011.
4. Simon J. D. Prince, ―Computer Vision: Models, Learning, and Inference‖, Cambridge University Press, 2012.

**COURSE OUTCOMES:**

The students should be able:

- To implement fundamental image processing techniques required for computer vision.
- To perform shape analysis and implement boundary tracking techniques.
- To apply Hough Transform for line, circle, and ellipse detections.
- To apply 3D vision techniques and Implement motion related techniques.
- To develop applications using computer vision techniques.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                                                  **L/T/P/C**
                                                                                                 **3/-/-/3**

## (R20A0561) SOFTWARE REQUIREMENTS AND ESTIMATION

**UNIT-I**

Software Requirements: What and Why

Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

**UNIT- II**

Software Requirements Engineering

Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality, Software Requirements Modeling-
Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

**UNIT-III**

Software Requirements Management
Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation,

**UNIT- IV**

Software Estimation
Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation. Size Estimation-Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

**UNIT -V**

Effort, Schedule and Cost Estimation
What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation
Software Estimation Tools:
Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools

**TEXT BOOKS:**

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill

**REFERENCES:**

1. Software Requirements by Karl E. Weigers,Microsoft Press.

2. Managing Software Requirements, Dean Leffingwell &amp; Don Widrig, Pearson Education,2003.

3. Estimating Software Costs, Second edition, Capers Jones, Tata McGraw-Hill, 2007.

4. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                              **L/T/P/C**
                                                                                  **3/-/-/3**

### OPEN ELECTIVE III
### (R20A1254)BIG DATA ARCHITECTURE

**COURSE OBJECTIVES:**

Student should be able:

1. To introduce the terminology, technology and its applications
2. To study the concept of Analytics
3. To get acquainted to the Big Data Architecture and its components and tools
4. To provide knowledge about Apache Spark.
5. To get wild understanding about the databases and Hadoop systems

**UNIT-I**

**Big Data Introduction:** Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data , Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

**UNIT -II:**

**Big Data Architecture Introduction:** - Definition, Why Big Data Architecture. Evolution of Big Data Architecture. Market Trends. Big Data Architecture and Its Sources. Big Data Architecture Use Cases.

**UNIT- III**

**Big Data architecture components:** Data ingestion, Data storage, Data Computing, Data Analysis, Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

**UNIT -IV**

**Introducing Apache Spark: Introduction to** Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

**UNIT- V**

**Introduction to Technology Landscape**

NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

**TEXT BOOKS:**

1. Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.


**REFERENCE BOOKS:**

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
4. Glen J. Myat, "Making Sense of Data", John Wiley & Sons, 2007
5. Pete Warden, "Big Data Glossary", O'Reily, 2011.
6. Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
7. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012
8. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications


**COURSE OUTCOMES:**

Student will be able:

1. To implement Big Data and its Business Implications.
2. To categorize and summarize Big Data and its importance.
3. To predict fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big data analytics
4. To compare various file systems and use an appropriate file system for storing different types of data.
5. To connect to web data sources for data gathering, integrate data sources with Hadoop components to process streaming data.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                                              **L/T/P/C**
                                                                                                **3/-/-/3**

## OPEN ELECTIVE - III
## (R20A0555)CLOUD COMPUTING FUNDAMENTALS

**COURSE OBJECTIVES:**
1. To understand the various distributed system models and evolving computing paradigms
2. To gain knowledge in virtualization of computer resources
3. To realize the reasons for migrating into cloud
4. To introduce the various levels of services that can be achieved by a cloud.
5. To describe the security aspects in cloud and the services offered by a cloud.

**UNIT- I:**

**Systems Modeling**: Distributed **System Models and Enabling Technologies**- Scalable Computing over the Internet- System Models for Distributed and Cloud Computing- Software Environments for Distributed Systems and Clouds- Performance, Security, and Energy Efficiency

**UNIT- II:**

**Virtualization: Virtual Machines and Virtualization of Clusters and data centers**-Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms-Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and data centers

**UNIT- III:**

**Foundations:** Introduction to Cloud Computing- Migrating into a Cloud-The Enterprise Cloud Computing Paradigm.

**UNIT- IV:**

**Infrastructure as a Service (IAAS) & Platform (PAAS):** Virtual machines provisioning and Migration services-On the Management of Virtual machines for Cloud Infrastructures-Aneka—Integration of Private and Public Clouds

**UNIT- V:**

**Software as a Service (SAAS) &Data Security in the Cloud:**

Google App Engine – Centralizing Email Communications- Collaborating via Web-Based Communication Tools-An Introduction to the idea of Data Security- The Current State of Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

**TEXT BOOKS:**

1. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2. Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.TanuraiSelvi,

3. TMH, 2012.
4. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way
5. you Work and Collaborate Online, Que Publishing, August 2008.

**COURSE OUTCOMES:**

1. To distinguish the different models and computing paradigms.
2. To explain the levels of virtualization and resources virtualization
3. To analyze the reasons for migrating into cloud
4. To effectively use the cloud services in terms of infrastructure and operating platforms.
5. To apply the services in the cloud for real world scenarios

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                             **L/T/P/C**
### OPEN ELECTIVE - III                                  3/-/-/3
### (R20A6251) INFORMATION SECURITY

**COURSE OBJECTIVES:**

1. To understand the basic categories of threats to computers and networks.
2. To understand various cryptographic algorithms.
3. To apply authentication functions for providing effective security.
4. To analyze the application protocols to provide web security.
5. To understand the importance and implementation of Web security and Firewalls

**UNIT- I**

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

**UNIT- II**

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES), Block cipher modes of operation, Stream ciphers, RC4,Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman), Key Distribution.

**UNIT-III**

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, Digital signatures, **Authentication Applications:**  Kerberos, X.509
Authentication Service, Public — Key Infrastructure, Biometric Authentication

**UNIT- IV**

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, Combining security associations, key management

**UNIT- V**

**Web Security:** Web security considerations, Secure  Socket Layer  and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion

detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure **Inter-Branch** Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

**TEXT BOOKS:**

1. Cryptography and Network Security : William Stallings, Pearson Education,4$^{11}$i Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2" Edition


**REFERENCE BOOKS:**

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, lst Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2"d Edition
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Sceurity: WM.Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning


**COURSE OUTCOMES:**

1. Students will be able to evaluate various security attacks and will gain understanding on servicesand mechanisms.
2. Students will understand the applications and working of various symmetricand asymmetric algorithms
3. Students will be able to identify information system requirements for both of them such as client and server.
4. Studentswill be able to understand the importance of IP security and key management.
5. Studentswill understand other types of threats and also the importance of web security

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - III- YEAR  II-SEM-IT**                                                                     **L/T/P/C**

**OPEN ELECTIVE - III**                                                                                    **3/-/-/3**
**(R20A0352) DESIGN THINKING**

**COURSE OBJECTIVES:**

1.  To understand the engineering design process and identification of customer need.
2.  To understand innovative problem solving concepts.
3.  To understand the principles of Design for Manufacturing and FMEA.
4.  To know about the design for assembly principles.
5.  To know about the concepts of design for environment and design for recycling.

**UNIT-I**

**Introduction:** Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

**Identification of Customer Need:** Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

**UNIT-II**

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

**UNIT-III**

**Design for Manufacturing:** Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

**UNIT-IV**

**Design for Assembly:** Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

**UNIT-V**

**Design for Environment:** Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

**TEXT BOOKS:**

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

**REFERENCE BOOKS**

1. The Art of Innovation, by Tom Kelley.
2. Design Thinking, by Nigel Cross.
3. The Design of Business: by Roger Martin.

**COURSE OUTCOMES:**

1. The importance of design in innovation.
2. Design tools and processes can generate innovative new ideas.
3. Design and design thinking to innovative in areas such as engineering, software development and business operations.
4. Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
5. To describe the various case studies for design for environment.

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

**B.TECH - III- YEAR  II-SEM-IT**                                           **L/T/P/C**
                              **OPEN ELECTIVE - III**                    **3/-/-/3**
                              **(R20A0065) BUSINESS ANALYTICS**

**Course Aim/s:**

- To help students in understanding how the managers use business analytics for managerial decision making.

**Learning Outcome/s:**

- The students will be familiar with the practices of analyzing and reporting the business data useful for the insights of business growth and development.

**Unit-I: Understanding Business Analytics**

**Introduction:** Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Role of Business Analyst.

**Unit-II: Dealing with Data and Data Science**

**Data:** Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification.

**Data Science Project Life Cycle:** Business Requirement - Data Acquisition - Data Preparation

- Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations - Optimization - Applications for Data Science

**Unit-III: Data Mining and Machine Learning**

**Data Mining:** The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis.

**Machine Learning:** History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

**Unit-IV: Applications of Business Analytics Overview of Business Analytics       Applications:** Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics - Lending Analytics - Sports Analytics - Future of Business Analytics.

**Unit-V: Ethical, Legal and Organizational Issues**

**Issues & Challenges:** Business Analytics Implementation Challenges - Privacy and Anonymization - Hacking and Insider Threats - Making Customer Comfortable.

**REFERENCES:**

- James R Evans, Business Analytics, Global Edition, Pearson Education
- U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
- Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
- J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T. A.Williams - *Essentials of Business Analytics*, 2e; Cengage Learning.
- Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, PearsonEducation India
- Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springer

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

B.TECH - IV- YEAR  I-SEM-IT                                                           **L/T/P/C**
                                                                                      **3/-/-/3**

**(R20A6202) CYBER SECURITY**

## COURSE OBJECTIVES:

This course will enable the students:
1.  To familiarize various types of cyber-attacks and cyber-crimes
2.  To give an overview of the cyber laws
3.  To study the defensive techniques against these attacks
4.  To study cyber security challenges and implications.
5.  To know about Cyber Security.

## UNIT - I

**Introduction to Cyber Security**: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

## UNIT - II

**Cyberspace and the Law & Cyber Forensics**: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence.

## UNIT - III

**Cybercrime: Mobile and Wireless Devices**: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

## UNIT - IV

**Cyber Security: Organizational Implications**: Introduction cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.
**Cybercrime and Cyber terrorism**: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

**UNIT - V**
**Privacy Issues:** Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy indifferent domains- medical, financial ,,etc.
## Cybercrime: Examples and Mini-Cases
**Mini-Cases**: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

## TEXT BOOKS*:*
1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

## REFERENCE BOOKS:
1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu, J.David Irwin.CRC Press T&FGroup

## COURSE OUTCOMES:
Student will be able to
1. Understand basic concepts of Cyber Crimes.
2. Ability to identify the attacks in Cyber Crimes
3. Able to specify the suitable methods used in Cyber Crime
4. Ability to face cyber security challenges
5. Understand Cyber laws

**MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY**

IV Year B. Tech. IT–I Sem          L/T/P/C
                                               3/-/-/3

## (R20A0522) BLOCKCHAIN TECHNOLOGY

**Objectives:**

1. To enable the student to understand and appreciate the importance of fundamentals of block chain technology, its usage in Business industry
2. To enable the students to know the types of Block chains and purposes.
3. To enable the students to provide an understanding of Cryptographic techniques in Block chain
4. To gain the awareness about various implementations of block chain technology such as bit coin, Ethereum, and Hyper ledger
5. To get familiarity with cryptocurrencies

**UNIT-I**

Introduction to Blockchain Technology – Distributed systems – The history of blockchain – Introduction to blockchain – CAP theorem and blockchain – Benefits and limitations of blockchain – Decentralization using blockchain - Methods of decentralization – Routes to decentralization

**UNIT-II**

Cryptography in Blockchain: Introduction – cryptographic primitives – Assymetric cryptography – public and private keys -line interface – Bitcoin improvement proposals (BIPs) – Consensus Algorithms.

**UNIT-III**

BitCoin Introduction – Transactions – Structure - Transactions types – The structure of a block– The genesis block – The bitcoin network– Wallets and its types– Bitcoin payments– Bitcoin investment and buying and selling bitcoins – Bitcoin installation – Bitcoin programming and the command-line interface – Bitcoin improvement proposals (BIPs).

**UNIT-IV**

Ethereum - Ethereum block chain- Elements of the Ethereum block chain– Precompiled contracts – Accounts and its types – Block header- Ether – Messages – Mining - Clients and wallets – Trading and investment – The yellow paper - The Ethereum network - Applications developed on Ethereum - Scalability and security issues

**UNIT-V**

Smart Contract and Hyper ledger – History of Smart Contract – Ricardian contracts - The DAO. Hyper ledger projects – Hyperledger as a protocol – Fabric - Hyperledger Fabric - Sawtooth lake – Corda Architecture.

**TEXT BOOKS:**

1. Bashir, Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained, 2nd Edition, 2nd Revised edition edition. Birmingham: Packt Publishing, 2018.

**REFERENCE BOOKS:**

1. A. M. Antonopoulos, Mastering bitcoin, First edition. Sebastopol CA: O'Reilly,2015.

2. Z. Zheng, S. Xie, H. Dai, X. Chen, andH. Wang, ―An Overviewof Blockchain Technology: Architecture, Consensus, and Future Trends,‖ in 2017 IEEE International Congress on Big Data (BigData Congress), 2017, pp.557–564.

**Outcomes:**

- Student will be able to understand the fundamentals of block chain technology.
- Apply knowledge of implementations of Bitcoin, Ethereum and Hyperledger to develop solutions in the appropriate domains.
- Understand the modern currencies and its market usage
- Demonstrate the application of hashing and public key cryptography in protecting the blockchain
- Use smart contract in real world applications.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**IV year B.Tech. IT-I Sem**                                        **L/T/P/C**
                                                                   **3/-/-/3**

### (R20A0520) BIG DATA ANALYTICS

**COURSE OBJECTIVES:**
The objectives of this course are,
1. To learn the need of Big Data and the various challenges involved and to acquire Knowledge about different analytical architectures.
2. To understand Hadoop Architecture and its ecosystems.
3. To Understand Hadoop Ecosystem and acquire knowledge about the NoSQL database.
4. To acquire knowledge about the NewSQL, MongoDB and Cassandra databases.
5. To imbibe the processing of Big Data with advanced architectures like Spark.

**UNIT – I**
**Introduction to big data:** Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured - Sources of data. Big Data Evolution - Definition of big data-Characteristics and Need of big data-Challenges of big data. Big data analytics, Overview of business intelligence.

**UNIT – II**
**Big data technologies and Databases: Hadoop** – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system SQL and RDBMS- Hadoop Components – Architecture -Hadoop 1 vs Hadoop 2.

**UNIT – III**
**MapReduce and YARN framework:** Introduction to MapReduce , Processing data with Hadoop using MapReduce, Introduction to YARN, Architecture, Managing Resources and Applications with Hadoop YARN.
**Big data technologies and Databases: NoSQL:** Introduction to NoSQL - Features and Types- Advantages & Disadvantages -Application of NoSQL.

**UNIT - IV**
**New SQL:** Overview of New SQL - Comparing SQL, NoSQL and NewSQL.
**Mongo DB:** Introduction – Features – Data types – Mongo DB Query language – CRUD operations – Arrays – Functions: Count – Sort – Limit – Skip – Aggregate – Map Reduce. Cursors – Indexes – Mongo Import – Mongo Export.
**Cassandra:** Introduction – Features – Data types – CQLSH – Key spaces – CRUD operations – Collections – Counter – TTL – Alter commands – Import and Export – Querying System tables.

**UNIT - V**
**(Big Data Frame Works for Analytics) Hadoop Frame Work:** Map Reduce Programming: I/O formats, Map side join-Reduce Side Join-Secondary Sorting-Pipelining MapReduce jobs
**Spark Frame Work:** Introduction to Apache spark-How spark works, Programming with RDDs: Create RDDspark Operations-Data Frame.

**TEXT BOOKS:**
1. Seema Acharya and Subhashini Chellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., 2016.
2. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.

**REFERENCE BOOKS:**
1. TomWhite, "Hadoop: The Definitive Guide", O"Reilly, 4th Edition, 2015.
2. Mohammed Guller, "Big Data Analytics with Spark", Apress, 2015
3. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

**COURSE OUTCOMES:**
On successful completion of the course, students will be able to,
1. Demonstrate knowledge of Big Data, Data Analytics, challenges and their solutions in Big Data.
2. Analyze Hadoop Framework and eco systems.
3. Analyze MapReduce and Yarn, Work on NoSQL environment.
4. Work on NewSQL environment, MongoDB and Cassandra.
5. Apply the Big Data using Map-reduce programming in Both Hadoop and Spark framework.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - IV- YEAR I-SEM-IT**                                          **L/T/P/C**

                                                                        **3/-/-/3**

## (R20A1209) TEXT ANALYTICS AND NATURAL LANGUAGE PROCESSING

## PROFESSIONAL ELECTIVE – V

**COURSE OBJECTIVES:**

1. To study the origin in text mining.
2. To gain knowledge about Information Extraction and IE Systems.
3. To understand the clustering concepts.
4. To be exposed to the Text Categorization Techniques.
5. To get acquainted with the challenges in NLP.

**UNIT-1**

**Introduction to text mining** – Origin of Text mining, Data Gathering and Text Extraction

**Text Processing –** From grammar rules to statistical NLP, Basic Linguistic Concepts, Word Segmentation, Part of Speech Tagging, and Parsing.

**Information Retrieval –** Indexing, Retrieval Models, Evaluation

**UNIT-2**

**Information Extraction –** Information Retrieval, Extraction, Full Text Understanding and Mining, Information Extraction from web documents v/s traditional ones.

**IE Systems Architecture –** Text Zoning, Pre-processor, Filter, Parser, Fragment Combination, Semantic Interpretation, Template Generation

**Applications of IE Systems –** Machine Learning for Information Extraction in Adaptive IE Systems, NAMIC, CROSSMARC

**UNIT-3**

**Clustering Techniques** – Hierarchical Methods, K-means Partitional Methods

**Efficient Clustering of Large Unstructured Datasets –** K-means clustering variants, RDA clustering,Clustering Approaches based on Database Community and Document.

**Clustering Web Documents**

**UNIT-4**

**Basic Text Categorization** – Document Indexing ,Classifier Learning, Classifier Evaluation

**Techniques** – Document Indexing Techniques, Classifier Learning Techniques – Support Vector Machines, Boosting.

**Applications –** Automatic Indexing for Boolean Information Retrieval Systems, Document Organization, Text Filtering, Hierarchical categorization of web pages, Spam Filtering etc.

**UNIT-5**

**Overview of NLP** – Origins of NLP, Challenges of NLP, Applications of NLP, Syntactic Analysis, Semantic Analysis, Discourse Processing

**Natural Language Generation**: Architecture of NLG Systems, Generation Tasks and Representations, Application of NLG

**Machine Translation**: Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches.

Case study: Sentiment analysis stakeholder satisfaction

Case study: Survey analysis

**TEXT BOOKS:**

1. Text Mining and its Applications to Intelligence, CRM and Knowledge Management edited by A. Zanasi, WIT Press, 2005.
2. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

**REFERENCE BOOKS:**

1. Anne Kao and Stephen R. Poteet (Eds), "Natural Language Processing and Text Mining", Springer-Verlag London Limited 2007.
2. Gerald J. Kowalski and Mark.T. Maybury, "Informatio n Storage and Retrieval systems", Kluwer academic Publishers, 2000.

**COURSE OUTCOMES:**

After completion of the course, student should be able:

- To use basic methods for information extraction and retrieval of textual data.
- To apply text processing techniques to prepare documents for statistical modeling.
- To analyze textual data and correctly interpreting the results.
- To classify clustering and categorization techniques for text prediction .
- To interpret different Machine Translation approaches based on the problems identified.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - IV- YEAR  I-SEM-IT**    **L/T/P/C**
**3/-/-/3**

## (R20A0523) SOFTWARE TESTING METHODOLOGIES
### PROFESSIONAL ELECTIVE - V

**COURSE OBJECTIVES:**

1. To learn and understand the tools and techniques of software testing and its practice in the industry.
2. To be aware of the differences between the various testing strategies.
3. To know the taxonomy and purpose of software testing tools.
4. Ability to learn path testing, domain testing
5. To know the data flow testing

**UNIT I**

**Introduction:** Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

**UNIT II**

**Flow graphs and Path testing:** Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

**Transaction Flow Testing**: Transaction flows, transaction flow testing techniques

**UNIT III:**

**Dataflow testing**: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. **Domain Testing:-**domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

**UNIT IV:**

**Paths, Path products and Regular expressions:** Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

**Logic Based Testing**: Overview, decision tables, path expressions, kv charts, specifications.

**UNIT V:**

**State, State Graphs and Transition testing** : State graphs, good & bad state graphs, state testing, Testability tips. **Graph Matrices and Applications:** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.

**TEXT BOOKS:**

1. Software Testing techniques - Boris Beizer, Dreamtech, secondedition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad,Dreamtech.

**REFERENCES:**

1. The craft of software testing - Brian Marick, PearsonEducation.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit,Pearson.
4. Effective methods of Software Testing, Perry, JohnWiley.
5. Art of Software Testing – Meyers, JohnWiley.

**COURSE OUTCOMES:**

- Ability to test a process for continuous quality improvement
- Generation of test cases from requirements
- Analysis of Modeling techniques: UML: FSM and State charts, Combinatorial design
- Test generation from models.
- Test adequacy assessment.

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH -IV-Year I-Sem-IT**                                                    **L/T/P/C**
                                                                                **3 -/-/3**

### (R20A0518) MACHINE LEARNING

**COURSE OBJECTIVES:**
The students will be able:
1. Recognize the basic terminology and fundamental concepts of machine learning.
2. Understand the concepts of Supervised Learning models with a focus on recent advancements.
3. Acquire the Concepts of Neural Networks Models of supervised Learning
4. Discover unsupervised learning paradigms of machine learning
5. Understand the concepts of Reinforcement learning and Ensemble methods.

## UNIT – I
**Introduction:** Introduction to Machine learning, Supervised learning, Unsupervised learning, Reinforcement learning. Deep learning.
**Feature Selection:** Filter, Wrapper, Embedded methods.
**Feature Normalization:-** min-max normalization, z-score normalization, and constant factor normalization
**Introduction to Dimensionality Reduction:** Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA)

## UNIT – II
**Supervised Learning – I (Regression/Classification)**
**Regression models:** Simple Linear Regression, multiple linear Regression. Cost Function, Gradient Descent, Performance Metrics: Mean Absolute Error(MAE),Mean Squared Error(MSE) R-Squared error, Adjusted R Square.
**Classification models:** Decision Trees-ID3, CART, Naive Bayes, K-Nearest-Neighbours (KNN), Logistic Regression, Multinomial Logistic Regression
Support Vector Machines (SVM) - Nonlinearity and Kernel Methods

## UNIT – III
**Supervised Learning – II (Neural Networks)**
Neural Network Representation – Problems – Perceptrons, Activation Functions, Artificial Neural Networks (ANN) , Back Propagation Algorithm.
**Convolutional Neural Networks** - Convolution and Pooling layers, , Recurrent Neural Networks (RNN).
**Classification Metrics:** Confusion matrix, Precision, Recall, Accuracy, F-Score, ROC curves

## UNIT - IV
Model Validation in Classification : **Cross Validation - Holdout Method, K-Fold, Stratified K-Fold, Leave-One-Out Cross Validation. Bias-Variance tradeoff, Regularization , Overfitting, Underfitting.** Ensemble Methods: **Boosting, Bagging, Random Forest.**

## UNIT – V

**Unsupervised Learning :** Clustering-K-means, K-Modes, K-Prototypes, Gaussian Mixture Models, Expectation-Maximization.

**Reinforcement Learning:** Exploration and exploitation trade-offs, non-associative learning, Markov decision processes, Q-learning.

## TEXT BOOKS:

1. Machine Learning –Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das,  Pearson
2.  Foundations of Machine Learning, Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, MIT Press.
3.  Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press,2012

## REFERENCE BOOKS:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer2009
2. Christopher Bishop, Pattern Recognition and Machine Learning, Springer,2007.
3.     Machine Learning Yearning, Andrew Ng.
4. Data Mining–Concepts and Techniques -Jiawei Han and Micheline Kamber,Morgan Kaufmann

**COURSE OUTCOMES:**

  The students will be able:

1.  Analyze the concepts and able to prepare the dataset for different Machine learning       models.
2.  Identify and Apply appropriate Supervised Learning models.
3.  Build and Design Neural Network models for the given data.
4. Perform Evaluation of Machine Learning algorithms and Model Selection.
5.  Compare supervised, un-supervised and Reinforcement learning models.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B.TECH - IV- YEAR  I-SEM-IT**                                                    **L/T/P/C**
                                                                                    **3/-/-/3**

### (R20A1210) AUGMENTED AND VIRTUAL REALITY
### PROFESSIONAL ELECTIVE - VI

**COURSE OBJECTIVES:**

1. To understand the concepts of Virtual Reality and its applications.
2. To perceive the concepts in Augmented Reality and Virtual Reality (AR &VR).
3. To imbibe the basic concept and framework of virtual reality.
4. To gain an understanding in the fundamental issues of virtual reality.
5. To study about Virtual Hardware and Software.

**Unit I**

**Introduction of Virtual Reality:** Fundamental Concept and Components of Virtual Reality.

Primary Features and Present Development on Virtual Reality.

Multiple Models of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital

Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output -- Visual

/Auditory / Haptic Devices

**Unit II**

**Visual Computation in Virtual Reality:** Fundamentals of Computer Graphics. Software and

Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of

Large Scale Environments & Real Time Rendering.

Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

**Unit III**

**Development Tools and Frameworks in Virtual Reality:** Frameworks of Software Development

Tools in VR. X3D Standard; Vega, MultiGen, Virtools etc.

Application of VR in Digital Entertainment: VR Technology in Film & TV Production. VR

Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

**Unit IV**

Augmented and Mixed Reality, Taxonomy, technology and features of augmented reality,

difference between AR and VR, Challenges with AR, AR systems and functionality.

**Unit V**

Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments, evaluating AR systems.

**TEXTBOOKS:**

1. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press,2003/2006.
2. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann,2013.

**REFERENCEBOOKS:**

1. Alan Craig, William Sherman and Jeffrey Will, Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, 2009.

**COURSE OUTCOMES:**
The students will be able:

- To create geometric modeling and Virtual environment.
- To realize the virtual reality experience.
- To develop Virtual Reality applications.
- To differentiate Augmented Reality and Virtual Reality (AR &VR).
- To comprehend the Augmented reality methods.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - IV- YEAR  I-SEM-IT**                                           **L/T/P/C**
                                                                         **3/-/-/3**

## (R20A0521) CLOUD COMPUTING
### PROFESSIONAL ELECTIVE – VI

**COURSE OBJECTIVES**
1. To understand the cloud computing fundamentals and evolving computing paradigms
2. To realize the reasons for migrating into cloud
3. To gain knowledge in virtualization of computer resources
4. To introduce the various levels of services that can be achieved by a cloud.
5. To describe the security aspects in cloud and the services offered by a cloud.

**UNIT- I Cloud Computing Fundamentals:** Definition of Cloud computing, Roots of Cloud Computing , Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers.
**Computing Paradigms:** Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Quantum Computing.

**UNIT- II Migrating into a Cloud:** Introduction, Broad Approaches to Migrating into the Cloud, the Seven-Step Model of Migration into a Cloud.
**Virtualization:** Virtual Machines and Virtualization of Clusters and data centers- Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms- Virtualization of CPU, Memory, and I/O Devices-Virtual Clusters and Data Centers

**UNIT- III Infrastructure as a Service (IAAS) & Platform (PAAS):** Virtual machines provisioning and Migration services - Virtual Machines Provisioning and Manageability - Virtual machine Migration Services - VM Provisioning and Migration in Action.
On the Management of Virtual machines for Cloud Infrastructures. Aneka—Integration of Private and Public Clouds.

**UNIT- IV Software as a Service (SAAS) & Data Security in the Cloud:** Software as a Service SAAS), Google App Engine – Centralizing Email Communications- Collaborating via Web-Based Communication Tools-An Introduction to the idea of Data Security. The Current State of Data Security in the Cloud - Cloud Computing and Data Security Risk -Cloud Computing and Identity.
**UNIT- V SLA Management in cloud computing:** Traditional Approaches to SLO Management, Types of SLA, Life Cycle of SLA, SLA Management in Cloud.
**TEXT BOOKS:**
 1. Cloud Computing Principles and Paradigms, by Rajkumar Buyya
 2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014
 3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
 4. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

**REFERENCE BOOKS:**
1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill,rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press,2010.
 3.  Cloud Computing: Implementation, Management and Security, John  W.Rittinghouse, James F.Ransome, CRC Press,rp2012.
4.  Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'reilly, SPD,rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

**COURSE OUTCOMES:**
- Ability to analyze various service delivery models of cloud computing
- Ability to interpret the ways in which the cloud can be programmed and deployed.
- Ability to comprehend the virtualization and cloud computing concepts
- Assess the comparative advantages and disadvantages of Virtualization technology
- Analyze security issues in cloud computing

## MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B. TECH - IV- YEAR I-SEM-IT**                                        **L/T/P/C**
                                                                       **3/-/-/3**

### (R20A6610) DEEP LEARNING
### PROFESSIONAL   ELECTIVE-VI

**COURSE OBJECTIVES:**

1. To acquire the knowledge of Deep Learning Concepts
2. To gain knowledge to apply Optimization strategies.
3. To be capable of performing experiments in deep learning using real world data
4. To improve the performance of the deep learning.
5. To learn supervised and unsupervised models.

**UNIT-I:**

**INTRODUCTION TO DEEP LEARNING**: Historical Trends in Deep Learning, Deep Feed-forward networks, Gradient –Based learning, Hidden Units, Architecture Design, Back- Propagation and other Differentiation Algorithms.

**UNIT-II:**

**DEEP NETWORKS**: History of Deep Learning-A Probabilistic Theory of Deep Learning-Back propagation and regularization, batch normalization-VC Dimension and Neural Nets- Deep Vs Shallow Networks –Conventional Networks-Generative Adversarial Networks (GAN), Semi-Supervised Learning.

**UNIT-III**

**DIMENTIONALITY REDUCTION**: LINEAR (PCA, LDA ) manifolds, metric learning-Auto encoders and dimensionality reduction in networks-Introduction to convert-architectures -AlexNet, VGG, Inception, ResNet-Training a convert: weights initialization ,batchnormalization, hyperparameter optimization.

**UNIT- IV**

**OPTIMIZATION AND GENERALIZATION** : Optimization in Deep Learning-Non – convex optimization for deep networks-stochastic optimization Generalization in neural networks

-spatial transformer networks-recurrent networks, LSTM-recurrent neural network language models-world-level RNNs & deep Reinforcement learning-computational & artificial neuroscience.

**UNIT- V**

**CASE STUDY AND APPLICATIONS**: ImageNet- Detection –Audio WaveNet-Natural Language Processing Word2Vec-joint Detection-Bioinformatics-Face Recognition- Scene Understanding-Gathering Image Captions.


**TEXT BOOKS:**

1. Cosma     Rohilla Shalizi,Advanced Data Analysis from         an Elementary Point ofView,2015.
2. Deng & Yu,Deep Learning:Methods and Applications,Now Publishers,2013
3. Deep Learning : An MIT Press Book by Ian Goodfellow and Yoshua Bengio Aaron Courville.
4. Michael Nielson,Neural Networks and Deep Learning,Determination Press,2015.
5.    Satish    kumar,Neural    networks:A    classroom    Approach,Tata    McGraw-Hill Education,2004


**COURSE OUTCOMES:**

1. Ability to select the Learning Networks in modeling real world systems.
2. Build own deep learning project.
3. Differentiate between machine learning, deep learning and artificial Intelligence.
4. Ability to use an efficient algorithm for Deep Models.
5. Ability to learn deep neural network implementation using the Tensor Flow and Keras.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**B.TECH - IV- YEAR  I-SEM-IT**                                                          **L/T/P/C**
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## (R20A0591) BLOCK CHAIN TECHNOLOGY LAB

## COURSE OBJECTIVES:

This course will enable the students:

1. Understanding Block chain Fundamentals and creating basic blocks.

2. Able to Design Block chain Applications in a structured manner

3. Ability to create own crypto currency and get familiarity with future currencies.

4. Able to Evaluate and Analyze  Block chain Systems

**LIST OF EXPERIMENTS**

Week 1: Creating Merkle tree

Week 2: Creation of Block

Week 3: Block chain Implementation Programming code

Week 4: Creating ERC20 token

Week 5: implement blockchain in Merkle Trees

Week 6: implement Mining using block chain

Week 7: implement peer-to-peer using block chain

Week 8: Creating a Crypto-currency Wallet

**Course Outcomes:**

1. Knowledge of Blockchain Concepts and creating basic blocks.

2. Proficiency in Blockchain Development.

3. Ability to Design and Implement Blockchain Applications.

4. Evaluation and Analysis of Blockchain Systems.

5. Knowledge of crypto currency and creating a basic form of it.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

**B. TECH - IV- YEAR I-SEM-IT**                                                   **L/T/P/C**
                                                                                  **-/-/3/1.5**

## (R20A0592) BIG DATA ANALYTICS LAB

**COURSE OBJECTIVES:**

The objectives of this course are,

1. To implement MapReduce programs for processing big data.

2. To realize storage of big data using MongoDB.

3. To analyze big data using machine learning techniques such as Decision tree classification and clustering.

**LIST OF EXPERIMENTS:**

1. Install, configure and run python, numPy and Pandas.

2. Install, configure and run Hadoop and HDFS.

3. Visualize data using basic plotting techniques in Python.

4. Implement NoSQL Database Operations: CRUD operations, Arrays using MongoDB.

5. Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB.

6. Implement word count / frequency programs using MapReduce.

7. Implement a MapReduce program that processes a dataset.

8. Implement clustering techniques using SPARK

9. Implement an application that stores big data in MongoDB / Pig using Hadoop / R.

**TEXT BOOKS:**

1. Mike Frampton, "Mastering Apache Spark", Packt Publishing, 2015.

2. TomWhite, "Hadoop:TheDefinitiveGuide", O"Reilly, 4thEdition, 2015.

3. NickPentreath, "Machine Learning with Spark", PacktPublishing, 2015.

4. Mohammed Guller, "Big Data Analytics with Spark", Apress, 2015

5. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O"Reilly, 2012

**COURSE OUTCOMES:**

On successful completion of the course, students will be able to,

1. Understand Configuration of various big data Frame Works.

2. Apply various visualization techniques to explore data.

3. Demonstrate data base operations using MongoDB.

4. Process big data using Hadoop framework.

5. Build and apply Map-Reduce & NoSQL Concepts.

6. Perform data analysis with machine learning methods.

# MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
**IV Year B.Tech.IT- II Sem**                                                 **L/T/P/C**
                                                                     **3/1/0/4**

## (R20A0337) INNOVATION, STARTUPS AND ENTERPRENEURSHIP

**UNIT-I**

**Introduction:** Meaning and Concept of Innovation, Levels of Innovation- Incremental Vs Radical Innovation-Inbound and Outbound Ideation- Open and Other Innovative Ideation Methods.

Entrepreneurship- Role-models of Entrepreneurship- Common Entrepreneurial characteristics, Role of Entrepreneurship in economic development- Entrepreneurship in the new millennium.

**UNIT-II**

**The Entrepreneur and Mindset:** Meaning – The skills required being an Entrepreneur and entrepreneurial decision process- Entrepreneurial stress - Challenges of start-ups- Entrepreneurial Motivation, Innovation, Imagination & Creativity.

**UNIT-III**

**Business Planning and Fund Raising:** Identifying, assessing and validation of the idea, Identifying the target segment and market share, creating an effective B-Plan, Market research, Financial, Market and Technical feasibility, Fund raising and valuation, Idea pitching.

**UNIT-IV**

**Legal and Financial Aspects:** Legal aspects:  Permits, Registrations and compliances, Intellectual Property Rights, Contracts.

**Financial aspects:** Working capital management- Financial management and long-term investments, Capital structure and taxation, Brake even analysis.

**UNIT-V**

**Contemporary Issues:** Legal forms of entrepreneurial organizations- Debt, Equity, Angle and Venture Capital markets for Start-ups, Growth and Development stages- new venture finance- Initial Public Offer (IPO) Governmental initiatives to encourage startups - Business Incubations and its benefits- Protection of Intellectual Property.

**TEXT BOOKS:**
1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning, 2016 Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
2. Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.
3. S. R. Bhowmik & M. Bhowmik, Entrepreneurship, New Age International, 2007.

**REFERENCE BOOKS**
1. Stuart Read, Effectual Entrepreneurship, Routledge, 2013
2. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012.
3. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013

**COURSE OUTCOMES:**
1. Students will be able to understand a) Startup opportunities b) Legal and other requirements for new ventures c) Financial Issues of startups d) Sustainability and growth of startups e) Exit strategies
2. Students will be able to understand a) mindset of the entrepreneurs, b) identify ventures for launching, c) develop an idea on the legal framework and d) strategic perspectives in entrepreneurship.