**MARRI LAXMAN REDDY**
**INSTITUTE OF TECHNOLOGY AND MANAGEMENT**
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

# B.Tech. in CSE (Cyber Security)
## COURSE STRUCTURE & SYLLABUS (R20)
**Applicable From 2020-21 Admitted Batch**

## Structure Breakup

| S.No | Category | Breakup of credits(Total 160 credits) |
|------|----------|---------------------------------------|
| 1 | Humanities and social sciences including management courses (HSMC) | 10 |
| 2 | Basic Sciences Courses (BS) | 22 |
| 3 | Engineering sciences courses including workshop, drawing basics of electrical/mechanical/computer etc.(ES) | 19 |
| 4 | Professional core courses (PC) | 68 |
| 5 | Professional Electives (PE) | 18 |
| 6 | Open Electives (OE) | 9 |
| 7 | Project work, seminar and internship in industry or elsewhere (PS) | 14 |
| 8 | Mandatory Courses | - |
| | TOTAL | 160 |

**I YEAR I SEMESTER**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2010001 | Engineering Mathematics - I | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 2 | 2010006 | Applied Physics | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 3 | 2010501 | Programming for Problem Solving | ES | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 4 | 2010009 | Communicative English | HSMC | 2 | 0 | 0 | 2 | 30 | 70 | 100 |
| 5 | 2010071 | Applied Physics Lab | BS | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 6 | 2010571 | Programming for Problem Solving Lab | ES | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 2010074 | Communicative English Lab | HSMC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8 | 2010021 | Environmental Science | MC | 2 | 0 | 0 | 0 | - | - | - |
| | | **Total Credits** | | 13 | 3 | 8 | 18 | 210 | 490 | 700 |

**I YEAR II SEMESTER**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2020002 | Engineering Mathematics - II | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 2 | 2020008 | Engineering Chemistry | BS | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 3 | 2020502 | Data Structures | ES | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | 2020371 | Engineering Drawing practice | ES | 1 | 0 | 4 | 3 | 30 | 70 | 100 |
| 5 | 2020073 | Engineering Chemistry Lab | BS | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 6 | 2020572 | Data Structures Lab | ES | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 7 | 2020372 | Engineering Workshop | ES | 1 | 0 | 3 | 2.5 | 30 | 70 | 100 |
| | | **Total Credits** | | 11 | 2 | 12 | 19 | 210 | 490 | 700 |

**II Year I Semester**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2036201 | Digital Logic Design & computer Organization | PC | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 2 | 2036202 | Database Management Systems | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | 2036203 | Computer Networks | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | 2030004 | Probability & Statistics | BS | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5 | 2036204 | Python Programming | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6 | 2046271 | Database Management Systems Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 2036272 | Computer Networks Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 2036273 | Python Programming Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 9 | 2030025 | Gender Sensitization& Community Participation | MC | 2 | 0 | 0 | 0 | - | - | - |
| | | **Total Credits** | | **17** | **1** | **9** | **20.5** | **240** | **560** | **800** |

**II Year – II Semester**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2040201 | Basic Electrical Engineering | ES | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2 | 2046205 | Automata Theory & Language Processors | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | 2046206 | Discrete Mathematics | pc | 3 | 1 | 0 | 4 | 30 | 70 | 100 |
| 4 | 2046207 | JAVA Programming | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5 | 2046208 | Cryptography & Network Security | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6 | 2046209 | Cyber Laws& Ethics | PC | 2 | 0 | 0 | 2 | 30 | 70 | 100 |
| 7 | 2040271 | Basic Electrical Engineering Lab | ES | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8 | 2046274 | Cryptography &Network Security Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 9 | 2046275 | JAVA Programming Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 10 | 2040023 | Constitution of India | MC | 2 | 0 | 0 | 0 | - | - | - |
| | | **Total Credits** | | **19** | **1** | **8** | **22** | **270** | **630** | **900** |

**III Year – I Semester**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week L | T | P | Credits | Internal (CIE) | External (SEE) | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2056210 | Database Security | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2 | 2050010 | Business Economics and Financial Analysis | HSMC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | 2056211 | Operating Systems | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | 2056212 | Software Engineering | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5 | | Open Elective I | OE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6 | 2056276 | Database Security Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 2056277 | Operating Systems Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 8 | 2056278 | Case Tools Lab | PC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 9 | 2056283 | Internship* | PS | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 10 | 2020024 | Intellectual Property Rights | MC | 2 | 0 | 0 | 0 | - | - | - |
| **Total Credits** | | | | **17** | **0** | **10** | **20** | **270** | **630** | **900** |

**III Year – II Semester**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week L | T | P | Credits | Internal (CIE) | External (SEE) | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2066213 | Cloud Computing & Security | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2 | 2066214 | Design and Analysis of Algorithms | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | 2066215 | Web Technologies | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | | Professional Elective I | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5 | | Open Elective II | OE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6 | 2066279 | Web Technology Lab | PC | 0 | 0 | 3 | 1.5 | 30 | 70 | 100 |
| 7 | 2060075 | Advanced English Communication Lab | HSMC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8 | 2066280 | Cloud Computing & Security Lab | PC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 9 | | Professional Ethics | MC | 2 | 0 | 0 | | | | |
| **Total Credits** | | | | **17** | **0** | **7** | **18.5** | **240** | **560** | **800** |

**\*Students have to complete internship in II Year- II Semester Summer, Evaluation is carried in III-I semester.**

**IV Year – I Semester**

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2076218 | Fundamentals of Management | HSMC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2 | 2076216 | Block Chain & Crypto currency | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | 2076217 | Mobile & wireless security | PC | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | | Professional Elective II | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 5 | | Professional Elective III | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 6 | | Open Elective III | OE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 7 | 2076281 | Block Chain & Crypto currency Lab | PC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 8 | 2076282 | Mobile & wireless security Lab | PC | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 9 | 2076284 | Industry Oriented Mini Project** | PS | 0 | 0 | 4 | 2 | 30 | 70 | 100 |
| | | **Total Credits** | | 18 | 0 | 8 | 22 | **270** | **630** | **900** |

| S. No. | Course Code | Course Title | Course Area | Hours Per Week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | | Professional Elective IV | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 2 | | Professional Elective V | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 3 | | Professional Elective VI | PE | 3 | 0 | 0 | 3 | 30 | 70 | 100 |
| 4 | 2086285 | Technical Seminar | PS | 0 | 0 | 2 | 1 | 30 | 70 | 100 |
| 5 | 2086286 | Major Project | PS | 0 | 0 | 20 | 10 | 30 | 70 | 100 |
| | | **Total Credits** | | 9 | 0 | 22 | 20 | **150** | **350** | **500** |

**\*\*Students have to complete industry oriented mini project in III Year- II Semester Summer break, Evaluation is carried in IV-I semester.**

**PE I - Professional Elective I**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2066241 | Data Mining |
| 2 | 2066242 | Intrusion Detection |
| 3 | 2066243 | Artificial Intelligence |
| 4 | 2066244 | Mobile Computing |

**PE II - Professional Elective II**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2076245 | Linux Programming |
| 2 | 2076246 | Wireless Sensor Networks |
| 3 | 2076247 | TCP/IP Design & Implementation |
| 4 | 2076248 | Application & Web Security |

**PEIII – Professional Elective III**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2076249 | Information Retrieval Systems |
| 2 | 2076250 | Machine Learning |
| 3 | 2076251 | Security Assessment & Risk Analysis |
| 4 | 2076252 | Natural Language Processing |

**PE IV - Professional Elective**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2086253 | Distributed System |
| 2 | 2086254 | Soft Computing |
| 3 | 2086255 | Ethical Hacking |
| 4 | 2086256 | Data Analytics |

**PE V - Professional Elective V**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2086257 | Artificial Neural Networks |
| 2 | 2086258 | Deep Learning |
| 3 | 2086259 | Enterprise Security |
| 4 | 2086260 | Internet of Things |

**PE VI - Professional Elective VI**

| S.No | Course Code | Course Title |
|------|-------------|--------------|
| 1 | 2086261 | Robotics |
| 2 | 2086262 | High Performance Computing |

| 3 | 2086263 | Digital Forensics |
|---|---------|-------------------|
| 4 | 2086264 | Business Intelligence Systems |

**Open Electives**

|   | **Course Code** | **Course Title** |
|---|-----------------|------------------|
| 1 | Open Elective 1 | 2066209- Java Programming |
|   |                 | 2076203- Database Management System |
| 2 | Open Elective 2 | 2076208- Cryptography & Network Security |
|   |                 | 2086206-Python Programming |
| 3 | Open Elective 3 | 2086216- Block Chain Technology |
|   |                 | 2086218- R Programming |

I–I

## 2010001: ENGINEERING MATHEMATICS - I

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

**Course Objectives: To learn**
- Types of matrices and their properties, Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form. Geometrical approach to the mean value theorems and their application to the mathematical problems.
- Partial differentiation, concept of total derivative, finding maxima and minima of function of two and three variables.
- The evaluation of Multiple integration and its applications

**Course Outcomes:**
After learning the contents of this paper the student must be able to
**CO.1**: Write the matrix representation of a set of linear equations and to analyse the solution    of the system of equations
**CO.2:** Find the Eigen values, Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.
**CO.3:** Solve the applications on the mean value theorems.
**CO.4:** Find the extreme values of functions of two variables with/ without constraints.
**CO.5:** Evaluate the multiple integrals and apply the concept to find areas, volumes for cubes, sphere and rectangular parallelepiped

**UNIT-I:  Matrices**
Matrices: Types of Matrices, Symmetric; Skew-symmetric; orthogonal matrices; rank of a matrix by Echelon form, Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method, Gauss seidel iteration method.

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

**UNIT-III:  Calculus of single variable.**
Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's and Maclaurin theorems with remainders (without proof). Beta and Gamma functions and their applications.

**UNIT-IV: Multivariable Calculus.**
Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence, independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

**UNIT-V: Multiple integrals& applications**:
Evaluation of Double integrals (Cartesian and polar coordinates); Change of order of integration (Cartesian form); Evaluation of Triple integrals; Change of variables (Cartesian to polar) for double and (cartesian to spherical and cylindrical polar coordinates) for triple integrals.
Applications: finding the area of a region using double integration and volume of a region using double and triple integration.

**TEXTBOOKS:**
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36$^{th}$ Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9$^{th}$ Edition, John Wiley & Sons,2006.

**REFERENCES**:
1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11$^{th}$Reprint, 2010.

## 2010006: APPLIED PHYSICS

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

**Course Objectives:**
- Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
- Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics, optoelectronics and dielectric and magnetic properties and a broad base of knowledge in physics.
- The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
- To study applications in engineering like memory devices, transformer core and electromagnetic machinery.

**Course Outcomes:** Upon graduation:
- The student would be able to learn the fundamental concepts on Quantum behavior of matter in its micro state.
- The knowledge of fundamentals of Semiconductor devices and their applications.
- Design, characterization and study of properties of optoelectronic devices help the students to prepare new materials for various engineering applications.
- Study about Lasers and fiber optics which enable the students to apply to various systems involved with communications.
- The course also helps the students to be exposed to the phenomena of dielectric and magnetic properties.

**UNIT-I: Quantum Mechanics**
Introduction to quantum physics, Black body radiation, Photoelectric effect, de-Broglie's hypothesis, Wave-particle duality, Davisson and Germer experiment, Heisenberg's Uncertainty principle, Born's interpretation of the wave function, Schrodinger's time independent wave equation, Particle in one dimensional box.
**Learning Outcomes:**
> **Understand** the fundamental concepts of quantum mechanics.
> **Explain** the physical significance of wave function.
> **Apply** Schrödinger's wave equation for a free particle.
> **Analyze** the particle behavior in different potential regions.
> **Evaluate** the significance of energy values in one dimensional box.

**UNIT-II: Semiconductor Physics**
Intrinsic and Extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature, Carrier transport: diffusion and drift, p-n junction diode, Zener diode and their V-I Characteristics, Bipolar Junction Transistor (BJT): Construction, Principle of operation, Hall effect.
**Learning Outcomes:**
> **Understand** the energy band formation of semiconductors.
> **Explain** the properties of n-type and p-type semiconductors.
> **Apply** the Hall effect for various types of semiconductors.
> **Analyze** the various types of diodes.
> **Evaluate** the hall coefficient of semiconductors.

**UNIT-III: Optoelectronics**

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

   **Learning Outcomes:**
   Understand the basic principle involved in LED.
   Explain about various types of photodiodes.
   Apply the knowledge on various diodes.
   Analyze the working of PIN and Avalanche diodes.
   Evaluate the characteristics of diodes.

**UNIT-IV: Lasers and Fibre Optics**

**Lasers:** Introduction to Lasers, Coherence, Population inversion, Pumping, Lasing action, Types of Lasers: Ruby laser, Carbon dioxide ($CO_2$) laser, He-Ne laser, Semiconductor laser; Applications of laser.

**Fibre Optics:** Introduction, Block diagram of fiber optic communication system, Total internal reflection, Acceptance angle and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

**Learning Outcomes:**
Understand about Laser and fiber optics.
Explain the working principle of laser and optical fibers.
Apply optical fibers in communication system.
Analyze the applications of optical fibers in medical, communication and other fields.
Evaluate the laser and fiber optic concepts in various fields.

**UNIT-V: Dielctric and Magnetic Properties**

**Dielectric properties:** Introduction to dielectrics, Polarisation, Permittivity and Dielectric constant, Types of polarisation (Qualitative), Internal fields in a solid, Clausius-Mossotti equation, Ferroelectrics and Piezoelectrics.

**Magnetic properties:** Introduction to magnetism, Magnetisation, permeability and susceptibility, Classification of magnetic materials, Domain theory of ferro magnetism,  Hysteresis, Applications of magnetic materials.

**Learning Outcomes:**
Understand the concept of polarization in dielectric materials.
Explain various types of polarization of dielectrics and classification of magnetic materials.
Apply Lorentz field and Claussius- Mosotti relation in dielectrics.
Analyze the ferromagenetism on the basis of domain theory.
Evaluate the applications of dielectric and magnetic materials.

**TEXT BOOKS:**

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

**REFERENCES:**

1. Richard Robinett, Quantum Mechanics
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Graw-Hill inc. (1995).
3. Online Course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Guptha on NPTEL.

## 2010501:PROGRAMMING FOR PROBLEM SOLVING

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

**Course Objectives:**
- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes:** The student will learn
- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to Cprograms.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code..
- Searching and sorting problems.

*Unit - 1: Introduction to Programming*
**Introduction to computers**: disks, primary and secondary memory, processor, operating system, compilers, creating and running of program, Number systems, Pseudo code, algorithm, flowchart.
**Introduction to C Programming Language:**Basic structure of C program, Syntax and Logical Errors in compilation, 'C' tokens: Identifiers, variables,Data types, Operators(Arithmetic, Relational, Logical, Bit-wise, Increment and Decrement, sizeof, Conditional operator, Assignment, Special operator), expressions and precedence, Expression evaluation, Precedence and Associativity,  type conversion, Command line arguments.


*Unit - II: Control statements,Arrays*
**Conditional statements:** Writing and evaluation of conditionals and consequent branching with if, if-else, nested if-else and switch statements.
**Iterative Statements**: while, do-while, for, Nested loops
**Jumping Statements**: break, continue and goto
**I/O:** Simple input and output with scanf and printf, formatted I/O, stdin,stdout,stderr.
**Arrays:**Types of arrays, creating, accessing and manipulating elements of arrays.
*Unit - III: Strings, Structures and Unions, Pointers*
**Strings:** Introduction to strings, handling strings as array of characters, string I/O functions, string handling functions, arrays of strings
**Structures and unions:** Defining structures, Initializing structures, Array of structures, nested structures, Bit Fields, unions.
**Pointers:** Defining pointers, Address and Indirection operators, pointers to arrays and structures, use of pointers in self-referential structures, Enumeration Data types
*Unit - IV: Functions and Dynamic memory allocation*
**Functions:** Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, call by reference, void function, Structure to functions, Some C standard functions and libraries, Storage classes (auto, extern, static and register)
**Recursion:** Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.
**Dynamic Memory Allocation**: Allocating and freeing memory, Allocating memory for arrays of different data types.
*Unit - V: Preprocessor and File handling in C:*
**Preprocessor:** Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.
**Files:** Text and Binary files, File structure, Creating, Reading and Writing text and binary files, Appending data to existing files, Writing and Reading structures using binary files,File Status functions,

File Positioning functions.

**TEXT BOOKS:**
1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3$^{rd}$Edition)
2. Let us C by YashavantKanetkar BPB publications (16$^{th}$ Edition)

**REFERENCE BOOKS:**
1. programming in ANSI C by Balaguruswamy,(7$^{th}$ Edition)
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,PrenticeHall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16$^{th}$Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducationHerbertSchildt, C: The Complete Reference, McGrawHill, 4th Edition

## 2010009:COMMUNICATIVE ENGLISH

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

**Learning Objectives:**

- Improve language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
- Analyze a variety of texts and interpret them to demonstrate in writing or speech.
- Write clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
- Develop language components to communicate effectively in formal and informal situations.

**Course Outcomes:**

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts in their profession.
- Acquire basic proficiency in English including LSRW skills.
- Use prewriting techniques to develop ideas and produce multiple drafts of different types of paragraphs.
- Recognize and incorporate basic grammar, mechanics, and sentence variety in writing.

**SYLLABUS**

**UNIT –I: 'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press**
**Vocabulary Building**: The Concept of Word Formation --The Use of Prefixes and Suffixes.
**Grammar:** Common Errors: Articles and Prepositions.
**Reading:** Reading and Its Importance- Techniques for Effective Reading.
**Basic Writing Skills:** Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.
**Learning Outcomes**
At the end of the module, the learners will be able to

- Understand the concept of word formation, root words and their usage in English.
- know the types of sentences and analyze the sentence structure
- use articles and prepositions appropriately
- use punctuation marks correctly in writing
- understand the techniques of effective reading
- write paragraphs effectively

**UNIT –II: Writing Skills.**
**Vocabulary:** Synonyms and Antonyms.
**Grammar:** Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
**Reading:** Improving Comprehension Skills – Techniques for Good Comprehension
**Writing:** Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter of Complaint, Letter of Requisition, and Job Application with Resume.
**Learning Outcomes**
At the end of the module, the learners will be able to

- enrich their vocabulary using synonyms and antonyms
- noun, pronoun and subject verb agreement accurately
- understand the techniques of reading comprehension
- write formal letters in various context.

**UNIT –III : 'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press**
**Vocabulary**: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.
**Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
**Reading:** Sub-skills of Reading- Skimming and Scanning
**Writing**: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying**- Providing Examples or Evidence
**Learning Outcomes**
At the end of the module, the learners will be able to
- use Prefixes and Suffixes from Foreign Languages in English
- understand the use misplaced modifiers and uses of tenses
- skim and scan the given text appropriately
- write definitions, descriptions and classifications

**UNIT –IV: 'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**
**Vocabulary**: Standard Abbreviations in English
**Grammar:** Redundancies and Clichés in Oral and Written Communication.
**Reading**: Comprehension- Intensive Reading and Extensive Reading
**Writing: Writing Practices-**-Writing Introduction and Conclusion - Essay Writing-Précis Writing.

**Learning Outcomes**
At the end of the module, the learners will be able to
- understand the importance of food pyramid in your daily life.
- explain the Active and passive Voice Subject Verb Agreement (Concord)
- apply the One word Substitutes in your every day vocabulary.
- analyze the Intensive and Extensive reading skills.
- evaluate the importance of Technical Report Writing, and E-mail writing.

**UNIT –V 'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**
**Vocabulary**: Technical Vocabulary and their usage
**Grammar:** Common Errors in English
**Reading:** Reading Comprehension-Exercises for Practice
**Writing: Technical Reports**- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.
**Learning Outcomes**
At the end of the module, the learners will be able to
- understand the Technical Vocabulary and their Usage.
- avoid common errors in English
- read any text using the sub skills of reading
- write technical reports using manual script format.

**Prescribed Textbooks:**
**1. Sudarshan, N. P. and Savitha, C. (2018). English for Engineers, Cambridge University Press**
**2. Wren & Martin. (2017). High School English Grammar and Composition Book, S Chand Publishing**

**References:**
1. Murphy, R. (2015). Essential Grammar in Use. Cambridge University Press.
2. Current English Grammar and Usage with Composition by R. P Sinha
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Swan, M. (2016). Practical English Usage. Oxford University Press.
5. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

# 2010071: APPLIED PHYSICS LAB

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

### COURSE OBJECTIVES:
- ➢ To gain practical knowledge by applying the experimental methods to correlate with the theoretical knowledge of physics concepts.
- ➢ To learn the usage of electrical and optical systems for measurements.
- ➢ Apply the analytical techniques and graphical analysis to the experimental data.
- ➢ To develop intellectual communication skills through discussion on basic principles of scientific concepts in a group.

### COURSE OUTCOMES:
- ➢ Understand the concepts of the error and analysis.
- ➢ Explain the different measuring devices and meters to record the data with precision.
- ➢ Apply the experimental skills to design new experiments in engineering.
- ➢ Analyze the theoretical knowledge and correlate with the experiment.
- ➢ Evaluate the various parameters accurately.

### List of Experiments:

1. Energy gap of P-N junction diode:To determine the energy gap of a semiconductor diode.

2. Solar Cell:To study the V-I Characteristics of solar cell.

3. Photoelectric effect:To determine work function of a given material.

4. Light emitting diode:Plot V-I and P-I characteristics of light emitting diode.

5. LASER:To study the V-I characteristics of LASER sources.

6. Optical fibre: To determine the Numerical aperture and bending losses of Optical  Fibres

7.  Stewart – Gee's experiment:

Determination of magnetic field induction along the axis of a current carrying coil.

8.  Hall effect:To determine Hall co-efficient of a given semiconductor.

9.  LCR Circuit: To determine the resonance frequency and Quality factor of LCR Circuit.

10. R-C Circuit: To determine the time constant of R-C circuit.


**Note: Any 8 experiments are to be performed**

# 2010571:PROGRAMMING FOR PROBLEM SOLVING LAB

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

*[Note:The programs may be executed using any available Open Source/ Freely available IDE Some of the Tools available are:*
*CodeLite: https://codelite.org/Code::Blocks: http://www.codeblocks.org/*
*DevCpp :http://www.bloodshed.net/devcpp.html Eclipse: http://www.eclipse.org*
*This list is not exhaustive and is NOT in any order of preference]*

**Course Objectives:** The students will learn the following:
- To work with an IDE to create, edit, compile, run and debugprograms
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arraysetc.
- To create, read from and write to text and binary files

**Course Outcomes:** The candidate is expected to be able to:
- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can bereused
- Create, read and write to and from simple text and binary files

### *Simple numeric problems:*
a. Write a program for the simple, compound interest.
b. Write a program for calculating area, perimeter of a rectangle, triangle and square.
c. Write a program for calculating area and perimeter of a circle.
d. Write a program to implement bit-wise operators.
e. Write a program for converting Fahrenheit to Celsius.
f. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
g. Write a simple program to find largest of two and three numbers using conditional operator.
h. Write a program for swapping two numbers with and without using third variable and using bitwise operators.

### *Condition branching and statements:*
a. Write a program for finding largest of three numbers.
b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%= Failed, 40% to <60% = Second class, 60% to <70%=First class, >=  70% = Distinction. Read percentage from standard input.
c. Write a C program to find the roots of a Quadratic equation.
d. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

### *Condition branching and loops:*
a. Write a program to find whether the given number is a prime or not.

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

c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

$$5 \times 1 = 5$$
$$5 \times 2 = 10$$
$$5 \times 3 = 15$$

d. Write a program that shows the binary equivalent of a given positive number between 0 to255.

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

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

g. Write a C program to calculate the following, where x is a fractional value.
$1-x/2+x^2/4-x^3/6$

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

i. Write a C program to construct a pyramid of numbers as follows:

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

j. Write a C program to find given number is Armstrong number or not.

k. Write a C program to find given number is Perfect number or not.

***Arrays, Strings, Pointers and Structures:***

a. Write a C program to find the minimum, maximum and average in an array of integers.

b. Write a program to compute Mean, Variance, Standard Deviation, Sortingof n elements in single dimension array.

c. Write a C program that perform the following:
   i. Addition of Two Matrices
   ii. Multiplication of Two Matrices
   iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.

d. Write a C program that sorts a given array ofnames.

e. Write a C program that perform the followingoperations:
   i. To insert a sub-string in to a given main string from a given position.
   ii. To delete n Characters from a given position in a given string.

f. Write a program for reading elements using pointer into array and display the values using array.

g. Write a program for display values reverse order from array using pointer.

h. Write a program through pointer variable to sum of n elements from array.

i. Write a program to implement student information by using structure to function.

j. Write a program to sort student id or name using structures.

***Functions:***

a. Write a C program to find factorial of a given number using functions.

b. Write a C program to perform swapping using functions.

c. Write a C program to find LCM, GCD of two numbers using functions.

d. Write a C program to implement sorting using functions.

e. Write a C program to create and print two dimensional array using functions.

f. Write a C program tofind factorial of a given number using recursion.

g. Write a C program to find Fibonacci series using recursion

h. Write a C program to implement Towers of Hanoi problem using recursion.

**Files:**

a. Write a C program to display the contents of a file to standard outputdevice.

b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercaseequivalents.

c. Write a C program to count the occurrence of a characterin a text file. The file name and the character are supplied as command linearguments.

d. Write a C 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 thirdfile).

## *Reference Books*

1. Byron Gottfried, Schaum'sOutline of Programming with C,McGraw-Hill
2. Let us C byYashavantKanetkar BPB publications (16th Edition)
3. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
5. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
7. Herbert Schildt, C: The Complete Reference, McGrawHill, 4thEdition.

# 2010074: Communicative English Lab

**B.Tech. I Year I Semester**                                                    **L T P C**
                                                                                **0  0  2  1**

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

**Course Objectives:**
- Facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- Enhance English language skills, communication skills and to practice soft skills.
- Improve fluency and pronunciation intelligibility by providing an opportunity for practice in speaking.
- Train students in different interview and public speaking skills such as JAM, debate, role
- play, group discussion etc.
- Instill confidence and make them competent enough to express fluently and neutralize their mother tongue influence.

**Learning Outcomes:**
**By the end of the course students will be able to-**
- Better perception of nuances of English language through audio- visual experience.
- Neutralization of accent for intelligibility.
- Participate in group activities.
- Speaking skills with clarity and confidence which in turn enhances their employability.
- Apply effective communication skills in a variety of public and interpersonal settings

**Communicative English Language Lab (CELL) shall have two parts:**
a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab
**Listening Skills**
**Objectives**
a. Enable students develop their listening skills to appreciate its role in the LSRW skills approach to language and improve their pronunciation.
b. Equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.
Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.
- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

**Speaking Skills**
**Objectives**
a. Involve students in speaking activities in various contexts.
b. Enable students express themselves fluently and appropriately in social and professional contexts.
- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

- Group Discussions
- Debate

**Exercise – I**
**CALL Lab**: *Understand:* Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.
**ICS Lab**: *Understand:* Communication at Work Place- Spoken vs. Written language. *Practice:* Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

**Exercise – II**
**CALL Lab**: *Understand:* Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context. *Practice:* Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.
**ICS Lab**: *Understand:* Features of Good Conversation – Non-verbal Communication. *Practice:* Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

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

**Exercise – IV**
**CALL Lab**: *Understand:* Listening for General Details. *Practice:* Listening Comprehension Tests.
**ICS Lab**: *Understand:* Public Speaking – Exposure to Structured Talks. *Practice:* Making a Short Speech – Extempore.

**Exercise – V**
**CALL Lab:** *Understand:* Listening for Specific Details. *Practice:* Listening Comprehension Tests.
**ICS Lab**: *Understand:* Interview Skills. *Practice:* Mock Interviews.

**Reference Books:**
1. Kumar, S. & Lata, P. (2011). Communication Skills. Oxford University Press.
2. Balasubramanian, T. (2008). A Text book of English Phonetics for Indian Students, Macmillan.
3. Thorpe, E. (2006). Winning at Interviews, Pearson Education.
4. Sethi, J. et al. (2005). A Practical Course in English Pronunciation (with CD), Prentice Hall of
5. Effective Technical Communication by M Ashraf Rizvi

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

**Course Objectives:**

•       Understanding the importance of ecological balance for sustainable development.
•       Understanding the impacts of developmental activities and mitigation measures.
•       Understanding the environmental policies and regulations
•       Understanding the importance of natural resources
•       Understanding the different standards of environmental pollution

**Course Outcomes:** Based on this course, the Engineering graduate will
•       Understand the technologies on the basis of ecological principles
•       Apply the environmental regulations which in turn helps in sustainable development.
•       Understand  the various classifications of ecosystems and natural resources.
•       Apply environmental regulations to different acts.
•       Evaluate  the values of  social, ethical and aesthetic.

## UNIT-I
**Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, Field visits.

**Learning Outcomes:**
• Understand the importance of ecosystem.
• Explain the various classifications.
• Apply to different cycles.
• Analyse the importance field visit.
• Evaluate the flow of energy.

## UNIT-II
**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.
**Learning Outcomes:**
• Understand the importance of natural resources.
• Explain the various classifications of natural resources.
• Apply to different renewable resources.
• Analyse the usage of resources.
• Evaluate  the value of renewable and non renewable energy sources.

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

**Learning Outcomes:**
- Understand the importance of Biodiversity.
- Explain the types of Biodiversity.
- Apply to different Biotic Resources.
- Analyse the importance Biodiversity And Biotic Resources.
- Evaluate the values of social, ethical and aesthetic.

## UNIT-IV

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

**Learning Outcomes:**
- Understand the importance of Pollution and control technologies.
- Explain the classifications of pollutions.
- Apply to environment.
- Analyse the importance waste management.
- Evaluate the value of Ozone depletion and Ozone depleting substances.

## UNIT-V

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspectsAir Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects.Concepts of Environmental Management Plan (EMP). **TowardsSustainable Future:** Concept of Sustainable Development Goals, Population and itsexplosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building.

**Learning Outcomes:**
- Understand the importance of Environmental Policy, Legislation.
- Explain the various acts.
- Apply to different Environmental Management Plan.
- Analyse the importance of environmental education.
- Evaluate the value of green building.

**TEXT BOOKS:**

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

**REFERENCE BOOKS:**

1.      Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2.      Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3.      Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

# I - II

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

                                                                            **3  1  0  4**

**Course Objectives:** To learn
- Methods of solving the differential equations of 1st and higher order.
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, etc.
- Concept of Sequence and nature of the series.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

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

  **Co 1:** Identify whether the given differential equation of first order is exact or not

  **Co 2:** Solve higher differential equation and apply the concept of differential equation to real world problems.

  **Co3:** Analyse the nature of sequence and series.

  **Co 4:** Apply the del operator to vector and scalar valued functions.

  **Co5**: Evaluate the line, surface and volume integrals and converting them from one to Another.

**UNIT-I: First Order and First-Degree ODE and its applications**

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

**Learning outcomes**:
- Identify whether the given differential equation of first order is exact or not.
- Apply the concept of differential equation to real world problems.
- Understand theconepts of linear and Non linear differential equations.
- Analyze Exact and Non Exact differential equations.
- Explain formation of differential equations, Homogeneous equations.

**UNIT-II: Higher Order Linear Differential equations**

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $e^{ax}$, Sin ax, Cos ax, and $x^n$, $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

**Learning outcomes**:
- Identify essential characteristics of linear differential equations with constant coefficients.
- Apply higher order DE's for solving some real world problems.
- Understand the differential equations with constant coefficients by appropriate method.
- Analyse Legendre's equation and Cauchy-Euler equation.
- Explain Method of variation of parameters.

**UNIT-III: Sequences & Series**

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

**Learning outcomes**:
- Identify the Sequence, types of sequences.
- Apply the concept of sequence and series to real world problems.
- Understand the logical knowledge of forming the series.

- Analyzethe nature of sequence and series.
- Explain Alternating series.

## UNIT-IV: Vector Differential Calculus

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

**Learning outcomes**:
- Identify scalar and vector point functions.
- Apply Del to scalar and vector point functions.
- Understand the concepts of Solenoidal and irrotational vectors.
- Analyzethe physical interpretation of Gradient, Divergence and curl.
- Explain vector identies.

## UNIT-V: Vector Integral Calculus

Line integral-Work done, SurfaceIntegrals-Flux of a vector valued function and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

**Learning outcomes**:
- Identify the work done in moving a particle along the path over a force field.
- ApplyGreens, Stokes and Divergence theorems in evaluation of double and triple integrals.
- Understand the concepts of Line Integral.
- Analyze the Flux of a vector valued function.
- Explain Vector valued theorems to real world problems.

**TEXT BOOKS:**

1       B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

2       Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006

3       G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson,       Reprint, 2002.

**REFERENCES:**

1.      Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes

2.      S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

**2020008: ENGINEERING CHEMISTRY**

**B.Tech. I Year II Semester**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Course Objectives:**

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- Toimpartthebasicknowledgeofatomic,molecularandelectronicmodificationswhich makes the student to understand the technology based on them.
- Toacquiretheknowledgeofelectrochemistry,corrosionandwatertreatmentwhichare essential for the Engineers and in industry
- To acquiretheskillspertainingtospectroscopyandtoapplythemformedicalandother fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

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

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

**Unit - I:**

**Molecularstructure and Theories of Bonding:** Atomicand Molecularorbitals / Introductionof VBT. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals ofdiatomic molecules, molecular orbitalenergyleveldiagramsof $N_2$, $O_2$ and COmolecules.πmolecularorbitalsof1,3-butadiene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbitalsin tetrahedral, octahedral and square planargeometries. Applications of CFT. Band structureofsolids and effect of doping on conductance.

**Learning Outcomes:** At the end of this unit, the students will be able to

- Understand the Schrodinger wave equation to hydrogen and particle in a box.
- Explain the molecular orbital energy level diagram of different molecular species.
- Apply the band theory of solids for conductors, semiconductors and insulators.
- Analyze discuss the magnetic behavior and colour of complexes.
- Evaluate the Crystal Field theory and Splitting of d- orbital"s

**Unit - II:**

**Water and its treatment:** Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method, Numerical Problems on hardness of water. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization.Boiler troubels-scale andsludge, causticembrittlement, priming and foaming. Boiler feed water and its treatment– Calgonconditioning, Phosphate conditioning and colloidal conditioning. External treatment of water – Ion exchange process.Desalination of water – Reverse osmosis.

**Learning outcomes:** The student will be able to

● Understand the differences between temporary and permanent hardness of water.
● Explain the principles of reverse osmosis and Ion-Exchange processes.
● Apply the drinking water with BIS and WHO standards.
● Analyze problems associated with hard water - scale and sludge.
● Evaluate the Internal and external treatment of water.

## Unit - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods-Proper Design, Cathodic protection– Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroplating and electroless plating of Nickel.

**Learning outcomes: The student will be able to**

● Understand the Nernst equation for calculating electrode and cell potentials.
● Explain the corrosion prevention methods and factors affecting corrosion.
● Apply the Pilling Bedworth rule for corrosion and corrosion prevention.
● Analyze the Dry and Wet corrosion and its Mechanism.
● Evaluate the Corrosion control methods

## Unit - IV:

**Stereochemistry, Reaction Mechanism and synthesis of drug molecules:** Introduction to representation of 3-dimensional structures, Structural and stereoisomers, symmetry and chirality. Enantiomers, diastereomers, optical activity and configurational nomenclatures (D,L and R,S configurations) Conformational analysis of n- butane.
Substitution reactions: Nucleophilic substitution reactions: Mechanism of $S_N1$, $S_N2$ reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff‫'‬s additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$. Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Learning Outcomes: At the end of this unit, the students will be able to
● Understand the 3 dimension structures of organic chemistry
● Explain the symmetry , chirality of the organic molecule
● Apply the  Markownikoff and anti Markownikoff‫'‬s additions; Grignard additions
   conformations of n-butane
● Analyze the reaction mechanism of different compounds.
● Evaluate the synthesis of aspirin, paracetamol

**Unit - V:**

Spectroscopic techniques and applications: Principles of spectroscopy, selection rulesandapplications of electronic spectroscopy and IR Spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift, spin-spin splitting Introduction to Magneticresonanceimaging.

**Learning Outcomes:** At the end of this unit, the students will be able to
- Understand the. Principles of .spectroscopy and its selection rules
- Explain the concepts of nuclear magnetic resonance spectroscopy
- Apply the chemical shift values for the different compounds
- Analyze the different structures of organic compound
- Evaluate the vibrational and rotational spectroscopy

**Text Books:**
1. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P)Ltd., New Delhi.
2. Text Book of Engineering chemistry by Jaya Shree Anireddy: Wiley Publications.
3. Text Book of Engineering Chemistry by Prasanth Rath,B.Rama Devi and Ch.VenkataRamana Reddy : Cengage Publication 2019.

**Reference Books:**

1. Organic reaction Mechanism by Morrison and Boyd.
2. Fundamentals of Molecular Spectroscopy by C.N.Banwell
3. Inorganic Chemistry by J.D.Lee

**2020502: DATA STRUCTURES**

**B.TECH I Year IISem.**                                                     **L T P C**
                                                                                   **3  0  0  3**

**Prerequisites**

A course on "Programming for Problem Solving "

**Objectives**
- Exploring basic data structures such as linked list, stacks and queues.
- Describes searching and sorting techniques.
- Introduces trees and graphs.

**Outcomes**
- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for searching and sorting.
- Design programs using a variety of data structures- lists, stacks, queues, trees and graphs.

**UNIT - I** Introduction to Data Structures, Linear list – singly linked list, Doubly linked list, Circular linked list - operations and its applications

**UNIT-II**
Stacks- Introduction, Operations, array and linked representations of stacks, stack applications (Infix to postfix conversion and postfix evaluation), Queues-Introduction, operations, array and linked representations of queues and its applications.

**UNIT - III**
Searching: Linear Search and Binary Search and its applications.
Sorting: Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort and its applications.

**UNIT-IV**
Trees - Introduction, Types of trees, Binary tree, recursive and non- recursive Traversals of Binary Tree, Binary search tree- Operations and its applications.

**UNIT - V**
Graphs: Introduction, Types of graphs, Representation of graphs, Graph Traversal Methods, comparison between trees and graphs and its applications.

**Text Books**
1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.
**References**
1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning. 2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

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

**Pre Requisites:** Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

**Course Objective:**

- The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
- To prepare the student to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- To get exposure to a CAD package.

**Course Outcomes:**

1. Familiarize with BIS standards and conventions used in engineering graphics.
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc and construct various reduced scales e.g., plain and diagonal scale.
3. Develop the lateral surfaces of simple solids
4. Ability to draw orthographic projections and isometric projections of given engineering components.
5. Visualize different views like elevation and plan for a given line, plane figures or solid objects.
6. Apply drafting techniques and use 2D software e.g., AutoCAD to sketch 2D plane figures.

## UNIT – 1 INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

**Geometrical Constructions**: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts, Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

**Construction of Scales:** Plain, Diagonal and Vernier Scale.

**Conic Sections:** Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- General Methods only.

**Engineering Curves:** Cycloid, Epicycloid, Hypocycloid

**Involutes:** For Circle, Triangle, Square, Pentagon and Hexagon.

**Learning Outcome:**

1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing.
2. Learn and draw the various types of curves used in engineering application.

## UNIT – 2 ORTHOGRAPHIC PROJECTIONS

Principles- Assumptions- Different Angles of Projection.

**Projections of Points-** orientation in all the quadrants

**Projections of Lines-** Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Projections of Planes:** Surface Parallel, Perpendicular, Inclined to one plane and Inclined to both planes.

**Learning Outcome:**

1. Knowledge in various planes of projections
2. To draw the front view, top view and side views of the given geometrical elements

## UNIT – 3   PROJECTIONS OF SOLIDS

Classification of solids- Axis- Parallel, Perpendicular, Inclined to one plane and Inclined to both planes- Prisms, Pyramids, Cylinder and Cone

**Learning Outcome:**

1. To understand the various solid types
2. To draw all the views of the given solid in all possible orientations.

## UNIT – 4   SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Types of Section Planes, Sectioning Prisms, Pyramids, Cylinders and Cones using various planes.

Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

**Learning Outcome:**

1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned.
2. To develop the surfaces of solid using various methods.

## UNIT – 5 ISOMETRIC PROJECTIONS AND PERSPECTIVE PROJECTIONS

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection and vice versa.

**Learning Outcome:**

1. Knowledge in principles of isometric projection
2. Conversion of isometric to orthographic and vice-versa.

**Text Books:**

1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2e –,McGraw-Hill Education(India) Pvt.Ltd.

**References:**

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers
2. Engineering Drawing- Johle/Tata Macgraw Hill.
3. K.Veenugopal, –Engineering Drawing and Graphics + Autocad New Age International Pvt.Ltd, 2011.

## 2020073: ENGINEERING CHEMISTRY LAB

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

**Course Objectives:** The course consists of experiments related to the principles of chemistry required for engineering student.
The student will learn:
• Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
• To determine the rate constant of reactions from concentrations as an function of time.
• The measurement of physical properties like adsorption and viscosity.
• To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

**Course Outcomes:** The experiments will make the student to:
- Understand various procedures  for performing the experiments.
- Explain the different measuring devices and meters to record the data
- Apply the mathematical concepts and equations to obtain quality results.
- Analyze the analytical techniques and graphical analysis to the experimental data.
- Evaluate the various parameters for different experiments accurately.

**List of Experiments:**
1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry

**Conductometric titrations**
3. Strong acid $_{vs}$ strong base
4. Weak acid $_{vs}$ strong base

**Potentiometric titrations**
5. Strong acid $_{vs}$ strong base
6. Redox titration:-$Fe^{2+}$ using KMnO4
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography- calculation of Rf values. eg: ortho and para nitro phenols
10.. Determination of acid value of coconut oil
11. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
12. Determination of surface tension of a give liquid using stalagnometer

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

# 2020572: DATA STRUCTURES LAB

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

## Prerequisites:
A Course on "Programming for problem solving"

## Objectives
- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

## Outcomes
- Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

## List of Experiments
1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal

2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion

3. Write a program that uses functions to perform the following operations on circular linked       list: i) Creation ii) Insertion iii) Deletion

4. Write a program that implement stack operations using i) Arrays ii) Pointers

5. Write a c program to implement infix to postfix conversion using stack.

6. Write a c program to implement postfix evaluation.

7  Write a program that implement Queue operations using i) Arrays ii) Pointers
8   Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
9   Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Merge sort ii) Quick sort
10  Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search
11 Write a program to implement the tree traversal methods using both recursive and non-recursive.
12  Write a program to implement the graph traversal methods.

**Text Books**

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
 2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

**References**

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON.

# 2020372:ENGINEERING WORKSHOP

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

**COURSE OBJECT** :
1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, Equipment and machines

**UNIT – 1                    CARPENTRY & FITTING**

Carpentry – Introduction, Carpentry tools, sequence of operations, Trade importance, advantages, disadvantages  and applications
Fitting –  Introduction, fitting  tools, sequence of operations, Trade importance, advantages, disadvantages   and applications

**UNIT – 2         TIN SMITHY AND BLACKSMITHY**

Tin-Smithy –  Introduction, Tin smithy tools, sequence of operations, Trade importance, advantages, disadvantages   and applications
Black smithy- Introduction, Black smithy tools, sequence of operations, Trade importance, advantages, disadvantages and applications

**UNIT – 3      HOUSE WIRING AND WELDING**

House-wiring –  Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)
Welding Practice – Introduction, electrode, welding tools, and sequence of operations, advantages and applications  ( Arc Welding & Gas Welding)

LIST OF EXPERIMENTS:
1. Carpentry
2. Fitting
3. House Wiring
4. Tin smithy
5. Black smithy
6. welding
7.Foundry
TRADES FOR DEMONSTRATION & EXPOSURE:
1.Plumbing
2. Metal Cutting (Water Plasma), Power
   Tools In Construction And
3.  Wood Working

**TEXT BOOK :**
1.      Workshop Practice /B. L. Juneja / Cengage
2.      Workshop Manual / K. Venugopal / Anuradha


**REFERENCE BOOK :**
1.      Work shop Manual – P. Kannaiah/ K. L. Narayana/ SciTech
2.      Workshop Manual / Venkat Reddy/ BSP

**COURSE OUTCOMES :**
1. Explain the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)
2. .Demonstrate the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)
3. .Understand to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)
4. .Demonstrate the design and model various basic prototypes in the trade of Welding. (L4)
5. Explain to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)
6. Understand to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

# II - I

## 2036201-DIGITAL LOGIC DESIGN AND COMPUTER ORGANIZATION

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

**Objectives:**

- To understand the basic theoretical concepts of digital systems like the binary system and Boolean algebra.
- To express real life problem in logic design terminology.
- To use Boolean algebraic formulations to design digital systems. To design using combinational/sequential circuits
- To understand the Instruction execution stages.
- To explain the functions of the various computer hardware components.

**UNIT- I**
**Basic Structure of Computers:** Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations. Data Representation: Binary Numbers, Fixed Point Representation. Floating – Point Representation. Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes.

**UNIT- II**
**Digital Logic Circuits - I:** Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. Flip-flops, Combinational Circuits.

**Digital Logic Circuits - II:** Registers, Shift Registers, Binary counters, Decoders, Multiplexers, Programmable Logic Devices.

**UNIT- III**
**Computer Arithmetic:** Algorithms for fixed point and floating point addition, subtraction, multiplication and division operations. Hardware Implementation of arithmetic and logic operations, High performance arithmetic.

**Instruction Set & Addressing:** Memory Locations and Addresses, Machine addresses and sequencing, Various Addressing Modes, Instruction Formats, Basic Machine Instructions. IA-32 Pentium example.

**UNIT- IV**
**Processor Organization:** Introduction to CPU, Register Transfers, Execution of Instructions, Multiple Bus Organization, Hardwired Control, Microprogrammed Control Memory Organization: Concept of Memory, RAM, ROM memories, memory hierarchy, cache memories, virtual memory, secondary storage, memory management requirements.

**UNIT- V**
**Input / Output Organization:** Introduction to I/O, Interrupts- Hardware, Enabling and disabling Interrupts, Device Control, Direct memory access, buses, interface circuits, standard I/O Interfaces.

**TEXT BOOKS:**

1. Computer Organization – Carl Hamacher, ZvonkoVranesic, SafwatZaky, fifth edition, McGraw Hill.
2. Computer Architecture and Organization- An Integrated Approach, Miles Murdocca, Vincent Heuring, Second Edition, Wiley India.
3. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson.

**REFERENCE BOOKS:**

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
2. Computer- organization and Design- David A. Paterson and John L.Hennessy-Elsevier.
3. Fundamentals or Computer Organization and Design, - SivaramaDandamudi Springer Int. Edition.
4. Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
5. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

# 2036202 -DATABASE MANAGEMENT SYSTEMS
## (Common to CSE,IT,CSIT,CSM,CSD,CSC,EEE,ECE)

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

### Prerequisites
1. A course on "Data Structures"

### 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. Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

### Course Outcomes

1. Gain knowledge of fundamentals of DBMS, database design and normal forms
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques

### UNIT - I
**Database System Applications:** A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

**Introduction to Database Design**: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

### UNIT - II
**Introduction to the Relational Model**: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, Relational Algebra, Tuple relational Calculus, Domain relational calculus.

### UNIT - III
**SQL: Queries, Constraints, Triggers:**form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

**Schema refinement**: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, 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, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

**UNIT - V**

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations,  Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

**TEXT BOOKS**:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw hill, Vedition.

**REFERENCE BOOKS**:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3[rd]Edition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah,SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL andPL/SQL,Shah,PHI.

# 2036203-COMPUTER NETWORKS

**II YearB.Tech.I-Sem**                                                        **L T P C**
                                                                               **3 0 0 3**

**Objectives:**
1. To introduce the fundamental various types of computer networks.
2. To demonstrate the TCP/IP and OSI models with merits and demerits.
3. To introduce UDP and TCP Models.

**COURSE OUTCOMES :**
1. Students will be able to understand and explore the basics of computer networks and various protocols.
2. Students will be in a position to understand the World Wide Web concepts.
3. Students will be in a position to administrate a network and flow of information further
4. Students can understand easily the concept of network security, mobile and ad hoc networks.

**UNIT – I**
Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

**UNIT – II**
Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

**UNIT – III**
Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Routing Protocols: Distance Vector Routing, Link state Routing, Path vector Routing

**UNIT – IV**
Transport Layer: Process to Process Delivery, UDP, TCP:  TCP Segments, TCP Connection, TCP sliding window, Data Traffic, Congestion, Congestion Control, QoS, QoS in Switched Networks.

**UNIT – V**
Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

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

**REFERENCES BOOKS:**
1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Edication.

2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

## 2030004:PROBABILITY AND STATISTICS

<div align="right">

**L T P C**
**3 0 0 3**

</div>

**B.Tech. II Year I Semester**

**Course Objectives:** To learn

- The ideas of probability and random variables and various discrete and continuous probability distributions and theirproperties.
- The basic ideas of statistics including measures of central tendency.
- The statistical methods of studying datasamples.
- The sampling theory and testing of hypothesis and making inferences.

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

- Formulate and solve problems involving random variables and apply statistical methods for analysing experimentaldata.
- Apply discrete and continuous probability distributions.
- Classify the concepts of data science and its importance.
- Infer the statistical inferential methods based on small and large sampling tests.
- Interpret the association of characteristics through correlation and regression tools.

### UNIT-I: Probability and Random Variables
**Probability:** Sample Space, Events, Probability of an Event, Additive Rules, conditional probability, independent events, Product Rule and Bayes' theorem.
**Random variables:** Discrete and continuous random variables. Expectation, Mean and Variance of random variables. Chebyshev's inequality.

### UNIT-II:  Probability Distributions & Estimation

Probability distribution-Binomial, Poisson approximation to the binomial distribution, uniform, exponential and Normal distribution. Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

### UNIT-III:  Sampling theory and Small samples
Population and sample, parameters and statistics; sampling distribution of means ($\sigma$ known)-central limit theorem, t-distribution, sampling distribution of means ($\sigma$ unknown)-sampling distribution of variances-chi-square and F-distributions.

### UNIT-IV: Testing of Hypothesis & Stochastic Process:
Testing of Hypothesis: Large sample test for single proportion, difference of proportions, single mean, difference of means.
 Stochastic process: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n- step transition

probabilities, Markov chain, Steady state condition, Markov analysis.


**UNIT-V: Curve Fitting for Statistical Data**

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.


**TEXTBOOKS:**
1.  Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.
2.   Fundamentals of Mathematical Statistics, Khanna Publications, S C Guptas and V.K. Kapoor.
**REFERENCES:**
1.  Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, PearsonEducations
    S. Ross, A First Course in Probability, 6th Ed., Pearson Education India,2002

## 2036204-PYTHON PROGRAMMING

## (Common to All Branches)

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

**Course Objectives:**
1. Handle Strings and Files in Python.
2. Understand Lists, Dictionaries and Regular expressions in Python.
3. Understand FILES, Multithread programming in Python.

**Course Outcomes:**
1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists,

Dictionaries and use Regular Expressions.
.

## UNIT - I
Python Introduction, History & Installing of Python, Python basics, Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions.
Control structures

## UNIT - II
Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types. Iterators, List comprehensions, Generator Expressions

## UNIT-III
**FILES**: File Objects, File Built-in Functions, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

## UNIT-IV
**Exceptions**: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Exceptions and the sys Module, Modules and Files, Namespaces, Importing Modules, Importing Module Attributes,

**Multithreaded Programming**: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

## UNIT – V
**GUI Programming**: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

**Regular Expressions**: Introduction, Special Symbols and Characters, Res and Python

**TEXT BOOKS**:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

**REFERENCE BOOKS**:

2. Think Python, Allen Downey, Green Tea Press
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. Python Programming: A Modern Approach, VamsiKurama, Pearson
5. Learning Python, Mark Lutz, O'Really.

## 2036271-DATABASE MANAGEMENT SYSTEMS LAB
## (Common to CSE,IT,CSIT,CSM,CSD,CSC,EEE,ECE)

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

### Course Objectives
1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation

### Course Outcomes
1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers

### List of Experiments

1   Concept design with E-R Model

2   Relational Model

3   Normalization

4   Practicing  DDL commands

5   Practicing  DML commands

6   Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)

7   Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.

8   Triggers (Creation of insert trigger, delete trigger, update trigger)

9   Procedures

10  Usage of Cursors

### TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw hill, Vedition.

### REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rdEdition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah,SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
5.

# 2036272-COMPUTER NETWORKS LAB

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

**Objectives**
1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its performance
3. To analyze the traffic flow and the contents of protocol frames

**Outcomes**
1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. To be able to work with different network tools

## List of Experiments

1. Implementthedatalinklayerframingmethodssuchascharacter,character-stuffingandbitstuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRCCCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-Nmechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
**10. Wireshark**
    i. Packet Capture Using Wireshark
    ii. Starting Wireshark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics &Filters.
11. How to run Nmapscan
12. Operating System Detection usingNmap
13. Do the following using NS2Simulator
    i. NS2Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate& Throughput.
    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with respect to Transmission of Packets

**Text Book**
1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

**References**

1. AnEngineeringApproachtoComputerNetworks,S.Keshav,2$^{nd}$Edition,Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition,TMH.

# 2036273-PYTHON PROGRAMMING LAB

## (Common to all branches)

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

                                                                          **0 0  3 1.5**

### Exercise 1 - Basics
a)   Running instructions in Interactive interpreter and a Python Script
b)   Write a program to purposefully raise Indentation Error and Correct it

### Exercise 2 -Operations
a)   Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

### Exercise - 3 Control Flow
a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

### Exercise 4 - Control Flow -Continued
a) Find the sum of all the primes below two million.
   Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

### Exercise - 5 Files
a) Write a program to print each line of a file in reverse order.
b) Write a program to compute the number of characters, words and lines in a file.

### Exercise - 6 Functions
a) Write a function ballcollide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
   Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius
   If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
b) Find mean, median, mode for the given set of numbers in a list.

### Exercise - 7 Functions - Continued
a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
b) Write a function dups to find all duplicates in the list.
c) Write a function unique to find all the unique elements of a list.

### Exercise - 8 - Functions - Problem Solving
a) Write a function cumulative_ product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute GCD, LCM of two numbers. Each function shouldn't exceed one line.

**Exercise 9 - Multi-D Lists**

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

**Exercise - 10 GUI, Graphics**

a) Write a GUI for an Expression Calculator usingtk

b) Write a program to implement the following figures using turtle
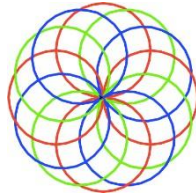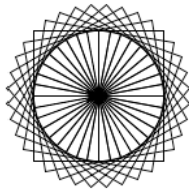
<div align="center">**2030025:Gender Sensitization**</div>

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

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

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

**UNIT – I**

**UNDERSTANDING GENDER**
**Gender:** Why Should We Study It? (*Towards a World of Equals:* Unit -1)
**Socialization:** Making Women, Making Men (*Towards a World of Equals:* Unit -2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste.
Different Masculinities.

**UNIT - II**
**GENDER AND BIOLOGY**
**Missing Women:** Sex Selection and Its Consequences (*Towards a World of Equals:* Unit -4)
Declining Sex Ratio. Demographic Consequences.
**Gender Spectrum:** Beyond the Binary (*Towards a World of Equals:* Unit -10)
Two or Many? Struggles with Discrimination.

**UNIT - III**
**GENDER AND LABOUR**
**Housework:** the Invisible Labour (*Towards a World of Equals:* Unit -3)
"My Mother doesn't Work." "Share the Load."
**Women's Work:** Its Politics and Economics (*Towards a World of Equals:* Unit -7)
Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

**UNIT - IV**
**ISSUES OF VIOLENCE**
**Sexual Harassment:** Say No! (*Towards a World of Equals:* Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further
Reading: "Chupulu".
**Domestic Violence:** Speaking Out (*Towards a World of Equals:* Unit -8)
Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional
Reading: New Forums for Justice.
Thinking about Sexual Violence (*Towards a World of Equals:* Unit -11)
Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face
of Violence.

**UNIT – V**
**GENDER: CO - EXISTENCE**
**Just Relationships:** Being Together as Equals (*Towards a World of Equals:* Unit -12)
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and
Fathers. Additional Reading: Rosa Parks-The Brave Heart.

**TEXTBOOK**
All the five Units in the Textbook, **"*Towards a World of Equals: A Bilingual Textbook
on Gender*"** written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama
Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie
Tharu and published by **Telugu Akademi, Hyderabad**,Telangana State in the year **2015**.

**REFERENCE BOOKS:**

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online
   at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

# II-II

## 2040201: BASIC ELECTRICAL ENGINEERING
### (Common for ECE, CSE, CSC,CSD, CSM, CSIT & IT)

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

**Course Prerequisites:** Nil
**Course Objectives:**
- To analyse and solve electric circuits.
- To provide an understanding of basics in Electrical circuits.
- To identify the types of electrical machines for a given application.
- To explain the working principles of Electrical Machines and single phase transformers.

**Course Outcomes**
After completion of this course the student is able to
- Analyse Electrical circuits to compute and measure the parameters of Electrical Energy.
- Comprehend the working principles of Electrical DC Machines.
- Identify and test various electrical switchgear, single phase transformers and assess the ratings needed in given application.
- Comprehend the working principles of electrical AC machines.

**UNIT-I DC Circuits**:
Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin's and Norton's Theorems.

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

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

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

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

**Text Books:**
1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshaiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

**Reference Books:**

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari& I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.

Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson

# 2046205 AUTOMATA THERY AND LANGUAGE PROCESSORS

**B.Tech. II Year II Sem.**

|  | L | T/P | C |
|---|---|---|---|
|  | 3 | 0/0 | 3 |

Course Objectives:

- To understand the various phases in the design of a compiler.
- To understand the design of top-down and bottom-up parsers.
- To understand syntax directed translation schemes.
- To introduce LEX and YACC tools.
- To learn to develop algorithms to generate code for a target machine.

Course Outcomes:

- Ability to design, develop, and implement a compiler for any language.
- Able to use LEX and YACC tools for developing a scanner and a parser.
- Able to design and implement LL and LR parsers.
- Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
- Ability to design algorithms to generate machine code

## UNIT-I

**Formal Language and Regular Expressions:** Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA toDFA.

**Context Free grammars:** Context free grammars, derivation, parse trees, ambiguous grammar.

## UNIT-II

**Language Processors and parsing: Language** Processors, the structure of a compiler, the science of building a compiler, programming language basics. Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex. Bottom-up parsing handle pruning LR Grammar Parsing, LALR parsing.

## UNIT-III

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

## UNIT-IV

**Code optimization:** Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs.

## UNIT-V

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

## TEXTBOOKS:

1. Introduction to Theory of computation. Sipser,2nd Edition,Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

**REFERENCES** :

1. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
2. Compiler Construction, LOUDEN, Thomson.

**REFERENCES** :
1. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
2. Compiler Construction, LOUDEN, Thomson.

## 2046206-DISCRETE MATHAMATICS
## (Common to CSE,IT,CSIT,CSM,CSD,CSC)

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

                                                        3   1/0   4

**Course Objectives:**
1. To introduce the concepts of mathematical logic.
2. To introduce the concepts of sets, relations, and functions.
3. To perform the operations associated with sets, functions, and relations.
4. To introduce generating functions and recurrence relations.
5. To use Graph Theory for solving problems.

**Course Outcomes**
1. Ability to apply mathematical logic to solve problems.
2. Understand sets, relations, functions, and discrete structures.
3. Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
4. Able to formulate problems and solve recurrence relations.
5. Able to model and solve real-world problems using graphs and trees.

## UNIT - I
**Mathematical logic:** propositional logic, Statements and Notation, logical Connectives, logical equivalence, Normal Forms.Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

## UNIT - II
**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.
Functions, types of functions, inverse of a function.

## UNIT - III
**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-
Exclusion.
**Induction and Recursion**
Mathematical Induction,Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms.

## UNIT - IV
**Recurrence Relations:** Generating Functions of Sequences, Calculating Coefficients of
generating functions, Recurrence relations, Solving recurrence relations by substitution, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations, Divide-and-Conquer Algorithms.

**UNIT - V**

**Graph Theory:** Basic Concepts, Isomorphisms and Subgraphs, Spanning Trees and their Properties, Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers.

**TEXT BOOKS:**
1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. **(UNITS - I ,II )**
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. **(Units - III, IV, V )**
3.

**REFERENCE BOOKS:**
1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGrawHill education (India) Private Limited

# 2046207-JAVA PROGRAMMING

## (Common to All Branches)

**B.Tech. II Year II Sem.**

L T P C
3 0 0 3

**Prerequisites**

1. A course on

**Course Objectives:**

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts, and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
4. To introduce the implementation of packages and interfaces.
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls.

**Course Outcomes:**

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using java collection framework and I/o classes.
4. Able to develop multithreaded applications with synchronization.
5. Able to develop applets for web applications.
6. Able to design GUI based applications

## UNIT-I:

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program,

Functions, Recursion, Enumeration. concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

## UNIT II:

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

**UNIT III**:
Exception handling and Multithreading—Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling,Exploringjava.util.Differences between multi threading and multitasking, thread life cycle,creating threads, thread priorities, synchronizing threads, interthread communication, thread groups, daemon threads.

**UNIT IV:**
Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

**UNIT V :**
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- Japplet, Jframe and Jcomponent, Icons and Labels, text fields, buttons – The Jbutton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables

**TEXT BOOKS:**
1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

**REFERENCE BOOKS**:
1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

## 2046208-Cryptography & Network Security

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

**Objectives**
 1. To impart knowledge on network security issues, services, goals and mechanisms.
 2. To analyze the security of communication systems, networks and protocols.
3. To apply algorithms used for secure transactions in real world applications

**Outcomes**
1. Demonstrate the knowledge of cryptography and network security concepts and applications.
2. Ability to apply security principles in system design.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

**UNIT-I:**
Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric andasymmetric key cryptography, steganography, key range and key size, possible types ofattacks.

**UNIT-II:**
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC4, RC5, Blockcipher operation, Stream ciphers, Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, ElgamalCryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

**UNIT-III:**
Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA512), Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme. Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

**UNIT-IV:**
Email privacy: Pretty Good Privacy (PGP) and S/MIME. IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

**UNIT-V:**
 Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET). Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

Text Books: 1. "Cryptography and Network Security" by William Stallings 3rd Edition, Pearson Education. 2. "Applied Cryptography" by Bruce Schneier.
References: 1. Cryptography and Network Security by Behrouz A.Forouzan.

## 2046209-CYBER LAWS AND ETHICS

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

**Course Objectives**
1. To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
2. To develop some ideas of the legal and practical aspects of their profession.

**Course Outcomes**
1. The students will understand the importance of professional practice, Law and Ethics in their personal lives and professional careers.
2. The students will learn the rights and responsibilities as an employee, team member and a global citizen

**UNIT-I**
Introduction to Computer Security: Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity.

**UNIT-II**
Secure System Planning and administration, Introduction to the orange book, Security policy requirements, accountability, assurance and documentation requirements, Network Security, The Red book and Government network evaluations.

**UNIT-III**
Information security policies and procedures:  Corporate policies- Tier 1, Tier 2 and Tier3 policies - process management-planning and preparation-developing policies-asset classification policy developing standards.

**UNIT- IV**
Information security: fundamentals-Employee responsibilities- information classification Information handling- Tools of information security- Information processing-secure program administration.

**UNIT-V**
Organizational and Human Security**:** Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals.

**REFERENCES:**
1. Debby Russell and Sr. G. T Gangemi, "Computer Security Basics (Paperback)", 2nd Edition, O' Reilly Media, 2006.
2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.
4. Thomas R Peltier, Justin Peltier and John blackley," Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996
5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997 6. James Graham, "Cyber Security Essentials" Averbach Publication T & F Group.

**B.TECH II Year II Sem.**                                                    **L T P C**
                                                                             **0  0  2 1**

**Course Objectives:**
To analyze a given network by applying various electrical laws and network theorems
   - To know the response of electrical circuits for different excitations
   - To calculate, measure and know the relation between basic electrical parameters.
   - To analyze the performance characteristics of DC and AC electrical machines

**Course Outcomes:**
   - Get an exposure to basic electrical laws.
   - Understand the response of different types of electrical circuits to different excitations.
   - Understand the measurement, calculation and relation between the basic electrical parameters
   - Understand the basic characteristics of transformers and electrical machines.

**List of experiments/demonstrations:**
   1. Verification of Ohms Law
   2. Verification of KVL and KCL
   3. Verification of superposition theorem.
   4. Verification of Thevenin's and Norton's theorem.
   5. Resonance in series RLC circuit.
   6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
   7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer.
   8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
   9. Three Phase Transformer: Verification of Relationship between Voltagesand Currents (Star-Delta, Delta-Delta, Delta-star,Star-Star)
   10. Measurement of Active and Reactive Power in a balanced Three-phase circuit.
   11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
   12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
   13. Performance Characteristics of a Three-phase Induction Motor.
   14. Torque-Speed Characteristics of a Three-phase Induction Motor.
   15. No-Load Characteristics of a Three-phase Alternator.

# 2046274-Cryptography and Network Security Lab

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

## List of Experiments

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.

2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.

3.  Write a Java program to perform encryption and decryption using the following algorithms a. Ceaser cipher b. Substitution cipher c. Hill Cipher

4. Write a C/JAVA program to implement the DES algorithm logic.

5. Write a C/JAVA program to implement the Blowfish algorithm logic.

6. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.

7. Write a Java program to implement RSA algorithm.

8. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.

9. Calculate the message digest of a text using the SHA-1 algorithm in JAVA. 1

10. Calculate the message digest of a text using the MD5 algorithm in JAVA

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

**Course Objectives:**
- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

**Course Outcomes:**
- Able to write programs for solving real world problems using java collection frame
- work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

1. a)Use Eclipse or Net bean platform and acquaint with the various menus. Create a testproject, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
   b) Write a java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.
   c) Write a java program to implement Fibonacci series.

2. a) Write a java program to implement method overloading and constructors overloading.
   b).Write a java program to implement method overriding.

3. a) Write a java program to check whether a given string is palindrome.
   b)Write a Java program to create an abstract class named Shape that contains twointegers and an empty method named print Area (). Provide three classes namedRectangle, Triangle, and Circle such that each one of the classes extends the classShape. Each one of the classes contains only the method print Area () that prints thearea of the given shape.

4. a) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
   b) Write a java program to create user defined exception class and test this class.

5. a) Write a Java program to list all the files in a directory including the files present in allits subdirectories.
   b) Write a java program that displays the number of characters, lines and words in a text file.

6. a) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the

third thread will print the value of cube of the number.
b) Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

7. Suppose that a table named Table.txt is stored in a text file. The first line in the file isthe header, and the remaining lines correspond to rows in the table. The elements areseparated by commas. Write a java program to display the table using Labels in GridLayout.

8. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

9. a)Write a Java program that handles all mouse events and shows the event name at thecenter of the window when a mouse event is fired (Use Adapter classes).
b) Write a java program to demonstrate the key event handlers.

10. a) Develop an applet in Java that displays a simple message.
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

11. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

12. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.

13. Develop Swing application which uses JList, JTree, JTable, JTabbedPane and JScrollPane.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

**REFERENCE BOOKS**
1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell,

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

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular politicalideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism"in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static"and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

**Course content**
1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and
    the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure

10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

# III-I

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

**(AUTONOMOUS)**

**2051202: DATABASE SECURITY**

| | L | T | P | C |
|---|---|---|---|---|
| **III Year B.Tech. CS I – Sem.** | 3 | 0 | 0 | 3 |

**Prerequisites**:
- A course on "Data Base Management Systems".
- A course on "Operating Systems".

**Course Objectives:**
- To explain Security Fundaments and Security Architecture.
- To Understand Creating and Managing Users, Creating and Managing Passwords.
- To study the Database Security Models and Virtual Private Databases.

**Course Outcomes:** The students will be able to:
- Understand the concepts of Security Architecture and its Components
- Ability to create and manage Users and Passwords using SQL.
- Understand the Database Security Models.

**UNIT-I**
**Security Architecture:** Introduction, Security, Information Systems, Database Management Systems, Information Security,. Information Security Architecture, Database Security, Asset Types and their values, Security Methods.
**Operating System Security Fundamentals:** Operating System(OS) Overview, Operating System Security Environment, Components of an OS Security Environment, Authentication Methods, User Administration, Password Policies, Vulnerabilities of OS, E-Mail Security.

**UNIT-II**
**Administration of Users:** Introduction, Documentation of User Administration, OS Authentication, Creating users, Creating a SQL Server Users, Removing Users, Modifying Users, Default Users, Remote Users, Database Links, Linked Servers, Remote Servers, Practices for Administrators and Managers. Best Practices.

**UNIT–III**
**Profiles, Password Policies, Privileges and Roles**: Introduction, Defining and Using Profiles, Designing and Implementing Password Policies, Granting and Revoking User Privileges, Creating Assigning and Revoking User Roles. Best Practices.

**UNIT–IV**
Database Application Security Models– Introduction, Types of Users, Security Models- Types of users, access matrix model, access modes model, commonly used application types. Classes of access control: Discretionary access control (DAC), Mandatory access control (MAC) and Role based Access control (RBAC); Application Types, Application Security Models, Data Encryption, Pharmacy Application.

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**UNIT-V**

Virtual Private Databases- Introduction, Overview of Virtual Private Databases(VPD), Implementing a VPD Using Views, Implementing a VPD Using Application Context in Oracle, Implementing Oracle VPD, Viewing VPD Policies and Application Contexts, Using Policy Manager, Implementing Row and Column level Security with SQL Server.

**TEXT BOOKS:**

1. Database Security and Auditing: Protecting Data Integrity and Accessibility – Hassan A. Afyouni - Cengage Learning.

**REFERENCES:**

1. Silvano Castano, Fugini, Martella, Samarati, Database Security, Addison Wesley, 1994.
2. M. Gertz, S. Jajodia, Handbook of Database Security, Springer, 2008

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**
**(AUTONOMOUS)**
**2050010: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS**

| **III Year B.Tech. CS I – Sem.** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| | **3** | **0** | **0** | **3** |

**Prerequisites**: A Course on "Data Structure and Linear Algebra".

**Course Objectives:**
- To learn the basic Business types, impact of the Economy on Business and Firms specifically.
- To analyze the Business from the Financial Perspective.

**Course Outcomes:**
- The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm‚s financial position by analyzing the Financial Statements of a Company

**UNIT-I**
**Introduction to Business and Economics:** Business: Structure of Business Firm, Types of Business Entities, Limited Liability Companies, Economics: Significance of Economics, Micro and Macro Economic Concepts, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist
**Course outcomes:**
By going through this unit, technical students can have the scope of learning about different economic concepts, business cycles and nature of business economists.

**UNIT – II**
**Demand Analysis:** Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Demand Forecasting: Steps in Demand Forecasting, Methods of Demand Forecasting.
**Course outcomes:**
By going through this content, student can learn about different types of demand, its determinants and elasticity of demand concepts thoroughly and how to forecast the demand of different things by using different agreed upon techniques.

**UNIT - III**
**Production, Cost, Market Structures & Pricing:** Production Analysis: Factors of Production, Production Function, Different Types of Production Functions. Cost analysis: Types of Costs, Short run and Long run Cost Functions. Market Structures: Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition. Pricing: Types of Pricing, Break Even Analysis, and Cost Volume Profit Analysis.
**Course outcomes**:
By reading this chapter, student can learn different pricing techniques in different market structures and different cost functions that determine products life cycle in a long term basis.

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**UNIT – IV**

**Capital Budgeting:** Importance of Capital Budgeting, methods of Capital Budgeting: Traditional Methods: Pay Back Period, Accounting Rate of Return, and Discounting Methods: Net Present Value, Profitability Index, Internal Rate of Return; Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).

**Course outcomes:**

By going thoroughly through this unit, students can have the scope of learning about different techniques by which a project can be evaluated from financials perspective and utilization of ratios at different times to assess the business position for decision making.

**UNIT - V**

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, and Preparation of Final Accounts.

**Course outcomes:**

Students can learn the methodology of accounting cycle which is valid from stakeholders„ point of view and they can learn the comparison of the different firms at a time, so that they can take appropriate decision of either investment or to become an entrepreneur.

**TEXT BOOKS:**

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.
4. I.M. Pandey, Financial Management, 11th Edition, Kindle Edition, 2015.

**REFERENCES:**

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013

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## 2050510: OPERATING SYSTEMS

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

                                                     **3  0  0  3**

**Prerequisites**:
- A course on "Programming for Problem Solving".
- A course on "Computer Organization and Architecture

**Course Objectives:**
- Provide an in introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interposes communication and I/O in Unix

**Course Outcomes: The students should be able to**
- .Control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

**UNIT-I**

**Operating System Introduction**: What is an operating system do, computer system organization, computer system architecture, operating system structure- operating system operations, process management, memory management, operating system services, System Calls, types of system calls.

**UNIT-II**

**Process** :.-process concepts, process scheduling, operations on processes ,Inter processes communication, multithreading models, thread libraries.

**Process Scheduling**:-Scheduling criteria, scheduling algorithms, thread scheduling Multiple-Processor Scheduling.

**UNIT–III**

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

**Synchronization**: - back ground, the critical section problem, peter's solution, Synchronization hardware, semaphores, Classical Problems of Synchronization, Monitors.

**UNIT–IV**

**Memory Management and Virtual Memory** –background, Swapping, Contiguous Allocation,

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Paging structure of the page table, Segmentation.

**Virtual memory**:-background, demand paging page replacement allocation of frames thrashing.

## UNIT-V

**File System** : –File system and implementing file system, file concept access methods, directory and file system structure, File system implementation, Directory implementation, Allocation methods, Free-space Management, efficiency and performance, recovery, NFS.

## TEXTBOOKS:

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.

## REFERENCES:

1. Operating Systems – Internals and Design Principles, Stallings, 5th Edition, Pearson Education/PHI,2005.
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

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## 2050513: SOFTWARE ENGINEERING

**III Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**
- A course on "Data Base Management Systems"

**Course Objectives:**
- To provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- To understand process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams.

**Course Outcomes:** The students will be able to:
- Translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Develop a simple testing report

**UNIT-I**
**INTRODUCTION TO SOFTWARE ENGINEERING**: The Evolving Role of Software, Software, Characteristics of Software, The Changing Nature of Software, Legacy 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, Agile models: Extreme Programming, and Scrum.

**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**.**

**UNIT–III**
**System models**: Context models, behavioral models, data models, object models, structured methods
**Design Engineering:** Design process and design quality, design concepts, the design model, software architecture, Architectural styles and patterns.
**Introduction to UML**:  Basic Building Blocks of UML- Things, Relationships and Diagrams**.**

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**UNIT–IV**

**Testing Strategies**: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, verification and validation testing, system testing, the art of debugging.

**Metrics for Process and Products**: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance, metrics for software quality.

**UNIT-V**

**Risk management**: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

**Quality Management**: Quality concepts, software quality assurance, software reviews, formal technical reviews, software reliability, the ISO 9000 quality standards**.**

**TEXTBOOKS:**

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommer ville, 7th edition, Pearson Education.
3. The unified modelling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

**REFERENCES:**

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

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**(AUTONOMOUS)**
**2056272: DATABASE SECURITY LAB**

| **III Year B.Tech. CS I – Sem.** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| | **0** | **0** | **3** | **1.5** |

**Prerequisites**:
- A course on "Data Base Management Systems".
- A course on "Operating Systems".

**Course Objectives:**
- To explain Security Fundaments and Security Architecture.
- To Understand Creating and Managing Users, Creating and Managing Passwords.
- To study the Database Security Models and Virtual Private Databases.

**Course Outcomes:** The students will be able to:
- Understand the concepts of Security Architecture and its Components
- Ability to create and manage Users and Passwords using SQL.
- Understand the Database Security Models.

**List of experiments:**

1. Creation and manipulation of database using SQL scripts and graphical interfaces.
2. Creating and managing users in My-SQL using Database Authentication
3. Creating and managing users in My-SQL using External Authentication
4. Creating and managing users in My-SQL using Global Authentication.
5. Design and Implement password policies in MY-SQL
6. Grant and revoke permissions in MY-SQL
7. Implementing DAC: Implementation of database security policies using DAC in My-Sql
8. Implementing of MAC to ensure confidentiality using either My-SQL or SQL server.
9. Implementing of MAC to control information flow using either My-SQL or SQL server
10. Implementation of Virtual Private Database using View using  My-SQL or SQL server
11. Implementing Row and Column Level security with MY-SQL

**TEXT BOOKS**:
1. Database Security and Auditing: Protecting Data Integrity and Accessibility – Hassan A. Afyouni - Cengage Learning.

**REFERENCES:**
1. Silvano Castano, Fugini, Martella, Samarati, Database Security, Addison Wesley, 1994.
2.  M. Gertz, S. Jajodia, Handbook of Database Security, Springer, 2008

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

**(AUTONOMOUS)**

**2050579: OPERATING SYSTEMS LAB**

**III YEAR I SEMESTER**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Prerequisites:**

- A course on "Programming for Problem Solving"
- A course on "Computer Organization and Architecture".

**Course Objectives**

- To provide an understanding of the design aspects of operating system concepts through simulation.
- Introduce basic Unix commands, system call interface for process management, interposes communication and I/O in Unix.

**Course Outcomes:** The students will be able to:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Implement C programs using Unix system calls.

**LIST OF EXPERIMENTS**

1. Write C programs to simulate the following CPU Scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system
   (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques
   a) Paging b) Segmentation

**TEXTBOOKS:**

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.

**REFERENCEBOOKS:**

1. Operating Systems – Internals and Design Principles 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

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

**(AUTONOMOUS)**
**2056673: CASE TOOLS LAB**

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

                                                                    **0   0   2   1**

### Course Objectives:
- To understand how UML supports the entire OOAD process.
- To become familiar with all phases of OOAD.
- To understand different software testing tools and their features

**Course Outcomes**: The students should be able to

- Understand the history, cost of using and building CASE tools.
- Construct and evaluate hybrid CASE tools by integrating existing tools.

### LIST OF EXPERIMENTS
Students have to draw the following diagrams using UML for an ATM system whosedescription is given below.

1. **UML diagrams to be developed are*:***
   1. Use Case Diagram.
   2. Class Diagram.
   3. Sequence Diagram.
   4. Collaboration Diagram.
   5. State Diagram
   6. Activity Diagram.
   7. Component Diagram
   8. Deployment Diagram.
   9. Test Design.

2. **Description for an ATM System:** The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot  for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for  this problem).

3. The ATM will service one customer at a time. A customer will be  required to insert an ATM card and enter a personal identification number (PIN) —  both of which will be sent to the bank for validation as part of each transaction. The  customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be  returned  - except as noted below.
   1. The ATM must be able to provide the following services to the customer:A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs.1000. Approval must be obtained from the bank before cash is dispensed.

2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.

3. A customer must be able to make a transfer of money between any two accounts linked to the card.

4. A customer must be able to make a balance inquiry of any account linked to the card.

5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

6. The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank onceit has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope with in the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have tocontact the bank to get it back. If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction. The ATM will provide the customer with a printed receipt for each successful transaction

7. The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the "on" position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the "off" position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

**TEXT BOOK:**
1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

**REFERENCES:**
1. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

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**(AUTONOMOUS)**

**2020024: INTELLECTUAL PROPERTY RIGHTS**

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

　　　　　　　　　　　　　　　　　　　　　　　　　　　　**2　0　0　0**

### UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

### UNIT – II

**Trade Marks:** Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

### UNIT – III

**Law of copy rights:** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law. Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer.

### UNIT – IV

**Trade Secrets:** Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation. Unfair competition: Misappropriation right of publicity, false advertising.

### UNIT – V

**New development of intellectual property:** new developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international – trade mark law, copy right law, international patent law, and international development in trade secrets law.

### TEXT & REFERENCE BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd

# III–II

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**
**(AUTONOMOUS)**
**2066203: CLOUD COMPUTING**

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

                                                                   **3   0   0   3**

**Prerequisites:** Nil

**Course Objectives*:***
- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.

**Course Outcomes:** The students should be able to
- Understand the virtualization and cloud computing concepts.
- Analyze and understand the functioning of different components involved in Amazon Web services cloud platform.

**UNIT-I**
Introduction to Cloud Computing, Evolution of Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Cloud Computing is a Service, Cloud Computing is a Platform, Principles of Cloud Computing, Five Essential Characteristics

**UNIT-II**
Four Cloud Deployment Models, Cloud Architecture-Layer, Anatomy of the Cloud,
Network Connectivity in the Cloud Computing, Application on the cloud, Managing the Cloud Infrastructure, Managing the Cloud Applications, Migrating Applications to Cloud, Phases for Cloud Migrations, Approaches for cloud migrations.

**UNIT–III**
**Cloud Service Models**: Infrastructure as a Service(IaaS) Characteristics, Suitability, Pros and Cons of IaaS, Platform as a Service(PaaS) Characteristics, Suitability, Pros and Cons of PaaS, Software as a Service(SaaS) Characteristics, Suitability, Pros and Cons of SaaS, Summary of IaaS,PaaS and SaaS, Other Cloud Service Models.

**UNIT–IV**
**Cloud Service Providers**: EMC , EMCIT , Captiva Toolkit, GCP – Google Cloud Platform, Google cloud Storage, Google cloud connect, Google cloud print, Google App Engine.

**UNIT-V**
AWS- Amazon Web Services-Amazon Elastic Compute Cloud(EC2) ,Amazon Simple Storage Service(S3), Amazon Simple Queue Service (SQS), Microsoft Windows Azure, MS Assessment and Planning Toolkit, Sharepoint, IBM Cloud Models, IBM Smart Cloud.

**TEXT BOOKS:**
1. Essentials of Cloud Computing - K. Chandrasekhran, CRC Press, 2014
**REFERENCES:**
1. Cloud Computing: Implementation, Managing, and Security -John W. Rittinghouse & James F. Ransom

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**2060508: DESIGN AND ANALYSIS OF ALGORITHMS**

| III Year B.Tech. CS II – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 3 | 0 | 0 | 3 |

**Prerequisites**: A Course on Programming for problem solving and Data Structures

**Course Objectives:**
- Introduces the notations for analysis of the performance of algorithms.
- Introduces the data structure disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate.
- Describes how to evaluate and compare different algorithms using worst-, average-, and best- case analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

**Course Outcomes:** The students should be able to
- Analyze the performance of algorithms
- Choose appropriate data structures and algorithm design methods for a specified application
- Understand how the choice of data structures and the algorithm design methods impact the performance of programs.

**UNIT - I**

**Introduction:** Algorithm, Performance Analysis-Space complexity, Time complexity, AsymptoticNotations- Big oh notation, Omega notation, Theta notation and little oh notation.
**Disjoint Sets**: Introduction, union and find Operations.

**Divide and conquer**: General method, applications-Binary search, Quick sort, Merge sort, Strassen‟smatrix multiplication

**UNIT - II**

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

**UNIT-III**

**Dynamic Programming**: General method, applications- All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design ,Traveling sales person problem.

**UNIT-IV**

**Backtracking**: General method, applications, n-queen‟s problem, sum of subsets problem, graph coloring, Hamiltonian cycles, knapsack problem.

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**UNIT – V**

**Branch and Bound**: General method, applications - 0/1 knapsack problem, LC Branch and Boundsolution, FIFO Branch and Bound solution, , Travelling sales person  problem,
**NP-Hard and NP-Complete problems**: Basic concepts, non deterministic algorithms, NP - Hard andNP- Complete classes, Cook"s theorem.

**TEXT BOOKS:**
1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, University Press.

**REFERENCE S:**
1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

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**(AUTONOMOUS)**

**2060516: WEB TECHNOLOGIES**

**III Year B.Tech. CS II – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**Prerequisites:**
- A course on "Java Programming".
- A course on "Data Base Management Systems".

**Course Objectives:**
- To introduce PHP Language for server side scripting
- To introduce XML and Processing of XML data
- To introduce server side programming with java servlets and JSP
- To introduce client side scripting with java scripts

**Course Outcomes:** The students will be able to:
- Gain knowledge of client side scripting validation of forms and AJAX programming
- Understand server side scripting with PHP language
- Understand XML and how to parse and use XML data with java.
- Do server side programming with java servlets and JSP.

**UNIT-I**
**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.
**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

**UNIT-II**
**HTML Common tags**- List, Tables, images, forms, Frames; Cascading Style sheets;
**XML**: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java

**UNIT–III**
**Introduction to Servlets**: Common Gateway Interface (CGt), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT–IV**
**Introduction to JSP**: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT-V**
**Client-side Scripting:** Introduction to JavaScript, JavaScript language – declaring variables,

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scope of variables, functions. event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

**REFERENCES:**

1. Web Programming, building internet applications, Chris Bates 2″edition, Wiley Dreamtech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly,
3. Java Script, D.Flanagan
4. Beginning Web Programming-Jon Duckett WROX

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### 2060514: DATA MINING (Professional Elective-I)

| III Year B.Tech. CS II – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 3 | 0 | 0 | 3 |

**Prerequisites:**
- A course on "Design and Analysis of Algorithms"
- A course on "Database Management Systems"
- A course on "Probability and Statistics"

**Course Objectives:**
- To presents methods for mining frequent patterns, associations, and correlations.
- To describes methods for data classification and prediction, and data–clustering approaches.
- To perform Mining various types of data stores such as spatial, textual, multimedia, streams.

**Course Outcomes:** The students will be able to:
- Understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
- Apply pre-processing methods for any given raw data.
- Extract interesting patterns from large amounts of data.
- Discover the role played by data mining in various fields.
- Choose and employ suitable data mining algorithms to build analytical applications
- Evaluate the accuracy of supervised and unsupervised models and algorithms

**UNIT-I**
**Introduction to Data Mining**: Introduction, Data Objects and attribute types, Basic Statistical Descriptions Of data, Data Visualization, Data Pre-processing, Data Cleaning, Data Integration, Data Reduction, Data Transformation and data discretization.

**UNIT-II**
**Association Rules:** Introduction, Large item sets, Basic Algorithms, Parallel and Distributed algorithms, Comparing approaches, Incremental Rules, Advanced Association Rule Techniques, Measuring the Quality of Rules.

**UNIT–III**
**Classification**: Introduction, Statistical-Based Algorithms, Distance-Based Algorithms, Decision Tree-Based Algorithms, Neural Network-Based Algorithms, Rule-Based Algorithms, Generating Rules from a DT, Generating Rules from a Neural Net, Generating Rules Without a DT or N, Combining Techniques.

**UNIT–IV**
**Clustering:** Introduction, Similarity and Distance Measure, Outliers, Hierarchical Algorithms, Partitional Algorithms, Minimum Spanning Tree, Squared Error Clustering Algorithm, K -Means Clustering, Nearest Neighbor Algorithm, PAM Algorithm, Bond Energy Algorithm, Clustering with

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Genetic Algorithms, Clustering with Neural Networks, Clustering Large Databases, Clustering with Categorical Attributes, Comparison**.**

**UNIT-V**
**Web and Text Mining:** Introduction, web mining, web content mining, web structure mining, web usage mining, Spatial Mining introduction, Spatial Data Overview, Spatial Data Mining Primitives, Generalization and Specialization, Spatial Rules, Spatial Classification Algorithm, Spatial Clustering Algorithms.

**TEXT BOOKS:**

1. Data Mining – Concepts and Techniques – Jiawei Han &MichelineKamber, 3rd Edition Elsevier.
2. Data Mining Introductory and Advanced topics –Margaret H Dunham, PEA.

**REFERENCES:**

1. Data Mining: Practical Machine Learning Tools and Techniques, Ian H. Witten and Eibe Frank, 2nd Edition, Morgan Kaufmann, 2005.

**2066241:INTRUSION DETECTION SYSTEMS(Professional Elective-I)**

| **III Year B.Tech. CS I – Sem.** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| | **3** | **0** | **0** | **3** |

**Prerequisites:**
- A course on "Programming for problem solving "
- A course on "Computer Networks"

**Course Objectives:**
- Compare alternative tools and approaches for Intrusion Detection through quantitative analysis  to determine the best tool or approach to reduce risk from intrusion.
- Identify and describe the parts of all intrusion detection systems and characterize new and emerging IDS technologies according to the basic capabilities all intrusion detection systems share.

**Course Outcomes:** The students will be able to:
- Possess a fundamental knowledge of Cyber Security.
- Understand what vulnerability is and how to address most common vulnerabilities.
- Know basic and fundamental risk management principles as it relates to Cyber Security and Mobile Computing.
- Have the knowledge needed to practice safer computing and safeguard your information using Digital Forensics.
- Understand basic technical controls in use today, such as firewalls and Intrusion Detection systems.
-  Understand legal perspectives of Cyber Crimes and Cyber Security.

**UNIT-I**
The state of threats against computers, and networked systems-Overview of computer security solutions and why they fail-Vulnerability assessment, firewalls, VPN's -Overview of Intrusion Detection and Intrusion Prevention, Network and Host-based IDS

**UNIT-II**
**Classes of attacks - Network layer:** scans, denial of service, penetration Application layer: software exploits, code injection-Human layer: identity theft, root access-Classes of attackers-Kids/hackers/sop Hesitated groups-Automated: Drones, Worms, Viruses

**UNIT–III**
A General IDS model and taxonomy, Signature-based Solutions, Snort, Snort rules, Evaluation of IDS, Cost sensitive IDS

**UNIT–IV**
Anomaly Detection Systems and Algorithms-Network Behaviour Based Anomaly Detectors (rate based)-Host-based Anomaly Detectors-Software Vulnerabilities-State transition, Immunology, Payload Anomaly Detection**.**

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**UNIT-V**

Attack trees and Correlation of alerts- Autopsy of Worms and Botnets-Malware detection - Obfuscation, polymorphism- Document vectors. Email/IM security issues-Viruses/Spam-From signatures to thumbprints to zero day detection-Insider Threat issues-Taxonomy-Masquerade and Impersonation Traitors, Decoys and Deception-Future: Collaborative Security.

**TEXT BOOKS:**

1. Peter Szor, The Art of Computer Virus Research and Defense, Symantec Press ISBN 0-321- 30545-3.
2. Markus Jakobsson and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses.

**REFERENCES:**

1. Saiful Hasan, Intrusion Detection System, Kindle Edition.
2. Ankit Fadia, Intrusion Alert: An Ethical Hacking Guide to Intrusion Detection

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**2060543: ARTIFICIAL INTELLIGENCE (Professional Elective-I)**

**III Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**
- A course on "Data Structures"
- A course on "Design and Analysis of Algorithms"
- A course on "Probability & Statistics"

**Course Objectives:**
- To learn the distinction between optimal reasoning Vs. human like reasoning
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and machine learning.

**Course Outcomes:** The students will be able to:
- Frame an efficient problem space for a problem expressed in natural language.
- Finalize a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem.
- Apply AI techniques to solve problems of game playing, and machine learning.

**UNIT-I**
**Artificial Intelligence**: What is AI, Foundations and History of AI.
**Intelligent Agents:** Introduction, how Agents Should Act, Structure of Intelligent Agents, Agent programs, Simple reflex agents, Goal based agents, Utility based agents, Environments and Environment programs.
**Problem Solving by Search:** Problem-Solving Agents, Formulating Problems, Example Problems, Searching for Solutions, Search Strategies (Breadth-first search, Uniform cost search, Depth-First
Search, Iterative deepening Depth-First search, Bidirectional search).

**UNIT-II**
**Informed Search Methods:** Best-First Search, Heuristic Functions, Memory Bounded Search, Iterative Improvement Algorithms.
**Game Playing:** Introduction, Games as Search Problems, Perfect Decisions in Two-Person Games, Imperfect Decisions, Alpha-Beta Pruning, Games That Include an Element of Chance, State-of-the- Art Game Programs.

**UNIT–III**
**Knowledge and Reasoning**: A Knowledge-Based Agent, The Wumpus World Environment, Representation, Reasoning, and Logic, Prepositional Logic, An Agent for the Wumpus World.
**First-Order Logic**: Syntax and Semantics, Extensions and Notational Variations, Using First-

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Order Logic, Logical Agents for the Wumpus World, A Simple Reflex Agent, Representing Change in the World Building a Knowledge Base: Properties of Good and Bad Knowledge Bases, Knowledge Engineering, The Electronic Circuits Domain, General Ontology, **Application:** The Grocery Shopping World.

**UNIT–IV**
**Inference in First-Order Logic**: Inference Rules Involving Quantifiers, An Example Proof, Generalized Modus Ponens, Forward and Backward Chaining, Resolution: A Complete Inference Procedure, Completeness of resolution.
 **Logical Reasoning Systems:** Introduction, Indexing, Retrieval, and Unification, Logic Programming Systems, Theorem Provers, Forward-Chaining Production Systems, Frame Systems and Semantic Networks, Description Logics, Managing Retractions, Assumptions, and Explanations.

**UNIT-V**
**Planning:** A Simple Planning Agent, From Problem Solving to Planning, Planning in Situation Calculus, Basic Representations for Planning, A Partial-Order Planning Example, A Partial-Order Planning Algorithm, Knowledge Engineering for Planning.
**Practical Planning:** Practical Planners, Hierarchical Decomposition, Analysis of Hierarchical Decomposition, Resource Constraints.

**TEXT BOOKS:**
3. Artificial Intelligence A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education.

**REFERENCES:**
3. Artificial Intelligence, E.Rich and K.Knight, , 3rd Edition, TMH
4. Artificial Intelligence, Patrick Henny Winston, 3rd Edition, Pearson Education.
5. Artificial Intelligence, ShivaniGoel, Pearson Education.
6. Artificial Intelligence and Expert systems – Patterson, Pearson Education

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### 2060546: MOBILE COMPUTING (Professional Elective-I)

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

　　　　　　　　　　　　　　　　　　　　　　　　　　　　**3　0　0　3**

**Prerequisites:**
- A course on "Computer networks".
- A course on "Data Structures".
- A course on "Operating Systems".

**Course Objectives:**
- To understand the basic concepts of mobile computing.
- To learn the basics of mobile telecommunication system.
- To be familiar with the network layer protocols and Ad-Hoc networks.
- To know the basis of transport and application layer protocols.
- To gain knowledge about different mobile platforms and application development.

**Course Outcomes:** The students will be able to:
- Learn basics of mobile telecommunication systems.
- Understand functionality of MAC, network layer and identify a routing protocol for a given Ad hoc network.
- Learn the functionality of Transport and Application layers.
- Develop a mobile application using android/blackberry/ios/Windows SDK

### UNIT-I
### INTRODUCTION
**Introduction to Mobile Computing –** Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA.

### UNIT-II
### MOBILE TELECOMMUNICATION SYSTEM
**Introduction to Cellular Systems –** GSM – Services - Architecture - Protocols – Security – Satellite Systems – History – Applications – GEO – LEO - MEO – GPRS- Services – Architecture - UMTS – Network Architecture.

### UNIT–III
### MOBILE NETWORK LAYER
MANET, Mobile IP, Classification of Multicast Routing Protocols, Multicast Routing Protocols: DSDV, DSR, AODV ,ZRP, DHCP, Security issues in MANETs, Introduction to Vehicular AdHoc networks (VANET) – MANET Vs VANET.

### UNIT–IV
### MOBILE TRANSPORT AND APPLICATION LAYER
Classical TCP Improvements – Inderect TCP - Mobile TCP – Transaction Oriented TCP – Wireless Application Protocols – Architecture – WDP – WTLS – WTP –WSP – WAE – WML –

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WML Script.

**UNIT-V**

**MOBILE PLATFORMS AND APPLICATIONS**

Operating Systems for Mobile Computing – Special Constraints & Requirements – Commercial Mobile Operating Systems – Windows Mobile, iOS, Android, BlackBerry – Mobile Commerce – Applications – Structure.

**TEXT BOOKS:**

1.  Jochen Schiller, —Mobile Communications, PHI, Second Edition, 2003.
2.  Prasant Kumar Pattnaik, Rajib Mall —Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd, New Delhi – 2012 .

**REFERENCES:**

1.  Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2.  Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computing, Springer, 2003.
3.  William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systemsǁ, Second Edition, Tata McGraw Hill Edition ,2006.
4.  C.K. Toh, —Ad Hoc Mobile Wireless Networksǁ, First Edition, Pearson Education, 2002.

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**2060582:WEB TECHNOLOGY LAB**

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

                                                                                     **0     0     3    1.5**

**Prerequisites:**
- A course on "Java Programming".
- A course on "Data Base Management Systems".

**Course Objectives:**
- To introduce PHP Language for server side scripting
- To introduce XML and Processing of XML data
- To introduce server side programming with java servlets and JSP
- To introduce client side scripting with java scripts

**Course Outcomes:** The students will be able to:
- Do client side scripting validation of forms and AJAX programming
- Understand server side scripting with PHP language
- Understand XML and how to parse and use XML data with java.
- Do server side programming with java servlets and JSP.

**List of Experiments**
1.     Write a PHP script to print prime numbers between 1-50.
2.     PHP script to
       a. Find the length of a string.
       b. Count no of words in a string.
       c. Reverse a string.
       d. Search for a specific string.
3.     Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4.     Write a PHP script that reads data from one file and write into another file.
5.     Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
       a.  Home page
       b.  Registration and user Login
       c.  User Profile Page
       d.  Books catalog
       e.  Shopping Cart
       f.  Payment By credit card
       g.  Order Conformation
6.     Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
7.     Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
8.     Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping

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Cart.

**9.** Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

**TEXT BOOKS:**

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

**REFERENCES:**

2. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson
3. International, 2012, 4th Edition.
4. J2EE: The complete Reference By James Keogh, McGraw-Hill
5. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson
6. Paul Dietel and Harvey Deitel," Java How to Program", Prentice Hall of India, 8th Edition
7. Web technologies, Black Book, Dream tech press.
8. Gopalan N.P. and Akilandeswari J., "Web Technology", Prentice Hall of India

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**2060075: ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY**

| III Year B.Tech. CS II – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 0 | 0 | 3 | 1.5 |

**INTRODUCTION**:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

**The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:**

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations. Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication**.**

**OBJECTIVES:**

**This Lab focuses on using multi-media instruction for language development to meet the following targets**:

To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

Further, they would be required to communicate their ideas relevantly and coherently in writing.

To prepare all the students for their placements.

**SYLLABUS:**

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

Activities on Fundamentals of Inter-personal Communication and Building Vocabulary - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

Activities on Reading Comprehension –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

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Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing. Activities on Presentation Skills – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/emails/assignments etc.

Activities on Group Discussion and Interview Skills – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

**TEXT BOOKS:**

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

**REFERENCES:**

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by ColmDownes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.

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**2066273: CLOUD COMPUTING LAB**

**III Year B.Tech. CS II – Sem.**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

**Prerequisites: NIL**

**Course Objectives:**
- To learn the cloud architecture and its efficiency, and tools to provide virtualization on cloud.
- Study and implementation of infrastructure as a service, storage as a service, user management and security on cloud.

**Course Outcomes:** The students will be able to:
- Define & implement Virtualization using different types of Hypervisors
- Examine the installation and configuration of Open stack cloud
- Analyze and understand the functioning of different components involved in Amazon Web services cloud platform.
- Design & Synthesize Security as a service on different Cloud environments.

**List of Experiments:**
1. Install Oracle Virtual box and create two VMs on your laptop.
2. Install Turbo C in guest OS and execute C program.
3. Test ping command to test the communication between the guest OS and Host OS
4. Install Hadoop single node setup.
5. Hopkinson's test on DC shunt machines
6. Develop hadoop application to count no of characters, no of words and each character frequency.
7. Develop hadoop application to process given data and produce results such as finding the year of maximum usage, year of minimum usage.
8. Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.
9. Design a protocol and use Simple Queue Service(SQS)to implement the barrier synchronization after the first phase
10. Use the Zookeeper to implement the coordination model in Problem 10.
11. Develop a Hello World application using Google App Engine
12. Develop Guestbook Application using Google App Engine.
13. Develop a Windows Azure Hello World application
14. Create a Mashup using Yahoo! Pipes.

**TEXT BOOKS:**
1. Essentials of Cloud Computing - K. Chandrasekhran, CRC Press, 2014

**REFERENCES:**
2. Cloud Computing: Implementation, Managing, and Security -John W. Rittinghouse& James F. Ransom

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**2060025: PROFESSIONAL ETHICS**

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

                                                                        **2    0    0    0**

**Prerequisite: Nil**

**Course Objectives:**

- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop some ideas of the legal and practical aspects of their profession.

**Course Outcomes:**

- To understand the importance of professional practice, Law and Ethics in their personal lives and professional careers.
- To learn the rights and responsibilities as an employee, team member and a global citizen

**UNIT – I**

**Professional Practice and Ethics:** Definition of Ethics, Professional Ethics - Engineering Ethics, Personal Ethics; Code of Ethics - Profession, Professionalism, Professional Responsibility, Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistle blowing, protected disclosures. Introduction to GST- Various Roles of Various Stake holders.

**UNIT - II**

**Law of Contract**: Nature of Contract and Essential elements of valid contract, Offer and Acceptance, Consideration, Capacity to contract and Free Consent, Legality of Object. Unlawful and illegal agreements, Contingent Contracts, Performance and discharge of Contracts, Remedies for breach of contract. **Contracts-II:** Indemnity and guarantee, Contract of Agency, Sale of goods Act - 1930: General Principles, Conditions & Warranties, Performance of Contract of Sale.

**UNIT – III**

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalats.

**UNIT – IV**

Engagement of Labour and Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other - Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017.

**UNIT - V**

Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP,

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Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970

**TEXT BOOKS:**

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ravinder Kaur, Legal Aspects of Business, 4e, Cengage Learning, 2016.

**REFERENCES:**

1. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co. RERA Act, 2017
2. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House.
3. O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers

# IV-I

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**

**(AUTONOMOUS)**

**2070011: FUNDAMENTALS OF MANAGEMENT**

**IV Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
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**Prerequisites:**

**Course Objectives:**

- To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills for Engineers.

**Course Outcomes:** The students will be able to:

- The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

**UNIT-I**

**Introduction to Management:** Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

**UNIT-II**

**Planning and Decision Making:** General Framework for Planning - Planning Process, Types of Plans, Management by Objectives; Production Planning and Control. Decision making and Problem Solving - Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making; Group Problem Solving and Decision Making, Creativity and Innovation in Managerial Work.

**UNIT–III**

**Organization and HRM**: Principles of Organization: Organizational Design & Organizational Structures; Departmentalization, Delegation; Empowerment, Centralization, Decentralization, Recentralization; Organizational Culture; Organizational Climate and Organizational Change.
Human Resource Management & Business Strategy: Job Satisfaction, Job Enrichment, Job Enlargement, Talent Management, Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

**UNIT–IV**

**Leading and Motivation:** Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Leadership.
Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories - Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y.

**UNIT-V**

**Controlling**: Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non- Budgetary Controls. Characteristics of Effective Controls, Establishing control systems,

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Control frequency and Methods

**TEXT BOOKS:**
1. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

**REFERENCES:**
1. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
2. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
3. Industrial Engineering and Management: Including Production Management, T.R. Banga, S.C. Sharma, Khanna Publishers

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**2076204: BLOCKCHAIN AND CRYPTOCURRENCY**

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

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**Prerequisites**

- Cryptography, Data Structure, Networking, OOP

**Course objective**

- Students will explore various aspects of Blockchain technology like application in various domains.
- By implementing learner will have idea about private and public Blockchain, and smart contract.
- Understand Blockchain and its main application cryptocurrency.
- Students will learn how this system works and how can they utilize and what application can be build.

**Course outcomes**

- Understand and explore the working of Blockchain technology
- Analyze the working of Smart Contracts
- Understand and analyze the working of Hyperledger
- Apply the learning of solidity and de-centralized apps on Ethereum

**UNIT-1: Introduction**

Definition of Blockchain, Blockchain Technology Mechanisms & Networks, Blockchain Origins, Objective of Blockchain, Blockchain Challenges, Transactions And Blocks, P2P Systems, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain.

**UNIT-2: Bit Coin and Cryptocurrency**

Bit Coin and Cryptocurrency: What is Bitcoin, The Bitcoin Network, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets, Decentralization and Hard Forks, Ethereum Virtual Machine (EVM), Merkle Tree, Double-Spend Problem, Blockchain and Digital Currency, Transactional Blocks, Impact Of Blockchain Technology On Cryptocurrency.

**UNIT-3: Ethereum & Hyperledger**

Introduction to Ethereum: What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?, Smart Contracts.

Introduction to Hyperledger: Definition of  Hyperledger, Distributed Ledger Technology & its Challenges, Hyperledger & Distributed Ledger Technology, Hyperledger Fabric, Hyperledger Composer.

**UNIT-4: Solidity Programming**

Solidity Programming: Solidity - Language of Smart Contracts, Installing Solidity & Ethereum Wallet, Basics of Solidity, Layout of a Solidity Source File & Structure of Smart Contracts, General Value Types (Int, Real, String, Bytes, Arrays, Mapping, Enum, address)

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## UNIT-5: Blockchain Applications

Blockchain Applications: Internet of Things, Medical Record Management System, Domain Name Service and Future of Blockchain, Alt Coins.

## TEXT BOOKS

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

## REFERENCES

1. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
2. Antonopoulos and G. Wood, Mastering Ethereum.
3. D. Drescher, Blockchain Basics. Apress, 2017.
4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts
5. Arun Kumar Arigela and RaziyaBegum ,Blockchain Technology in advanced applications, IIP Publications,2022.

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**2076205: MOBILES AND WIRELESS SECURITY**

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

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**Pre-requisite**

- Computer Networks, Wireless Networks, Fundamentals of Security

**Course Objective**

- Student will understand Mobile security and its different challenges.
- Discovering various flaws and vulnerabilities in android and iOS.
- Student will also learn next generation wireless networks and its security challenges.

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

- Understanding the modern concept and foundation of Mobile security.
- Understand and classify various next generation networks
- Identity various sources of vulnerabilities from Mobile
- Analyze network security attacks and its countermeasures.

**UNIT-1**

**Security Issues in Mobile Communication**: Mobile Communication History, Security – Wired Vs Wireless, Security Issues in Wireless and Mobile Communications, Security Requirements in Wireless and Mobile Communications, Security for Mobile Applications, Advantages and Disadvantages of Application – level Security.

**UNIT-2**

Mobile Security: Security risks in Mobile ,Android  Architecture, and Security Model for Android, Fundamentals of Android Development, Android Rooting, Intercepting Android Traffic, Attacks on Android, and Security Model for iOS.

UNIT-3

Mobile   and   Wireless   Networks:   Mobile   Cellular   Networks–(Generation Networks),802.11Standards–02.11.802.15, 802.16, 802.20, 802.21, Mobile  Internet  networks, Attacks and defence strategies on Cellular networks.802.11 dedicated architectures
Introduction, Adhoc networks(hotspot), Wireless Intrusion Detection System(WIDS),Honeypots,

**UNIT-4**

Wireless Security: Wireless networks Attacks – Active, passive attacks, DoS attacks, TCP, Trojan and Dictionary Attacks, Security risks in IEEE 802.11 standards, Security in 802.1x, 802.11i.

**UNIT-5**

Wi MAX and LTE Security: Introduction, WiMAX architecture and OFDM, Security risks involved in802.16-2004, Security risks involved in 802.16e Security in GSM, UMTS, GPRS, VoIP security, LTE security.

**TEXT BOOK:**

1.   M.Au,R.Chooand G.Kessler,Mobile security and privacy.Cambridge,MA:Syngress,2017.

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**REFERENCES:**

1. Pallapa Venkataram, Satish Babu: "Wireless and Mobile Network Security", 1st Edition, Tata McGraw Hill,2010.
2. J.Joshi, Network Security. NewYork: Elsevier,2009.
3. S.AHMADI,MOBILEWIMAX.[Placeofpublicationnotidentified]:ELSEVIERACADEMICPress, 2016.
4. J.Harrington, Network security. SanFrancisco, CA: Morgan Kaufmann Publishers,2005.

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT (AUTONOMOUS)**

**2070545: LINUX PROGRAMMING (Professional Elective-II)**

**IV Year B.Tech. CS I – Sem.**

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**Prerequisites:**
- A course on "Operating Systems".
- A course on "Computer Organization"

**Course Objectives:**
- To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters.
- To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
- To facilitate students in understanding Inter process communication.
- To facilitate students in understanding semaphore, shared memory and process.

**Course Outcomes:** The students will be able to:
- Use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator.
- Write Shell Programming using Linux commands.
- Design and write application to manipulate internal kernel level Linux File System.
- Develop IPC-API's that can be used to control various processes for synchronization.
- Develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

**UNIT-I**
**INTRODUCTION TO LINUX AND LINUX UTILITIES**: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor. Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio**.**

**UNIT-II**
**Introduction to Shells:** Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

**UNIT–III**
**Grep:** Operation, grep Family, Searching for File Content. Sed :Scripts, Operation, Addresses,

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commands, Applications, grep and sed. UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers. File Management :File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

## UNIT–IV

**PROCESS AND SIGNALS**: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks.

## UNIT-V

**INTER PROCESS COMMUNICATION:** Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands. INTRODUCTION TO SOCKETS: Socket, socket connections - socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications.

## TEXTBOOKS:

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.
2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson

## REFERENCES:

1. Linux System Programming, Robert Love, O'Reilly, SPD.
2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX Network Programming, W.R. Stevens, PHI. UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education

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**2070549: WIRELESS SENSOR NETWORKS (Professional Elective-II)**

| IV Year B.Tech. CS I – Sem. | L | T | P | C |
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**Prerequisites:**

**Course Objectives:**
- To understand the fundamentals of wireless sensor networks and its application to critical real time scenarios.
- To study the various protocols at various layers and its differences with traditional protocols.
- To understand the issues pertaining to sensor networks and the challenges involved in managing a sensor network.
- 

**Course Outcomes: The students will be able to:**
- Technical knowhow in building a WSN network.
- Analysis of various critical parameters in deploying a WSN

**UNIT-I**
**Introduction**: Fundamentals of wireless communication technology, the electromagnetic spectrum radio propagation, characteristics of wireless channels, modulation techniques, multiple access techniques, wireless LANs, PANs, WANs, and MANs, Wireless Internet.

**UNIT-II**
**Introduction to adhoc/sensor networks:** Key definitions of adhoc/ sensor networks, unique constraints and challenges, advantages of ad-hoc/sensor network, driving applications, issues in adhoc wireless networks, issues in design of sensor network, sensor network architecture, data dissemination and gathering.

**UNIT–III**
**MAC Protocols** : Issues in designing MAC protocols for adhoc wireless networks, design goals, classification of MAC protocols, MAC protocols for sensor network, location discovery, quality, other issues, S-MAC, IEEE 802.15.4.

**UNIT–IV**
**Routing Protocols**: Issues in designing a routing protocol, classification of routing protocols, table-driven, on-demand, hybrid, flooding, hierarchical, and power aware routing protocols

**UNIT-V**
**QoS and Energy Management :** Issues and Challenges in providing QoS, classifications, MAC, network layer solutions, QoS frameworks, need for energy management, classification, battery, transmission power, and system power management schemes.

**TEXT BOOKS:**
1. C. Siva Ram Murthy, and B. S. Manoj, "AdHoc Wireless networks ", Pearson Education - 2008.

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**REFERENCES:**
1. Feng Zhao and Leonides Guibas, "Wireless sensor networks ", Elsevier publication - 2004.
2. Jochen Schiller, "Mobile Communications", Pearson Education, 2nd Edition, 2003.
3. William Stallings, "Wireless Communications and Networks ", Pearson Education - 2004

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**(AUTONOMOUS)**

**2076242: TCP/IP DESIGN & IMPLEMENTATION (Professional Elective-II)**

**IV Year B.Tech. CS I – Sem.**                                    **L   T   P   C**
                                                                    **3   0   0   3**

**Course Outcomes: The students will be able to:**
- Design and implement TCP/IP networks.
- Explain network management issues.
- Design and implement network applications.
- Develop data structures for basic protocol functions of TCP/IP.

**UNIT-I**

Internetworking concepts and architecture model – classful Internet address - CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

**UNIT-II**

Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.

**UNIT–III**

IP global software organization –routing table–routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

**UNIT–IV**

Data structure and input processing – transmission control blocks – segment format – comparison– finite state machine implementation – Output processing – mutual exclusion – computing the computing the TCP Data length.

**UNIT-V**

Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission– congestion avoidance and control – urgent data processing and push function.

**TEXT BOOKS:**

1. Douglas E Comer,"Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1, V th Edition 2006 and Vol 2, III rd Edition, 1999.

2. W.Richard Stevens "TCP/IP Illustrated" Vol 1. Pearson Education, 2003.

**REFERENCES:**
1. Forouzan, " TCP/IP Protocol Suite" Second Edition, Tata MC Graw Hill, 2003.
2. W.Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

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**2076243: APPLICATION & WEB SECURITY (Professional Elective-II)**

**IV Year B.Tech. CS I – Sem.**

| L | T | P | C |
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**Course Outcomes: The students will be able to:**
- Understand the Web architecture and applications.
- Understand client side and server-side programming.
- Understand how common mistakes can be bypassed and exploit the application.
- Identify common application vulnerabilities.

**UNIT-I**

The Web Security, The Web Security Problem, Risk Analysis and Best Practices. Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification.

**UNIT-II**

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Anti-Theft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications.

**UNIT – III**

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems.

**UNIT – IV**

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities.

**UNIT - V**

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location Based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment.

**TEXT BOOKS:**

1. Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

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**(AUTONOMOUS)**

### 2070544: INFORMATION RETRIEVAL SYSTEMS (Professional Elective-III)

**IV Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**
- A course on "Data Structures".
- A course on "DBMS"

**Course Objectives:**
- To learn the important concepts and algorithms in IRS.
- To understand the data/file structures those are necessary to design, and implement information retrieval (IR) systems.

**Course Outcomes: The students will be able to:**
- Apply IR principles to locate relevant information large collections of data
- Design different document clustering algorithms
- Implement retrieval systems for web search tasks.
- Design an Information Retrieval System for web search tasks.

### UNIT-I
**Introduction to Information Retrieval Systems**: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses Information Retrieval System **Capabilities**: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities.

### UNIT-II
**Cataloging and Indexing:** History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models.

### UNIT–III
**Automatic Indexing**: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters.

### UNIT–IV
**User Search Techniques**: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies**.**

### UNIT-V
**Text Search Algorithms**: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval**.**

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**TEXT BOOKS:**

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer.

**REFERENCES:**

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Information Storage & Retrieval By Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

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**2070518: MACHINE LEARNING (Professional Elective-III)**

| IV Year B.Tech. CS I – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objectives:**
- To be able to formulate machine learning problems corresponding to different applications.
- To understand and analyze the basic concepts of machine learning and machine learning system design.
- To analyze the fundamentals of different types supervised learning methods and algorithms.
- To evaluate the various association analysis learning basis.
- To learn unsupervised learning algorithms and methods.
- To visualize reinforcement learning methods.

**Course Outcomes:** The students will be able to:
- Thoroughly understand and analyze the basic concepts of machine learning and machine learning system design.
- Understand analyze the fundamentals of different types supervised learning methods and algorithms.
- Evaluate the various association analysis learning basis.
- Learn unsupervised learning algorithms and methods.
- Visualize reinforcement learning methods

**UNIT-I**
**Introduction to Machine Learning –** Types of Learning - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

**UNIT-II**
**Decision Tree learning** – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.
**Artificial Neural Networks** – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks.
**Evaluation Hypotheses** – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

**UNIT–III**
**Bayesian learning** – Introduction, Bayes theorem, Bayes theorem and concept learning,

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Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm.

**Computational learning theory** – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning.

**Instance-Based Learning**- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

**Genetic Algorithms** – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms.

**UNIT–IV**

**Learning Sets of Rules** – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

**Analytical Learning** - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

**UNIT-V**

**Combining Inductive and Analytical Learning** – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators.

**Reinforcement Learning** – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

**TEXT BOOKS:**
1. Tom M. Mitchell, Machine Learning, McGraw-Hill, First Edition, 1997.
2. Marsland, S. Machine Learning: An Algorithmic Perspective, Second Edition. Boca Raton, FL: CRC Press, 2015.

**REFERENCES:**
1. Hsieh, W. W., Machine Learning Methods in the Environmental Sciences: Neural Networks and Kernels. Cambridge, England: Cambridge University Press, 2009.
2. Duda, R. O., Hart, P. E., & Stork, D. G., Pattern Classification. Hoboken, NJ: John Wiley & Sons, 2012.
3. Bishop, C. M., Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995.

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**2076244: SECURITY ASSESSMENT & RISK ANALYSIS (Professional Elective-III)**

**IV Year B.Tech. CS I – Sem.**

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**Course Outcomes:** The students will be able to:
- Understand the Web architecture and applications.
- Understand client side and server-side programming.
- Understand how common mistakes can be bypassed and exploit the application.
- Identify common application vulnerabilities.

**UNIT-I**

The Web Security, The Web Security Problem, Risk Analysis and Best Practices. Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification.

**UNIT-II**

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Anti-Theft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications.

**UNIT-III**

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems.

**UNIT-IV**

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities.

**UNIT-V**

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location Based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment.

**TEXT BOOKS:**
1. Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT (AUTONOMOUS)**

## 2070552: NATURAL LANGUAGE PROSESSING (Professional Elective-III)

**IV Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objectives:**
- To provide an overview of principles of Embedded System

**Course Outcomes:** The students will be able to:
- Understand the selection procedure of processors in the embedded domain.

### UNIT-I
**Finding the Structure of Words**: Words and Their Components, Issues and Challenges, Morphological Models Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

### UNIT-II
**Syntax Analysis:** Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

### UNIT–III
**Semantic Analysis:** Introduction, Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation.

### UNIT–IV
**Discourse Processing:** Cohesion, Reference Resolution, Discourse Cohesion and Structure.
**Language Modeling**: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems.

### UNIT-V
**Natural Language Generation:** Introduction, Architectures of NLG systems, Generation tasks and Representations, Applications of NLG.
**Machine Translation:** Introduction, Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation approaches, Direct Machine Translation, Rule-Based Machine Translation, Corpus-based Machine Translation, Knowledge- based Machine Translation systems.

### TEXT BOOKS:
1. "Natural Language Processing with Python" Analyzing text with Natural Language Toolkit, Steven Biord, Ewan Klein and Edward Loper.
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

### REFERENCES:
1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications.

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**20762754: BLOCKCHAIN &CRYPTOCURRENCY LAB**

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

                                                   **0   0   3   1.5**

**List of Experiments**

1.  Create a Simple Blockchain in any suitable programming language?
2.  Use Geth to Implement Private Ethereum Block Chain?
3.  Build Hyperledger Fabric Client Application?
4.  Build Hyperledger Fabric with Smart Contract?
5.  Create Case study of Block Chain being used in illegal activities in real world?
6.  Develop Block Chain Application using python?
7.  Build Hyperledger Composer?
8.  Create a smart contract to take a string as input and give an 8 digit hash as an output?
9.  ConstructERC-20 Token
10. Prepare a case study on Crypto currency Cyber-attack. (Ex: Grim Finance)

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**(AUTONOMOUS)**

**2076275: MOBILE & WIRELESS SECURITY LAB**

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

                                                                   **0   0   3   1.5**

**List of Experiments:**

1. Perform the process of call connection and call release of Mobile System.
2. Transfer an image, audio and video file using Bluetooth protocol with varying distance between two devices and analyze the performance.
3. Configure Wi-Fi setting in mobile devices using mobile tethering.
4. Implementation of a trusted secure web transaction.
5. Perform wireless audit on an access point or a router and decrypt WEP and WPA.
6. Develop a native application that uses GPS location information.
7. Design a gaming application
8. Create an application to handle images and videos according to size.
9. Prepare a case study on Mahesh Bank cyber-attack.
10. Working With KF Sensor tool  for Creating and Monitoring Honeypot.

# IV-II

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**
**(AUTONOMOUS)**

**2080553: DISTRIBUTED SYSTEMS (Professional Elective-IV)**

| IV Year B.Tech. CS II – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objectives:**
- To understand what and why a distributed system
- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols.
- To understand IPC, Group Communication & RPC Concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

**Course Outcomes:** The students will be able to:
- Able to comprehend and design a new distributed system with the desired features.
- Able to start literature survey leading to further research in any subarea.
- Able to develop new distributed applications.

**UNIT-I**
**Characterization of Distributed Systems**: Introduction, Examples of Distributed Systems Resource Sharing and the 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, Distributed Debugging. **Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

**UNIT–III**
**Inter Process Communication:** Introduction, The API for the Internet Protocols, 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. Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.
**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency, Munin Case Study, Other 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, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition, 2009.

**REFERENCES:**

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2nd Edition, PHI.
2. Distributed Systems, An Algorithm Approach, SukumarGhosh, Chapman & Hall/CRC, Taylor &Fransis Group, 2007.

**MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT**
**(AUTONOMOUS)**
**2080562: SOFT COMPUTING(Professional Elective-IV)**

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

                                                        **3   0   0   3**

**Pre-requisites:**
- A course on "Digital Logic Design".
- A course on "Computer Organization".
- A course on "Artificial Intelligence".

**Course Objectives:**
- To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario.
- To implement soft computing based solutions for real-world problems.
- To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks, fuzzy sets, fuzzy logic, genetic algorithms.

**Course Outcomes**: The students should be able to

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem.

**UNIT-I**
**Introduction:** Neural networks, Fuzzy logic, Genetic algorithm, Hybrid systems, Soft computing
**Artificial Neural network**: Fundamental concept, Evolution of Neural Networks, Basic models of Artificial Neural Networks, Important Terminologies of ANNs, McCulloch-Pitts Neuron, Linear Separability, Hebb Network.
**Supervised Learning Network**: Introduction, Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back-propagation Network, Radial Basis Function Network, Time Delay Neural Network, Functional Link Networks, Tree Neural Networks, Wavelet Neural Networks

**UNIT-II**
**Associative Memory Networks:** Introduction, Training Algorithms for Pattern Association, Auto associative Memory Network, Hetero associative Memory Network, Bidirectional Associative Memory, Hop fields, Interactive Auto associative Memory Networks.
**Unsupervised Learning Networks**: Fixed Weight Competitive nets, Kohonen Self- Organizing Future maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Network

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### UNIT–III

**Third-Generation Neural Networks:** Spiking Neural Networks, Convolutional Neural Networks, Deep learning Neural Networks
Introduction to Fuzzy logic, Classical sets, Fuzzy sets.
Classical Relations and Fuzzy Relations: Cartesian product of Relation, Classical Relations, Fuzzy Relations, Tolerance and Equivalence Relations.

### UNIT–IV

**Fuzzification:** Features, Methods of Membership Value assignments, Defuzzification, Fuzzy Arithmetic, Extension Principle, Fuzzy Measures, Fuzzy Integrals.
Fuzzy Rule Base and Approximation Reasoning: Truth values and Tables in Fuzzy Logic, Fuzzy Propositions, Fuzzy Reasoning, Fuzzy Inference systems, Fuzzy Decision Making, Fuzzy Logic control systems, Fuzzy Cognitive maps.

### UNIT-V

**Genetic Algorithms:** Introduction, Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm and search space, Basic Terminology, Simple GA, Operators in Genetic Algorithm, Stopping Condition for Generic Algorithm Flow, Classification of Genetic Algorithms, Genetic Programming

**TEXTBOOKS:**
1. Principles of Soft Computing By S.N. Sivanandam, S.N.Deepa Wiley 3rd Edition

**REFERENCEBOOKS:**
1. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic - Theory and Applications, Prentice Hall, 1995.
2. Ross J.T., Fuzzy Logic with Engineering Applications John Wiley & Sons, 2009
3. Rajasekaran, S. Vijayalakshmi Pai, G.A. Neural Networks, Fuzzy Logic and Genetic Algorithms PHI Learning, 2003.
4. Priddy L.K., Keller E.P., Artificial Neural Networks: An Introduction, SPIE Press, 2005. 7. Gen, M. Cheng R., Genetic Algorithms and Engineering Optimization John Wiley & Sons. 2000.

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**(AUTONOMOUS)**
**2086245: ETHICAL HACKING (Professional Elective-IV)**

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

                                                                 **3   0   0   3**

**Pre-requisites:**

• Courses on Operating Systems, Computer Networks, Network Security and Cryptography.

**Course Outcomes: The students will be able to:**

• Gain the knowledge of the use and availability of tools to support an ethical hack
• Gain the knowledge of interpreting the results of a controlled attack
• Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
• Comprehend the dangers associated with penetration testing

**UNIT-I**
**Introduction**: Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration. Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking.

**UNIT-II**
The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges. Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

**UNIT–III**
Preparing for a Hack: Technical Preparation, Managing the Engagement. Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance.

**UNIT–IV**
Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase. Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern.

**UNIT-V**
Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation. Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion.

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**TEXT BOOKS:**

1. James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press.

**REFERENCES:**

1. EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning.
2. Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning.

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**2080556: DATA ANALYTICS (Professional Elective-IV)**

**IV Year B.Tech. CS I – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objectives:**
- To learn techniques adopted to Preprocess Data.
- To learn and analyze data using intelligent techniques.
- To Understand the Predictive Models for Real World Data.

**Course Outcomes:** The students will be able to:
- Know the concepts and techniques to Preprocess Data.
- Analyze Real time data using Real world Datasets.
- Get Experience on Markov Chains.
- Acquire knowledge on the Basics of Neural Networks.
- Explore the essentials of Fuzzy set and Systems in the Analytics Domain.

**UNIT-I**
**Introduction to Data Preprocessing:** Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.
**Data Characterization and Comparison:** Data Generalization and Summarization-Based Characterization ,Analytical Characterization, Mining Class Comparison, Mining Descriptive Statistical Measures in Large Databases, Discussion.

**UNIT-II**
Introduction to Simple Linear Regression, Model Building, Estimation of Parameters using Ordinary Least Squares.
Introduction to Logistic Regression, Model Building, Interpretation of Logistic Regression Parameters.

**UNIT-III**
Markov Chains, Estimating Properties of Markov Chains, Ranking the Web by simulating a Markov Chain, Hidden Markov Models and Dynamic Programming.

**UNIT-IV**
**Introduction to Artificial Intelligence Systems:** Neural Networks, Fuzzy Logic, Genetic Algorithms.
**Fundamentals of Neural Networks**: Basic Concepts of Neural Networks, Human Brain, Mode of an Artificial Neuron, Neural Network Architectures, Characteristics of Neural Networks, Learning Methods, Taxonomy of Neural Network Architectures, History of Neural Network Research, Early Neural Network Architectures.
**Back propagation Networks:** Architecture of a Back propagation Network.

**UNIT-V**
**Fuzzy set Theory**: Fuzzy versus Crisp, Crisp sets, Fuzzy sets, Crisp Relations, Fuzzy Relations.
**Fuzzy Systems**: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based System.

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**TEXT BOOKS:**
1. Data Mining: Concepts and Techniques, Jiawei Han, Micheline Kamber, Simon Fraser University, Morgan Kaufmann Publishers.
2. Business Analytics: The Science of Data-Driven Decision Making, U.Dinesh Kumar.
3. Probability and Statistics for Computer Science, David Forsyth, Springer.
4. Neural Networks, Fuzzy Logic, and Genetic Algorithms, Synthesis and Applications, S.Rajasekaran, G.A.Vijayalakshmi Pai, PHI Learning Private Limited.

**REFERENCES:**
1. Probability and Statistics for Computer Scientists, Michael baron, Chapman & Hall/CRC, First Edition, Taylor& Francis Group.
2. Neural Networks: A Comprehensive Foundation, Simon Haykin, Second Education, Pearson Education.
3. Introduction to Fuzzy Logic, Shinghal R,PHI.

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## 2080557: ARTIFICIAL NEURAL NETWORKS (Professional Elective-V)

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

                                                    **3    0    0    3**

### UNIT-I  INTRODUCTION TO NEURAL NETWORKS

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

### UNIT-II ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement),Learning Rules

### UNIT–III  SINGLE LAYER FEED FORWARD NETWORKS

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Limitations of the Perceptron Model.

### UNIT–IV MULTI- LAYER FEED FORWARD NETWORKS

Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

### UNIT-V

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function. **Architecture of Hopfield Network**: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis. Neural network applications: Process identification, control, fault diagnosis.

### REFERENCES:

1.  Laurene Fausett, "Fundamentals of Neural Networks" , Pearson Education, 2004.
2.  Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.
3.  S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TATA Mc Graw Hill, 2006.
4.  S. Rajasekharan and G. A. Vijayalakshmi pai, "Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications", PHI Publication, 2004.
5.  Timothy J. Ross, " Fuzzy Logic With Engineering Applications", Tata McGraw-Hill Inc. 2000

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**2080558: DEEP LEARNING (Professional Elective-V)**

**IV Year B.Tech. CS II – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Course Objectives:**
- Know the Characteristics and principles of Deep neural networks.
- Familiar with learning in CNN and Modeling CSV data
- learns deep learning models and Architectures.
- Model building through different learning techniques .
- Know the Vectorization Deep models and Feature Engineering.

**Course Outcomes:** The students will be able to:
- After this course, Student will be able to know how to use Deep networks for solving different problems related to data visualization.
- Formalize tasks in terms of Computational Complexity via neural networks and Deep Learning  architectures.
- Design deep learning models to solve data-rich tasks
- Build datasets, tune and train deep learning models with deep learning libraries
- Understand the inner mechanisms of Deep learning neural techniques during training process and Vectorization

**UNIT-I Foundations of Neural Networks and Deep Learning**
Neural Networks, activation function, loss function, hyper parameters, Definition-Deep learning, Architectural Principles, Building blocks of Deep networks, RBMs, Auto encoders.

**UNIT-II Architectures of deep Networks**
Unsupervised pre-trained Networks, Deep Belief Networks, Generative Adversial Networks, CNN, Architecture, Input layer, Convolution Layers, Recurrent Neural networks, Recursive Neural Networks, Modeling CSV data with Multilayer Perceptron, Modeling Handwritten images using CNN.

**UNIT–III Concepts of Tuning Deep Networks**
An Intuition for Building Deep Networks, Matching Input data and Network Architectures, Relating Model Goal and Output layers, Weight Initialization, Loss Function, Learning rates and Recommendations,  Optimization methods, How to use Regularization.

**UNIT–IV Tuning Specific Deep Network Architectures**
Common Convolutional Architectural Patterns, Configuring Convolutional Layers, Configuring Pooling Layers, Transfer Learning, Network Input Data and Input Layers, Output Layers and RNN Output Layer, Training the Network,  Padding and Masking.

**UNIT-V Vectorization**:
Introduction to vectorization, Why do we need to Vectorize Data, Feature Engineering and Normalization techniques, Vectorizing Image data, Image data Representation, Working with sequential data, Working with Text in Vectorization.

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**TEXT BOOKS:**

1. Deep Learning-A Practitioners approach, Josh Patterson and Adam Gibson, O'reilly 2017
2. Fundamentals of Deep learning", Nikhil Budum, Nicholas Locascio, 2017.

**REFERENCES:**

1. Introduction to Artificial Neural Systems, Jacek M.Zurada, PWS Publishing Company,
2. Deep Learning and Neural Networks, Jeff Heaton, Heaton Research, Inc., 2015.
3. Learning Deep Architectures for AI", Foundations and Trends® in Machine Learning,

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**2086246: ENTERPRISE SECURITY (Professional Elective-V)**

**IV Year B.Tech. CS II – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**UNIT-I**
**Introduction**: Enterprise security and risk analysis. **Identity management**: Passwords and two-factor authentication. Authentication protocols. Single sign-on: SAML and OpenID.
**Access control**: Access control matrix. ACLs. Capabilities and PKI. Attacks and sandboxing. Safety analysis. HRU and Take-grant. Federated access control: XACML

**UNIT-II**
**Web service security:** Enterprise web service security and SAML. REST security and OAuth, Enterprise security patterns.
**Private key security:** Stream ciphers. Birthday theorem. Block ciphers. Hash functions
**Public key security:** Diffie-Helman, El Gamal,RSA. Public key protocols. Advanced cryptosystems.

**UNIT-III**
**Multilevel security**: Bell-Lapadula, noninterference, non-deducibility. Role-based access control.
**Multilevel integrity**:  Biba. Multilateral security: Compartmentation, Chinese Wall, Clark-Wilson, BMA. Secondary uses and privacy

**UNIT-IV**
**Network security:** Vulnerabilities. Firewalls. Intrusion detection. Denial of service.
**Worms**: Botnets. Cyber forensics. Security and privacy in the cloud

**UNIT-V**
**Cryptography APIs:** Java Cryptography Extension (JCE). Bouncy Castle. PKI and certificate management.

**TEXT BOOKS:**
1. Ross Anderson, [A] Security Engineering, 2nd ed., Wiley, 2008. ISBN 0470068523
2. David Hook, [H] Beginning Cryptography, Wiley, 2005. ISBN 9780764596339

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## 2080517: INTERNET OF THINGS (Professional Elective-V)

**IV Year B.Tech. CS II – Sem.**

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

**Prerequisites:**

**Course Objectives:**
- To introduce the terminology and technology.
- To introduce the Python packages and Raspberry PI platform widely used in IoT applications.
- To introduce the concept of M2M with necessary protocols, configuration and applications.
- To introduce the implementation of web based services on IoT devices.
- To introduce various case studies illustrating IoT design.

**Course Outcomes:** The students will be able to:
- Understand the characteristics, protocols and communication models required for logical design of IoT.
- Realize the hardware platforms for implementing and interfacing the IoT based board with different peripheral devices and serial communication devices.
- Gain knowledge on protocol stacks for IoT and M2M networks and configurations.
- Able to integrate devices and develop an application that can communicate through IoT Cloud.
- Implement various case studies in IoT design.

## UNIT-I
Introduction to Internet of Things –Definition and Characteristics of IoT. Physical Design of IoT – IoT Protocols. Logical Design of IoT -IoT Communication Models, IoT Communication APIs.
IoT Enabling Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems. IoT Levels and Deployment Templates.

## UNIT-II
Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib, RPi.GPIO.
IoT Physical Devices and Endpoints - Introduction to Raspberry PI, Interfaces (serial, SPI, I2C). Programming Raspberry PI with Python - Controlling LED, Interfacing an LED and Switch, Interfacing a Light Sensor with Raspberry Pi.

## UNIT–III
Domain Specific IoTs – Home, City, Environment, Energy Systems, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.
IoT and M2M – Software Defined Networks, Network Function Virtualization, Difference between SDN and NFV for IoT.
IoT System Management with NETCONF-YANG: SNMP, NETCONF, YANG, NETOPEER.

## UNIT–IV
IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, WAMP-AutoBahn for IoT, Cloud for IoT, Python Web Application Framework, Designing a RESTful Web API.

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**UNIT-V**

Case Studies Illustrating IoT Design: Home Automation and Agriculture.

**TEXTBOOKS:**
1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press,2015.
2. Learning Internet of Things by Peter Waher, Packt publisher, 2015.

**REFERENCES:**
3. Getting started with sensors: Measure the world with Electronics, Arduino, and Raspberry, Kimmokarvinen and teroKarvenien, First Edition, Shroff/O'Reilly, 2014.
4. Getting started with Raspberry Pi, Richardson Matt, Shroff Publishers & Distributers Private Limited.2015
5. Practical Internet of Things Security by Brian Russell, Drew Van Duren, Packt publisher, 2016.

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**(AUTONOMOUS)**

**2080561: ROBOTICS (Professional Elective-VI)**

| IV Year B.Tech. CS II – Sem. | L | T | P | C |
|---|---|---|---|---|
| | 3 | 0 | 0 | 3 |

**Course Objectives**:
- To understand the functions of the basic components of a Robot.
- To study the use of various types of End of Effectors and Sensors
- To impart knowledge in Robot Kinematics and Programming
- To learn Robot safety issues and economics.

**Course Outcomes:** The students will be able to**:**
- Upon completion of this course, the students can able to apply the basic engineering knowledge for the design of robotics

**UNIT-I FUNDAMENTALS OF ROBOT**
Robot - Definition - Robot Anatomy - Co ordinate Systems, Work Envelope Types and Classification- Specifications-Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load- Robot Parts and their Functions-Need for Robots-Different Applications.

**UNIT-II ROBOT DRIVE SYSTEMS AND END EFFECTORS**
Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

**UNIT–III SENSORS AND MACHINE VISION**
Requirements of a sensor, Principles and Applications of the following types of sensors- Position sensors - Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, pneumatic Position Sensors, Range Sensors Triangulations Principles, Structured, Lighting Approach, Time of Flight, Range Finders, Laser Range Meters, Touch Sensors ,binary Sensors., Analog Sensors, Wrist Sensors, Compliance Sensors, Slip Sensors, Camera, Frame Grabber, Sensing and Digitizing Image Data- Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis-Data Reduction, Segmentation, Feature Extraction, Object Recognition, Other Algorithms, Applications- Inspection, Identification, Visual Serving and Navigation.

**UNIT–IV ROBOT KINEMATICS AND ROBOT PROGRAMMING**
Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design-Derivations and problems. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

**UNIT-V IMPLEMENTATION AND ROBOT ECONOMICS**
RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

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**TEXTBOOKS:**

1. Klafter R.D., Chmielewski T.A and Negin M., "Robotic Engineering - An Integrated Approach", Prentice Hall, 2003.
2. Groover M.P., "Industrial Robotics -Technology Programming and Applications", McGraw Hill, 2001.

**REFERENCES:**

1. Craig J.J., "Introduction to Robotics Mechanics and Control", Pearson Education, 2008.
2. Deb S.R., "Robotics Technology and Flexible Automation" Tata McGraw Hill Book Co., 1994.
3. Koren Y., "Robotics for Engineers", Mc Graw Hill Book Co., 1992.
4. Fu.K.S., Gonzalz R.C. and Lee C.S.G., "Robotics Control, Sensing, Vision and Intelligence", McGraw Hill Book Co., 1987.
5. Janakiraman P.A., "Robotics and Image Processing", Tata McGraw Hill, 1995.
6. Rajput R.K., "Robotics and Industrial Automation", S.Chand and Company, 2008.
7. Surender Kumar, "Industrial Robots and Computer Integrated Manufacturing", Oxford and IBH Publishing Co. Pvt. Ltd., 1991.

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## 2086247: HIGH PERFORMANCE COMPUTING (Professional Elective-VI)

**IV Year B.Tech. CS II – Sem.**

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|---|---|---|---|
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**PREREQUISITES:**
- Computer organization and architecture
- Operating system programming

**Course Outcomes:** The students will be able to:
- Understanding the concepts in grid computing
- Ability to set up cluster and run parallel applications
- Ability to understand the cluster projects and cluster OS
- Understanding the concepts of pervasive computing & quantum computing.

### UNIT-I

Grid Computing: Data & Computational Grids, Grid Architectures And Its Relations To Various Distributed Technologies. Autonomic Computing, Examples Of The Grid Computing Efforts (Ibm).

### UNIT-II

Cluster Setup & Its Advantages, Performance Models & Simulations; Networking Protocols & I/O,
Messaging Systems. Process Scheduling, Load Sharing And Balancing; Distributed Shared Memory, Parallel I/O.

### UNIT–III

Example Cluster System – Beowlf; Cluster Operating Systems: Compas And Nanos Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

### UNIT–IV

Device Connectivity; Java for Pervasive Devices; Application Examples.

### UNIT–V

Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin & Toffoli Gates; Quantum Circuits; Quantum Algorithms.

**TEXTBOOKS:**
1. "Selected Topics In Advanced Computing" Edited By Dr. P. Padmanabham And Dr. M.B. Srinivas, 2005 Pearson Education.

**REFERENCES:**
1. J. Joseph & C. Fellenstien: 'Grid Computing ', Pearson Education
2. J. Burkhardt et.al: 'pervasive computing' Pearson Education
3. Marivesar:' Approaching quantum computing', Pearson Education.
4. Raj kumar Buyya:'High performance cluster computing', Pearson Education.
5. Neilsen & Chung L:' Quantum computing and Quantum Information', Cambridge University Press.

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6.  A networking approach to Grid Computing, Minoli, Wiley

**2080551: COMPTER FORENSICS (Professional Elective-III)**

**IV Year B.Tech. CS I – Sem.**                                    L   T   P   C
                                                                   3   0   0   3

**Prerequisites:** Computer Networks, Cryptography and Network Security

**Course Objectives:**
- To learn computer forensics
- To explain forensics tools
- To analyze and validate forensics data

**Course Outcomes:** The students will be able to:
- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario.
- Analyze and validate forensics data
- Identify the vulnerabilities in a given network infrastructure
- Implement real -world hacking techniques to test system security

**UNIT-I**
**Computer Forensics Fundamentals:** What is Computer Forensics? Use of Computer Forensics in Law Enforecement, Computer Forensics Assistance to Human Recources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists.
**Types of Computer Forensics Technology: -** Types of Business Computer Forensic Technology. Types of Military Computer Forensic Technology, Types of Law Enforcement-Computer Forensic Technology, Types of Business Computer Forensic Technology.
**Computer Forensics Evidence and capture**: Data Recovery Defined-Data Back-up and Recovery-The Role of Back -up in Data Recovery-The Data -Recovery Solution.

**UNIT-II**
**Evidence Collection and Data Seizure:** Why Collect Evidence? Collection Options- Obstacles-Types of Evidence-The Rules of Evidence-Volatile Evidence-General Procedure-Collection and Archiving-Methods of Collections-Art facts-Collection Steps
-Controlling Contamination: The chain of custody**.**
**Duplication and Preservation of Digital Evidence:** Preserving the Digital Crime Scene-Computer Evidence processing steps-Legal Aspects of collecting and Preserving Computer forensic Evidence.
**Computer image Verification and Authentication:** Special needs of Evidential Authentication - Practical Consideration-Practical Implementation**.**

**UNIT–III**
**Computer forensic analysis and validation:** Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions
**Network Forensics:** Network forensic overview, performing live acquisitions, developing standar procedures for network forensics, using network tools, examining the honeynet project.

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**Processing crime at incident scenes**: 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, storing digital evidence, obtaining a digital hash, reviewing a case**.**

### UNIT–IV
**Current Computer Forensic Tools**: evaluating computer forensic tool needs, computer forensic software tools, computer forensic hardware tools, validating and testing forensic software.
**E-mail investigations:** Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, understanding email servers, using specialized email forensic tools.
**Cell phone and mobile device forensics:** Understanding mobile device forensic, understanding acquisition procedures for cell phones and mobile devices.

### UNIT-V
**Working with windows and dos systems:** understanding file systems, exploring Microsoft file structures examining NTFS disks, understanding whole disk encryption, windows registry, Microsoft startup tasks, MS Dos startup tasks, virtual machines.

### TEXT BOOKS:
1. Computer Forensics, Computer Crime Investigation by John R,Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.

### REFERENCES:
1. Real Digital Forensics by Keith j.Jones, Richard Bejitlich,Curtis W.Rose ,Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide  by Tony Sammes andBrain Jenkinson, Springer International edition.
3. Computer Evidence Collection &Presentation by Chrostopher L.T. Brown,Firewall Media.
4. Homeland Security,Techniques& Technologies by Jesus Mena,Firewall Media.
5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M.Slade ,TMH 2005
6. Windows Forensics by chad Steel,Wiley India Edition.

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**2086704: BUSINESS INTELLIGENCE SYSTEMS (Professional Elective-VI)**

**IV Year B.Tech. CS II – Sem.**

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**Course Outcomes:** The students will be able to**:**
- Understand architecture of data warehouse and OLAP operations.
- Understand Fundamental concepts of BI and Analytics
- Application of BI Key Performance indicators
- Design of Dashboards, Implementation of Web Analytics
- Understand Utilization of Advanced BI Tools and their Implementation.
- Implementation of BI Techniques and BI Ethics.

**UNIT-I**

DATA WAREHOUSE: Data Warehouse-Data Warehouse Architecture- Multidimensional Data Model Data cube and OLAP Technology-Data Warehouse Implementation -DBMS schemas for Decision support - Efficient methods for Data cube computation.

**UNIT-II**

Business Intelligence: Introduction – Definition, Leveraging Data and Knowledge for BI, BI Components, BI Dimensions, Information Hierarchy, Business Intelligence and Business Analytics. BI Life Cycle. Data for BI - Data Issues and Data Quality for BI.

**UNIT-III**

BI Implementation - Key Drivers, Key Performance Indicators and Performance Metrics, BI Architecture/Framework, Best Practices, Business Decision Making, Styles of BI-vent-Driven alerts – A cyclic process of Intelligence Creation. The value of Business Intelligence-Value driven &amp; Information use.

**UNIT-IV**

Advanced BI – Big Data and BI, Social Networks, Mobile BI, emerging trends, Description of different BI-Tools (Pentaho, KNIME)

**UNIT-V**

Business intelligence implementation-Business Intelligence and integration implementation-connecting in BI systems- Issues of legality- Privacy and ethics- Social networking and BI.

**TEXTBOOKS:**

1. Data Mining – Concepts and Techniques - JIAWEI HAN &amp; MICHELINE KAMBER, Elsevier.
2. Rajiv Sabherwal "Business Intelligence" Wiley Publications, 2012.

**REFERENCES:**

1. Efraim Turban, Ramesh Sharda, Jay Aronson, David King, Decision Support and Business
2. Intelligence Systems, 9th Edition, Pearson Education, 2009.
3. David Loshin, Business Intelligence - The Savy Manager&#39;s Guide Getting Onboard

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with Emerging IT, Morgan Kaufmann Publishers, 2009.

4.  Philo Janus, Stacia Misner, Building Integrated Business Intelligence Solutions with SQL Server, 2008 R2 &amp; Office 2010, TMH, 2011.

5.  Business Intelligence Data Mining and Optimization for decision making [Author: Carlo-Verellis] [Publication: (Wiley)].