**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**
*(Established by Govt. of A.P., Act. No. 30 of 2008)*
**ANANTHAPURAMU – 515 002 (A.P.) INDIA.**

-----------------------------------------------------------------------------------------------------

### Course Structure for B.Tech-R15 Regulations

## COMPUTER SCIENCE AND ENGINEERING

### I B.Tech. - I Semester

| S.No | Course code | Subject | L | T | P | Drg | C |
|---|---|---|---|---|---|---|---|
| 1. | 15A52101 | Functional English | 3 | 1 | - | - | 3 |
| 2. | 15A54101 | Mathematics – I | 3 | 1 | - | - | 3 |
| 3. | 15A05101 | Computer Programming | 3 | 1 | - | - | 3 |
| 4. | 15A56101 | Engineering Physics | 3 | 1 | - | - | 3 |
| 5. | 15A03101 | Engineering Drawing | - | - | - | 6 | 3 |
| 6. | 15A52102 | English Language Communication Skills Lab | - | - | 4 | - | 2 |
| 7. | 15A56102 | Engineering Physics Lab | - | - | 4 | - | 2 |
| 8. | 15A05102 | Computer Programming Lab | - | - | 4 | - | 2 |
| | | Total | 12 | 4 | 12 | 6 | 21 |

### I-II Semester

| S.No | Course code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | 15A52201 | English for Professional Communication | 3 | 1 | - | 3 |
| 2. | 15A54201 | Mathematics – II | 3 | 1 | - | 3 |
| 3. | 15A05201 | Data Structures | 3 | 1 | - | 3 |
| 4. | 15A51101 | Engineering Chemistry | 3 | 1 | - | 3 |
| 5. | 15A01101 | Environmental Studies | 3 | 1 | - | 3 |
| 6. | 15A05202 | Data Structures Lab | - | - | 4 | 2 |
| 7. | 15A51102 | Engineering Chemistry Lab | - | - | 4 | 2 |
| 8. | 15A99201 | Engineering & IT Workshop | - | - | 4 | 2 |
| | | Total | 15 | 5 | 12 | 21 |

* L   -   **Lecture hours**
*T   -   **Tutorial hours**
*P   -    **Practical hours**
*Drg -   **Drawing**
*C   -    **Credits**

**II B. Tech – I Sem**

| S. No | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1 | 15A54301 | Mathematics III | 3 | 1 | - | 3 |
| 2 | 15A05301 | Database Management Systems | 3 | 1 | - | 3 |
| 3 | 15A05302 | Discrete Mathematics | 3 | 1 | - | 3 |
| 4 | 15A99301 | Basic Electrical and Electronics Engineering | 3 | 1 | - | 3 |
| 5 | 15A04306 | Digital Logic Design | 3 | 1 | - | 3 |
| 6 | 15A52301 | Managerial Economics and Financial Analysis | 3 | 1 | - | 3 |
| 7 | 15A05303 | Database Management Systems Laboratory | - | - | 4 | 2 |
| 8 | 15A99302 | Basic Electrical and Electronics Laboratory | - | - | 4 | 2 |
| | | **Total** | **18** | **06** | **08** | **22** |

**II B. Tech – II Sem**

| S. No | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1 | 15A54401 | Probability and Statistics | 3 | 1 | - | 3 |
| 2 | 15A05401 | Software Engineering | 3 | 1 | - | 3 |
| 3 | 15A05402 | Computer Organization | 3 | 1 | - | 3 |
| 4 | 15A04407 | Microprocessors & Interfacing | 3 | 1 | - | 3 |
| 5 | 15A05403 | Object Oriented Programming using Java | 3 | 1 | - | 3 |
| 6 | 15A05404 | Formal Languages and Automata Theory | 3 | 1 | - | 3 |
| 7 | 15A04408 | Microprocessors & Interfacing Laboratory | - | - | 4 | 2 |
| 8 | 15A05405 | Java Programming Laboratory | - | - | 4 | 2 |
| 9 | 15A05406 | Comprehensive Online Examination-I | - | - | - | 1 |
| | | **Total** | **18** | **06** | **08** | **23** |

**B.Tech III-I Semester (CSE)**

| S. No. | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | 15A05501 | Operating Systems | 3 | 1 | - | 3 |
| 2. | 15A05502 | Computer Networks | 3 | 1 | - | 3 |
| 3. | 15A05503 | Object Oriented Analysis and Design | 3 | 1 | - | 3 |
| 4. | 15A05504 | Principles of Programming Languages | 3 | 1 | - | 3 |
| 5. | 15A05505 | Software Testing | 3 | 1 | - | 3 |
| 6. | 15A05506 15A05507 15A05508 | **MOOCS-I** a. Introduction to Big Data b. R Programming c. Introduction to Operations Management | 3 | 1 | - | 3 |
| 7. | 15A05509 | Object Oriented Analysis and Design & Software Testing Laboratory | - | - | 4 | 2 |
| 8. | 15A05510 | Operating Systems Laboratory | - | - | 4 | 2 |
| 9. | 15A99501 | Social Values & Ethics (Audit Course) | 2 | - | 2 | - |
| | | **Total** | **20** | **06** | **10** | **22** |

**B.Tech III-II Semester (CSE)**

| S. No. | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | 15A05601 | Compiler Design | 3 | 1 | - | 3 |
| 2. | 15A05602 | Data Warehousing & Mining | 3 | 1 | - | 3 |
| 3. | 15A05603 | Design Patterns | 3 | 1 | - | 3 |
| 4. | 15A05604 | Design and Analysis of Algorithms | 3 | 1 | - | 3 |
| 5. | 15A05605 | Web and Internet Technologies | 3 | 1 | - | 3 |
| 6. | 15A05606 15A05607 15A05608 15A01608 | **CBCC-I** a. Artificial Intelligence b. Linux Environment System c. System Applications & Product (SAP) d. Intellectual Property Rights | 3 | 1 | - | 3 |
| 7. | 15A05609 | Web and Internet Technologies Laboratory | - | - | 4 | 2 |
| 8. | 15A05610 | Data Warehousing & Mining Laboratory | - | - | 4 | 2 |
| 9. | 15A52602 | Advanced English Language Communication Skills(AELCS) Laboratory) (Audit Course) | - | - | 2 | - |
| 10. | 15A05611 | Comprehensive Online Examination-II | - | - | - | 1 |
| | | **Total** | **18** | **06** | **10** | **23** |

**B.Tech IV-I Semester (CSE)**

| S. No. | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | 15A52601 | Management Science | 3 | 1 | - | 3 |
| 2. | 15A05701 | Grid & Cloud Computing | 3 | 1 | - | 3 |
| 3. | 15A05702 | Information Security | 3 | 1 | - | 3 |
| 4. | 15A05703 | Mobile Application Development | 3 | 1 | - | 3 |
| 5. | 15A05704 15A05705 15A05706 | **CBCC-II** a. Software Architecture b. Computer Graphics c. Machine Learning | 3 | 1 | - | 3 |
| 6. | 15A05707 15A05708 15A05709 | **CBCC-III** a. Software Project Management b. Distributed Systems c. Real Time Systems | 3 | 1 | - | 3 |
| 7. | 15A05710 | Grid & Cloud Computing Laboratory | - | - | 4 | 2 |
| 8. | 15A05711 | Mobile Application Development Laboratory | - | - | 4 | 2 |
| | | **Total** | **18** | **06** | **08** | **22** |

**B.Tech IV-II Semester (CSE)**

| S. No. | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | 15A05801 15A05802 15A05803 | **MOOCS-II** a. Data Analytics b. Mobile Computing c. Innovations and IT Management | 3 | 1 | - | 3 |
| 2. | 15A05804 15A05805 15A05806 | **MOOCS-III** a. Building Large Scale Software Systems b. Enabling Technologies for Data Science Analytics : IoT c. Cyber Security | 3 | 1 | - | 3 |
| 3. | 15A05807 | Comprehensive Viva-Voce | - | - | 4 | 2 |
| 4. | 15A05808 | Technical Seminar | - | - | 4 | 2 |
| 5. | 15A05809 | Project Work | - | - | 24 | 12 |
| | | **Total** | 6 | 2 | 32 | 22 |

## Minor Discipline in CSE

| S. No. | Course Code | Subject | L | T | P | C |
|---|---|---|---|---|---|---|
| 1 | 15A05201 | Data Structures | 3 | 1 | - | 3 |
| 2 | 15A05301 | Database Management Systems | 3 | 1 | - | 3 |
| 3 | 15A05401 | Software Engineering | 3 | 1 | - | 3 |
| 4 | 15A05501 | Operating Systems | 3 | 1 | - | 3 |
| 5 | 15M05101 | Minor Discipline Project | - | - | - | 8 |
| | | **Total** | **12** | **4** | **-** | **20** |

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech I-I Sem. (CSE) | 3 | 1 | 0 | 3 |

## (15A52101) FUNCTIONAL ENGLISH

### (Common to All Branches)

**Preamble:**

English is an international language as well as a living and vibrant one. People have found that knowledge of English is a passport for better career, better pay, and advanced knowledge and for communication with the entire world.   As it is a language of opportunities in this global age, English is bound to expand its domain of use everywhere. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy.  The prescribed book serves the purpose of preparing them for everyday communication and to face the global competitions in future.

The text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language.  The classes should be interactive and learner-centered.  They should be encouraged to participate in the classroom activities keenly.

 In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

**Objectives:**

- To enable the students to communicate in English for academic and social purpose.
- To enable the students to acquire structure and written expressions required for their profession.
- To develop the listening skills of the students.
- To inculcate the habit of reading and critical thinking skills.
- To enhance the study skills of the students with emphasis on LSRW skills.

**UNIT –I**
**Topics:** Paragraph writing, writing letters, role play, reading graphs, prepositions, designing posters, tenses, making recommendations.

Text: ENVIRONMENTAL CONSCIOUSNESS' from *MINDSCAPES*
        Climate Change - Green Cover – Pollution

**UNIT –II**
**Topics:** Compound nouns, imperatives, writing instructions, interpreting charts and pictures, note making, role play, prefixes, subject-verb agreement.

**Text:** EMERGING TECHNOLOGIES from *MINDSCAPES*
        Solar Thermal Power - Cloud Computing - Nanotechnology

**UNIT –III**
**Topics:** Making conversations, homonyms and homophones, SMS and use of emotions, past participle for irregular verbs, group discussion, E - mail communication, antonyms, Preparing projects

**Text:** GLOBAL ISSUES from *MINDSCAPES*
     Child Labour - Food Crisis - Genetic Modification - E-Waste - Assistive Technology

**UNIT –IV**
**Topics:** Group discussion, affixes, double consonants, debates, writing a book / film review, predicting and problem-solving-future tense, adverbs

**Text:** SPACE TREK from *MINDSCAPES*
        Hubble Telescope - Chandrayan-2 - Anusat - Living Quarters - Space
        Tourism

**UNIT –V**
**Topics: C**ompare and contrast, effective writing, group discussion,    writing reports, writing advertisements, tweeting and blogging, types of interviews, framing questions.

**Text:** MEDIA MATTERS from *MINDSCAPES*
History of Media - Language and Media - Milestone in Media - Manipulation by Media - Entertainment Media - Interviews

**Text Books:**

1.  MINDSCAPES: English for Technologists and Engineers, Orient Blackswan, 2014.

**References:**

1.  A Practical Course in Effective English Speaking Skills by J.K.Gangal, PHI Publishers, New Delhi.2012
2.  Technical Communication, Meenakshi Raman, Oxford University Press,2011.
3.  Spoken English, R.K. Bansal & JB Harrison, Orient Longman,2013, 4Th edition.
4.  Murphy's English Grammar with CD, Murphy, Cambridge University Press,3 Rd edition.
5.  An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha        Nagarajan , Frank Bros & CO,2008.

**Outcomes:**

- Have improved communication in listening, speaking, reading and writing skills in general.
- Have developed their oral communication and fluency in group discussions and interviews.
- Have improved awareness of English in science and technology context.
- Have achieved familiarity with a variety of technical reports.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  I-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### (15A54101) MATHEMATICS – I

### (Common to All Branches)

**Objectives:**

- To train the students thoroughly in Mathematical concepts of ordinary differential equations and their applications.
- To prepare students for lifelong learning and successful careers using mathematical concepts of differential and Integral calculus, ordinary differential equations and vector calculus.
- To develop the skill pertinent to the practice of the mathematical concepts including the students abilities to formulate and modeling the problems, to think creatively and to synthesize information.

**UNIT – I**

Exact, linear and Bernoulli equations, Applications to first order equations; Orthogonal trajectories, Simple electric circuits.

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type $e^{ax}$, sin ax, cos ax, polynomials in x, $e^{ax}$ V(x), xV(x).

**UNIT – II**

Method of variation of parameters, linear equations with variable coefficients: Euler-Cauchy Equations, Legendre's linear equation. Applications of linear differential equations- Mechanical and Electrical oscillatory circuits and Deflection of Beams.

**UNIT – III**

Taylor's and Maclaurin's Series - Functions of several variables – Jacobian – Maxima and Minima of functions of two variables, Lagrange's method of undetermined Multipliers with three variables only.  Radius of curvature.

**UNIT – IV**

Multiple integral – Double and triple integrals – Change of Variables – Change of order of integration. Applications to areas and volumes in Cartesian and polar coordinates using double and triple integral.

**UNIT – V**

Vector Calculus: Gradient – Divergence – Curl and their properties; Vector integration – Line integral - Potential function – Area – Surface and volume integrals. Vector integral theorems: Green's theorem – Stoke's and Gauss's Divergence Theorem (Without proof). Application of Green's, Stoke's and Gauss's Theorems.

**Text Books:**

1. Engineering Mathematics-I, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher
2. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.

**References:**

1. Engineering Mathematics Volume-I, by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S.Chand publication.
2. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.
3. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.
4. Advanced Engineering Mathematics, by Alan Jeffrey, Elsevier.

**Outcomes:**

- The students become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  I-I Sem. (CSE)**

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

### (15A05101) COMPUTER PROGRAMMING

### (Common to All Branches)

**Objectives:**

- Understand  problem solving techniques
- Understand representation of a solution to a problem
- Understand the syntax and semantics of C programming language
- Understand the significance of Control structures
- Learn the features of C language

**UNIT - I**

Overview of Computers and Programming - Electronic Computers Then and Now - Computer Hardware - Computer Software - Algorithm - Flowcharts - Software Development Method - Applying the Software Development Method.

Types, Operators and Expressions:   Variable Names - Data Types and Sizes - Constants - Declarations - Arithmetic Operators - Relational and Logical Operators - Type Conversions - Increment and Decrement Operators - Bitwise Operators - Assignment Operators and Expressions - Conditional Expressions - Precedence and Order of Evaluation.

**UNIT - II**

Selections Statements – Iteration Statements – Jump Statements- Expression Statements - Block Statements.

Single Dimensional  Arrays – Generating a Pointer to an Array – Passing Single Dimension Arrays to Functions – Strings – Two Dimensional Arrays – Indexing Pointers – Array Initialization – Variable Length Arrays

## UNIT - III

Pointer Variables – Pointer Operators - Pointer Expressions – Pointers And Arrays – Multiple Indirection – Initializing Pointers – Pointers to Functions – C's Dynamic Allocation Functions – Problems with Pointers.

Understanding the scope of Functions – Scope Rules – Type Qualifiers – Storage Class Specifiers- Functions Arguments –The Return Statement.

## UNIT - IV

Command line arguments – Recursion – Function Prototypes – Declaring Variable Length Parameter Lists

Structures – Arrays of Structures – Passing Structures to Functions – Structure Pointers – Arrays and Structures within Structures – Unions – Bit Fields – Enumerations – typedef

## UNIT - V

Reading and Writing Characters – Reading and Writing Strings – Formatted Console I/O – Printf - Scanf – Standard C Vs Unix File I/O – Streams and Files – File System Basics – Fread and Fwrite – Fseek and Random Access I/O – Fprintf ( ) and Fscanf( ) – The Standard Streams – The Preprocessor Directives #define and #include.

**Text Books:**

1. "The Complete Reference C"- Fourth Edition- Herbert Schildt- McGrawHill Eduction.
2. "The C Programming Language" Second Edition- Brain W. Kernighan- Dennis M. Ritchie- Prentice Hall-India. (UNIT- I)

**References:**

1. Programming in C, Second Edition – Pradip Dey, Manas Ghosh, Oxford University Press.
2. "C From Theory to Practice"- George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
3. "Programming with C"- R S Bichkar- University Press.

4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education. (UNIT-I)
5. Computer Fundamentals and C Programming- Second Edition- P.Chenna Reddy- Available at Pothi.com (http://pothi.com/pothi/book/dr-p-chenna-reddy-computer-fundamentals-and-c-programming).

**Outcomes:**

- Apply problem solving techniques in designing the solutions for a wide-range of problems
- Choose appropriate control structure depending on the problem to be solved
- Modularize the problem and also solution

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

|   | L | T | P | C |
|---|---|---|---|---|
| B. Tech I-I Sem. (CSE) | 3 | 1 | 0 | 3 |

### (15A56101) ENGINEERING PHYSICS

### (Common to CSE/EEE/CIVIL)

**Objectives:**

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and non-destructive evaluation using ultrasonic techniques.
- To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.
- To open new avenues of knowledge and understanding semiconductor based electronic devices , basic concepts and applications of semiconductors and magnetic materials have been introduced which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in emerging technologies are elicited.

### UNIT - I

### PHYSICAL OPTICS, LASERS AND FIBRE OPTICS

*Physical Optics:* Interference (Review) – Interference in thin film by reflection –Newton's rings –Diffraction (Review) - Fraunhofer diffraction due to single slit, double slit and diffraction grating.

*Lasers:* Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients —— Population inversion – Excitation mechanism and optical resonator – Nd:YAG laser - He-Ne laser – Semiconductor Diode laser - Applications of lasers

*Fiber optics:* Introduction - construction and working principle of optical fiber –Numerical aperture and acceptance angle – Types of optical fibers – Attenuation and losses in Optical fibers –Block diagram of Optical fiber communication system – Applications of optical fibers

## UNIT – II

## CRYSTALLOGRAPHY AND ULTRASONICS

*Crystallography:* Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method.

*Ultrasonics:* Introduction – Production of ultrasonics by piezoelectric method – Properties and detection – Applications in non-destructive testing.

## UNIT – III

## QUANTUM MECHANICS AND ELECTRON THEORY

*Quantum Mechanics: M*atter waves – de'Broglie hypothesis and properties - Schrodinger's time dependent and independent wave equations – Physical significance of wave function - Particle in one dimensional infinite potential well.

*Electron theory:* Classical free electron theory – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Source of electrical resistance  – Kronig-Penny model (qualitative treatment) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

**UNIT – IV**

**SEMICONDUCTORS AND MAGNETIC MATERIALS**

*Semiconductors:* Intrinsic and extrinsic semiconductors (Qualitative treatment) – Drift & diffusion currents and Einstein's equation – Hall effect - Direct and indirect band gap semiconductors – Formation of p-n junction.

*Magnetic materials:* Introduction  and basic definitions – Origin of magnetic moments – Bohr magnetron – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials (Qualitative treatment) – Hysteresis - Soft and hard magnetic materials,  applications of magnetic materials.

**UNIT – V**

**SUPERCONDUCTIVITY AND PHYSICS OF NANOMATERIALS**

*Superconductivity:* Introduction  - Effect of magnetic field - Meissner effect – Type I and Type II superconductors – Flux quantization – Penetration depth - BCS theory (qualitative treatment) — Josephson effects –Applications of superconductors.

*Physics of Nanomaterials*: Introduction - Significance of nanoscale and types of nanomaterials – Physical properties: optical, thermal, mechanical and magnetic properties – Synthesis of nanomaterials by Top down and bottom up approaches: ball mill, chemical vapour deposition, and sol gel –Applications of nanomaterials.

**Text Books:**

 1**.** Engineering Physics – K.Thyagarajan, 5th Edition,    MacGraw Hill Publishers, NewDelhi, 2014.

 2. Physics for Engineers - N.K Verma, 1st Edition, PHI Learning Private Limited, New Delhi,2014.

**References:**

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, 10th Edition, S.Chand and
   Company, New Delhi, 2014.
2. Engineering Physics – D K Pandey, S. Chaturvedi, 2nd Edition, Cengage Learning, New Delhi,
   2013.
3. Engineering Physics – D.K Bhattacharya, Poonam Tandon, 1nd Edition, Oxford University Press, New Delhi, 2015.

**Outcomes**:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting and magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

**B. Tech  I-I Sem. (CSE)**

| L | T | Drg | C |
|---|---|-----|---|
| 0 | 0 | 6 | 3 |

## (15A03101) ENGINEERING DRAWING

### (Common to CSE/EEE/CIVIL)

**Objectives:**
- To gain and understanding of the basics of geometrical constructions of various planes and solids, understanding system of graphical representation of various objects and various views to draft and read the products to be designed and eventually for manufacturing applications.
- To learn about various projections, to understand complete dimensions and details of object.
- Ultimately student must get imaginary skill to put an idea of object, circuit, assembly of parts in black & white, to design a product and to understand the composition, which can be understood universally.

**UNIT I**

**Introduction to Engineering Drawing**: Principles of Engineering Graphics and their Significance- Conventions in Drawing-Lettering – BIS Conventions. Curves used in Engineering Practice. a) Conic Sections including the Rectangular Hyperbola- General method only, b) Cycloid, Epicycloid and Hypocycloid

**UNIT II**

**Scales:** Plain, Diagonal and Vernier;

**Projection of Points**: Principles of orthographic projection – Convention – First angle projections, projections of points.

**UNIT III**

**Projections of Lines**: lines inclined to one or both planes, Problems on projections, Finding True lengths.

**Projections of Planes**: Projections of regular plane surfaces- plane surfaces inclined to both planes.

**UNIT IV**

**Projections of Solids**: Projections of Regular Solids with axis inclined to both planes.

**Developments of Solids**: Development of Surfaces of Right Regular Solids-Prism, Cylinder, Pyramid, Cone.

**UNIT V**

**Isometric and Orthographic Projections**: Principles of isometric projection- Isometric Scale- Isometric Views- Conventions- Isometric Views of lines, Planes, Simple solids (cube, cylinder and cone). Isometric projections of spherical parts. Conversion of isometric Views to Orthographic Views.

*Text Books*:

*1. Engineering Drawing, N.D. Bhatt, Charotar Publishers*

*2. Engineering Drawing, K.L. Narayana& P. Kannaih, Scitech Publishers, Chennai*

*References*:

*1. Engineering Drawing, Johle, Tata McGraw-Hill Publishers*

*2. Engineering Drawing, Shah and Rana,2/e, Pearson Education*

*3. Engineering Drawing and Graphics, Venugopal/New age Publishers*

*4. Engineering Graphics, K.C. John, PHI,2013*

*5. Engineering Drawing, B.V.R. Guptha, J.K. Publishers*

**Outcomes:**

- Drawing 2D and 3D diagrams of various objects.
- Learning conventions of Drawing, which is an Universal Language of Engineers.
- Drafting projections of points, planes and solids.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  I-I Sem. (CSE)**

|   | L | T | P | C |
|---|---|---|---|---|
|   | 0 | 0 | 4 | 2 |

**(15A52102) ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB**

**(Common to All Branches)**

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

**Objectives:**

- To enable students to learn better pronunciation through stress on word accent, intonation, and rhythm.
- To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

**UNIT - 1**

1. Phonetics -importance
2. Introduction to Sounds of Speech
3. Vowels and consonants sounds
4. Phonetic Transcription

**UNIT - II**

5. Word Stress
6. Syllabification
7. Rules of word stress
8. Intonation

**UNIT - III**

9. Situational Dialogues
10. Role Plays
11. JAM
12. Describing people/objects/places

**UNIT - IV**

13. Debates
14. Group Discussions
15. Interview skills

**UNIT - V**

16. Video speech writing
17. Book reviews -oral and written

**Minimum Requirements for ELCS Lab:**

The English Language Lab shall have two parts:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. The Communication Skills Lab with movable chairs and audio-visual aids with a P.A. system, Projector, a digital stereo-audio & video system and camcorder etc.
   System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

       i)       P – IV Processor
           a)  Speed – 2.8 GHZ
           b)  RAM – 512 MB Minimum
           c)  Hard Disk – 80 GB
       ii)     Headphones of High quality

**Suggested Software:**

1. Clarity Pronunciation Power – Part I (Sky Pronunciation)
2. Clarity Pronunciation Power – part II
3. K-Van Advanced Communication Skills
4. Walden InfoTech Software.

**References:**

1. A Textbook of English Phonetics for Indian Students 2nd Ed T. Balasubramanian. (Macmillian),2012.
2. A Course in Phonetics and Spoken English, Dhamija Sethi, Prentice-Hall of India Pvt.Ltd
3. Speaking English Effectively, 2nd Edition Krishna Mohan & NP Singh, 2011. (Mcmillan).
4. A Hand book for English Laboratories, E.Suresh Kumar, P.Sreehari, Foundation Books,2011
5. Spring Board Succes, Sharada Kouhik, Bindu Bajwa, Orient Blackswan, Hyderbad, 2010.

**Outcomes**:

- Become active participants in the learning process and acquire proficiency in spoken English.
- Speak with clarity and confidence thereby enhance employability skills.

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech I-I Sem. (CSE)** | **0** | **0** | **4** | **2** |

### (15A56102) ENGINEERING PHYSICS LABORATORY

### (Common to CSE/EEE/CIVIL)

**Objectives**:

- Will recognize the important of optical phenomenon like Interference and diffraction.
- Will understand the role of optical fiber parameters and signal losses in communication.
- Will recognize the importance of energy gap in the study of conductivity and hall effect
  in a semiconductor
- Will understand the applications of B H curve.
- Will acquire a practical knowledge of studying the crystal structure in terms of lattice constant.
- Will recognize the application of laser in finding the particle size and its role in diffraction studies.
- Will learn to synthesis of the nanomaterials and recognize its importance by knowing its nano particle size and its impact on its properties.

**Any 10 of the following experiments has to be performed during the I year I semester**

1. Determination of radius of curvature of a Plano-convex lens by forming Newton's rings.
2. Determination of wavelength of given source using diffraction grating in normal incidence method.
3. Determination of Numerical aperture, acceptance angle of an optical fiber.
4. Energy gap of a Semiconductor diode.
5. Hall effect – Determination of mobility of charge carriers.
6. B-H curve – Determination of hysteresis loss for a given magnetic material.
7. Determination of Crystallite size using X-ray pattern (powder) using debye-scheerer method.
8. Determination of particle size by using laser source.
9. Determination of dispersive power of a prism.

10. Determination of thickness of the thin wire using wedge Method.
11. Laser : Diffraction due to single slit
12. Laser : Diffraction due to double slit
13. Laser: Determination of wavelength using diffraction grating
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Synthesis of nanomaterial by any suitable method.

**References:**

1.  Engineering Physics Practicals – NU Age Publishing House, Hyderabad.
2.  Engineering Practical physics – Cengage Learning,  Delhi.

**Outcomes:**

- Would recognize the important of optical phenomenon like Interference and diffraction.
- Would have acquired the practical application knowledge of optical fiber, semiconductor, dieclectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.

Would recognize the significant importance of nanomaterials in various engineering fields.

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| L | T | P | C |
|---|---|---|---|

**B. Tech  I-I Sem. (CSE)**     **0   0   4   2**

### (15A05102) COMPUTER PROGRAMMING LAB

### (Common to All branches)

**Objectives:**

- Learn C Programming language
- To make the student solve problems, implement algorithms using C language.

**List of Experiments/Tasks**

1. Practice DOS and LINUX Commands necessary for design of C Programs.
2. Study of the Editors, Integrated development environments, and Compilers in chosen platform.
3. Write, Edit, Debug, Compile and Execute Sample C programs to understand the programming environment.
4. Practice programs: Finding the sum of three numbers, exchange of two numbers, maximum of two numbers, To read and print variable values of all data types of C language, to find the size of all data types, to understand the priority and associativity of operators using expressions, to use different library functions of C language.
5. Write a program to find the roots of a Quadratic equation.
6. Write a program to compute the factorial of a given number.
7. Write a program to check whether the number is prime or not.
8. Write a program to find the series of prime numbers in the given range.
9. Write a program to generate Fibonacci numbers in the given range.
10. Write a program to find the maximum of a set of numbers.
11. Write a program to reverse the digits of a number.
12. Write a program to find the sum of the digits of a number.
13. Write a program to find the sum of positive and negative numbers in a given set of numbers.
14. Write a program to check for number palindrome.
15. Write a program to evaluate the sum of the following series up to 'n' terms $e^x=1+x+x^2/2!+x^3/3!+x^4/4!+$--------
16. Write a program to generate Pascal Triangle.

17. Write a program to read two matrices and print their sum and product in the matrix form.
18. Write a program to read matrix and perform the following operations.
    i. Find the sum of Diagonal Elements of a matrix.
    ii. Print Transpose of a matrix.
    iii. Print sum of even and odd numbers in a given matrix.
19. Write a program to accept a line of characters and print the number of Vowels, Consonants, blank spaces, digits and special characters.
20. Write a program to insert a substring in to a given string and delete few characters from the string. Don't use library functions related to strings.
21. Write a program to perform the operations addition, subtraction, multiplication of complex numbers.
22. Write a program to split a 'file' in to two files, say file1 and file2. Read lines into the 'file' from standard input. File1 should consist of odd numbered lines and file2 should consist of even numbered lines.
23. Write a program to merge two files.
24. Write a program to implement numerical methods Lagrange's interpolation, Trapezoidal rule.
25. Write a program to read a set of strings and sort them in alphabetical order.
26. Write a program to read two strings and perform the following operations without using built-in string Library functions and by using your own implementations of functions.
    i. String length determination            ii .Compare Two Strings
    iii. Concatenate them, if they are not equal            iv.            String

reversing

27. Write programs using recursion for finding Factorial of a number, GCD, LCM, and solving Towers of Hanoi problem.
28. Write a program to exchange two numbers using pointers.
29. Write a program to read student records into a file. Record consists of rollno, name and marks of a student in six subjects and class. Class field is empty initially. Compute the class of a student. The calculation of the class is as per JNTUA rules. Write the first class, second class, third class and failed students lists separately to another file.
30. A file consists of information about employee salary with fields employeeid, name, Basic, HRA, DA, IT, other-deductions, Gross and Net salary. Initially only employeeid, name, and basic have valid values. HRA is taken as 10% of the basic, DA is taken as 80% of basic, IT is 20% of the basic, other deductions is user specified. Compute the Gross and Net salary of the employee and update the file.
31. Write a program to perform Base (decimal, octal, hexadecimal, etc) conversion.

32. Write a program to find the square root of a number without using built-in library function.
33. Write a program to convert from string to number.
34. Write a program to implement pseudo random generator.
35. Write a program to generate multiplication tables from 11 to 20.
36. Write a program to express a four digit number in words. For example 1546 should be written as one thousand five hundred and forty six.
37. Write a program to generate a telephone bill. The contents of it and the rate calculation etc should be as per BSNL rules. Student is expected to gather the required information through the BSNL website.
38. Write a program to find the execution time of a program.
39. Design a file format to store a person's name, address, and other information. Write a program to read this file and produce a set of mailing labels

**Note**:

1. Instructors are advised to conduct the lab in LINUX/UNIX environment also
2. The above list consists of only sample programs. Instructors may choose other programs to illustrate certain concepts, wherever is necessary. Programs should be there on all the concepts studied in Theory. Instructors are advised to change atleast 25% of the programs every year until the next syllabus revision.

**References:**

1. "How to Solve it by Computer", R.G. Dromey, Pearson.
2. "The C Programming Language", Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. "Let us C", Yeswant Kanetkar, BPB publications
4. "Pointers in C", Yeswant Kanetkar, BPB publications.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

**Outcomes:**

- Apply problem solving techniques to find solutions to problems
- Able to use C language features effectively and implement solutions using C language.
- Improve logical skills.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech I-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### (15A52201) ENGLISH FOR PROFESSIONAL COMMUNICATION

## 1. INTRODUCTION:

English is a global language and has international appeal and application. It is widely used in a variety of contexts and for varied purposes. The students would find it useful both for social and professional development.  There is every need to help the students acquire skills useful to them in their career as well as workplace. They need to write a variety of documents and letters now extending into professional domain that cuts across business and research also. The syllabus has been designed to enhance communication skills of the students of engineering and pharmacy.  The prescribed book serves the purpose of preparing them for everyday communication and  to face the global  competitions in future.

The text prescribed for detailed study focuses on LSRW skills and vocabulary development. The teachers should encourage the students to use the target language.  The classes should be interactive and learner-centered.  They should be encouraged to participate in the classroom activities keenly.

 In addition to the exercises from the text done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements, promotional material etc.

## 2. OBJECTIVES:

1.  To develop confidence in the students to use English in everyday situations.
2.  To enable the students to read different discourses so that they appreciate English for science and technologies.
3.  To improve familiarity with a variety of technical writings.
4.  To enable the students to acquire structure and written expressions required for their profession.
5.  To develop the listening skills of the students.

## 3. SYLLABUS:
**UNIT –I**

**Topics:** Group discussion, cause and effect, events and perspectives, debate, if conditional, essay writing.

**Text: LESSONS FROM THE PAST** from *MINDSCAPES*
Importance of History - Differing Perspectives - Modern Corporatism - Lessons From The Past

## UNIT-II

**Topics:** Idioms, essay writing, power point presentation, modals, listening and rewriting, preparing summary, debate, group discussion, role play, writing a book review, conversation

**Text: 'ENERGY'** from *MINDSCAPES*
Renewable and Non-Renewable Sources - Alternative Sources -Conservation -Nuclear Energy

## UNIT-III

**Topics:** Vocabulary, impromptu speech, creative writing, direct and indirect speech, fixed expressions, developing creative writing skills, accents, presentation skills, making posters, report writing

**Text: 'ENGINEERING ETHICS'** from *MINDSCAPES*
Challenger Disaster - Biotechnology - Genetic Engineering - Protection From Natural Calamities

## UNIT-IV

**Topics:** Vocabulary, Conversation, Collocation, Group discussion, Note-making, Clauses, Interpreting charts and tables , Report writing.

**Text: 'TRAVEL AND TOURISM'** from *MINDSCAPES*

Advantages and Disadvantages of Travel - Tourism - Atithi Devo Bhava - Tourism in India

**UNIT-V**

**Topics:** Vocabulary, phrasal verbs, writing a profile, connectives, discourse markers, problem-solving, telephone skills, application letters, curriculum vitae, interviews (telephone and personal)

**Text: 'GETTING JOB-READY'** from *MINDSCAPES*

SWOT Analysis - Companies And Ways Of Powering Growth - Preparing For Interviews

**Prescribed Text**

*MINDSCAPES*: English for Technologists and Engineers, Orient Blackswan, 2014.

**REFERENCES:**

1**. Effective Tech Communication,** Rizvi,Tata McGraw-Hill Education, 2007.

2. **Technical Communication,** Meenakshi Raman, Oxford University Press.

3. **English Conversations Prcatice,** Grant Taylor, Tata Mc GrawHill publications,2013**.**

4**.Practical English Grammar.** Thomson and Martinet, OUP, 2010.

**Expected Outcomes:**

At the end of the course, students would be expected to:

1. Have acquired ability to participate effectively in group discussions.

2. Have developed ability in writing in various contexts.

3. Have acquired a proper level of competence for employability.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  I-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

### (15A54201)   MATHEMATICS – II

### (Common to All Branches)

**Objectives:** Our emphasis will be more on conceptual understanding and application of Fourier series, Fourier, Z and Laplace transforms and solution of partial differential equations.

### UNIT – I

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Unit step function – Second shifting theorem – Dirac's delta function – Convolution theorem – Laplace transform of Periodic function.

Differentiation and integration of transform – Application of Laplace transforms to ordinary differential equations of first and second order.

### UNIT – II

Fourier Series: Determination of Fourier coefficients – Fourier series – Even and odd functions – Fourier series in an arbitrary interval – Even and odd periodic continuation – Half-range Fourier sine and cosine expansions- Parseval's formula- Complex form of Fourier series.

### UNIT – III

Fourier integral theorem (only statement) – Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – Finite Fourier transforms.

### UNIT – IV

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Method of separation of variables – Solutions of one dimensional

wave equation, heat equation and two-dimensional Laplace's equation under initial and boundary conditions.

**UNIT – V**

z-transform – Inverse z-transform – Properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equations by z-transforms.

**TEXT BOOKS:**

1. Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
2. Engineering Mathematics, Volume - II, E. Rukmangadachari Pearson Publisher.

**REFERENCES:**

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad S. Chand publication.
2. Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.

3. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

<u>Outcomes:</u>The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  I-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

### (15A05201) DATA STRUCTURES

### (Common to CSE and IT branches of Engineering)

**Objectives:**

- Understand different Data Structures
- Understand Searching and Sorting techniques

**Unit-1**

**Introduction and overview**: Asymptotic Notations, One Dimensional array- Multi Dimensional array- pointer arrays.

**Linked lists**: Definition- Single linked list- Circular linked list- Double linked list- Circular Double linked list- Application of linked lists.

**Unit-2**

**Stacks**: Introduction-Definition-Representation of Stack-Operations on Stacks-Applications of Stacks.

**Queues**:  Introduction, Definition- Representations of Queues- Various Queue Structures- Applications of Queues. **Tables**: Hash tables.

**Unit-3**

**Trees**: Basic Terminologies- Definition and Concepts- Representations of Binary Tree-Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees, Height Balanced Trees, B. Trees, Red Black Trees.

**Graphs**: Introduction- Graph terminologies- Representation of graphs- Operations on Graphs- Application of Graph Structures: Shortest path problem- topological sorting.

**Unit-4**

**Sorting** : Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort-Sorting by Exchange- Bubble Sort- Shell Sort-Quick Sort-External Sorts: Merging Order Files-Merging Unorder Files- Sorting Process.

**Unit-5**

**Searching:** List Searches- Sequential Search- Variations on Sequential Searches-Binary Search- Analyzing Search Algorithm- Hashed List Searches- Basic Concepts-Hashing Methods- Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing.

**Text Books:**

1. "Classic Data Structures", Second Edition by Debasis Samanta, PHI.

2. "Data Structures A Pseudo code Approach with C", Second Edition by

   Richard F. Gilberg, Behrouz A. Forouzan, Cengage Learning.

**Reference Books:**

1. Fundamentals of Data Structures in C – Horowitz, Sahni, Anderson-

   Freed, Universities Press, Second Edition.

2. Schaum' Outlines – Data Structures – Seymour Lipschutz – McGrawHill-

   Revised First Edition.

3. Data structures and Algorithms using C++, Ananda Rao Akepogu and
   Radhika Raju Palagiri, Pearson Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech I-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

## (15A51101) ENGINEERING CHEMISTRY

### (Common to All Branches)

**Objectives:**

- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand the concepts of chemistry and apply to various materials for engineering applications.

## UNIT – I  WATER QUALITY AND TREATMENT

Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity, acidity and chlorides in water, Water treatment for domestic purpose (Chlorination, Bleaching powder, ozonisation)

Industrial Use of water:

For steam generation, troubles of Boilers: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water:

Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate treatment.

External Treatment: Ion-Exchange and Permutit processes.

Demineralisation of brackish water: Reverse Osmosis and Electrodialysis

## UNIT – II POLYMERS

i)Introduction: Basic concepts of polymerisation, Types of poloymerisation (Chain Growth (Addition), Step growth (Condensation)), Mechanism: cationic, anionic, free radical and coordination covalent.

Plastomers: Thermosetting and Thermoplatics, Preparation, properties and Engineering applications of PVC, Teflon, Bakelite and nylons.

Elastomers

Natural Rubber; Processsing of natural rubbers, Compounding of Rubber

Synthetic Rubber:  Preparation, properties and engineering applications of Buna-S, Buna-N, Polyurethene, Polysulfide (Thiokol) rubbers

ii) Conducting polymers: Mechanism, synthesis and applications of polyacetyline, polyaniline.

iii) Inorganic Polymers: Basic Introduction, Silicones, Polyphospazins (-(R)2-P=N-) applications

## UNIT – IIIELECTROCHEMISTRY

i) Galvanic cells, Nernest Equation, Numerical calculations, Batteries: Rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries),Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen, Solid oxide)

ii) Corrosion: Introduction, type of corrosion (Concentration cell corrosion, Galvanic corrosion), Chemical (Dry) and Electrochemical (Wet) Theory of corrosion. Galvanic series, factors affecting the corrosion (Metal and environment). Prevention: Cathodic protection (Sacrificial anode and impressed current), Inhibitors (Anodic and cathodic), electroplating (Copper, nickel and chromium) and electroless plating (Copper and nickel)

## UNIT – IVFUELS AND COMBUSTION

Classifications of Fuels – Characteristics of Fuels- Calorific Value – Units, Numerical Problems.

Solid Fuels: Coal-Classification and Analysis (proximate and ultimate), Coke :Characteristics of metallurgical coke, Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels:

Petroleum: Refining of Petroleum, Gasoline- Octane Number, Diesel -Cetane Number, Synthetic Petrol: Bergius Processes, Fischer Troph's synthesis

Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

Gaseous Fuels: Natural gas, Producer gas, Water gas, Coal gas and Biogas. Determination calorific value of Gases fuels by Junker's calorimeter.

Combustion: Basic principles and numerical problems, Flue Gas analysis by Orsat's apparatus.

## UNIT – V CHEMISTRY OF ENGINEERING MATERIALS

i) Cement: Composition, Classification, preparation (Dry and Wet processes), Setting and Hardening (Hydration and Hydrolysis)

ii) Refractories: Introduction, Classification , properties and applications

iii) Lubricants: Introduction, classification (Solid, liquid, semi solid, emulsion and synthetic),Theory of lubrication (Thin film, Thick film & Extreme pressure) , properties of lubricants and applications.

iv) Carbon clusters: Fullerenes and Carbon Nano Tubes (CNT)

**Text Books**:

1. Engineering Chemistry, First Edition, Jayaveera KN, Subba Reddy GVand Ramachandraiah C, McGraw Hill Higher Education, New Delhi, 2013.
2. A Text Book of Enigneering Chemistry, 15th Edition, Jain and Jain, Dhanapathi Rai
Publications, New Delhi, 2013.

**References:**

1. A Text book of Engineering Chemistry, 12th Edition, SS Dhara,Uma, S. Chand Publications, New Delhi, 2010.
2. Engineering Chemistry, First edition, K.B. Chandra Sekhar, UN.Das and Sujatha Mishra, SCITECH  Publications India Pvt Limited, 2010.
3. Engineering Chemistry, First edition, Seshamaheswaramma K and Mridula Chugh, Pearson Education, 2013.

**Outcomes:** The student is expected to:
- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy

Understand industrially based polymers, various engineering materials.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech I-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### (15A01101) ENVIRONMENTAL STUDIES

*OBJECTIVE: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.*

**UNIT – I**

**MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES: –** Definition, Scope and Importance – Need for Public Awareness.

**NATURAL RESOURCES :** Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

**UNIT – II**

**ECOSYSTEMS:** Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**BIODIVERSITY AND ITS CONSERVATION :** Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

**UNIT – III**

**ENVIRONMENTAL POLLUTION:** Definition, Cause, effects and control measures of :

a. Air Pollution.

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

**SOLID WASTE MANAGEMENT :** Causes**,** effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

## UNIT – IV

**SOCIAL ISSUES AND THE ENVIRONMENT:** From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

## UNIT – V

**HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

**FIELD WORK :** Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

**TEXT BOOKS** :

1.  Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.

2.  Environmental Studies by Kaushik, New Age Pubilishers.

**REFERENCES :**

1.  Environmental studies by R.Rajagopalan, Oxford University Press.

2.  Comprehensive Environmental studies  by J.P.Sharma, Laxmi publications.

3.  Introduction to Environmental engineering and science by  Gilbert M. Masters and Wendell P. Ela - Printice hall of India  Private limited.

**Outcomes :**

(1) Students will get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.

(2) Students will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.

(3) Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.

(4) By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often.

At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|     | L | T | P | C |
|-----|---|---|---|---|
| B. Tech  I-II Sem. (CSE) | 0 | 0 | 4 | 2 |

## (15A05202) DATA STRUCTURES LAB

### (Common to CSE & IT Branches of Engineering)

**Course Objectives:**

- To strengthen the ability to identify and apply the suitable data structure for the given real  world problem

**Course Outcomes:**

- Apply problem solving techniques to find solutions to problems
- Able to identify the appropriate data structure for a given problem or application.
- Improve logical skills

**List of Experiments/Tasks**

40. Write a program to sort the elements of an array using sorting by exchange.
41. Write a program to sort the elements of an array using Selection Sort.
42. Write a program to implement heap sort.
43. Write a program to perform Linear Search on the elements of a given array.
44. Write a program to perform Binary Search on the elements of a given array.
45. Write a program to convert infix expression to postfix expression and evaluate postfix expression.
46. Write a program to implement stack, queue, circular queue using arrays and linked lists.

47. Write a program to perform the operations creation, insertion, deletion, and traversing a singly linked list.
48. Write a program to perform the operations creation, insertion, deletion, and traversing a Doubly linked list.

10. Write a program to remove duplicates from ordered and unordered

    arrays.

11. Write a program to sort numbers using insertion sort.
12. Write a program to implement quick sort using non-recursive and recursive approaches. Use randomized element as partitioning element.
13. Write a program to search a word in a given file and display all its positions.
14. Write a program for tic-tac-toe game.
15. Write a program to perform operations creation, insertion, deletion and traversing on a binary search tree.
16. Write a program to implement depth first search and breadth first search on graphs.
17. Write a program to perform different operations on Red Black trees.
18.  Write a program to implement external sorting.
19. Write a program to perform different operations of B Tree.

**Note**:

3. Instructors are advised to conduct the lab in LINUX/UNIX environment

4. The above list consists of only sample programs. Instructors may choose other programs to illustrate certain concepts, wherever is necessary. Programs should be there on all the concepts studied in Theory. Instructors are advised to change atleast 25% of the programs every year until the next syllabus revision.

**References:**

6. Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-freed, Second Edition, Universities Press.
7. Data structures and Algorithms using C++, Ananda Rao Akepogu and Radhika Raju Palagiri, Pearson Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech I-II Sem. (CSE)** | 0 | 0 | 4 | 2 |

### (15A51102) ENGINEERING CHEMISTRY LAB
### (Common to All Branches)

**Objectives**:

- Will learn practical understanding of the redox reaction
- Will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications
- Will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.

**List of Experiments:**

1. Determination of total hardness of water by EDTA method.

2. Determination of Copper by EDTA method.

3. Estimation of Dissolved Oxygen by Winkler's method

4. Estimation of iron (II) using diphenylamine indicator (Dichrometry – Internal indicator method).

5. Determination of Alkalinity of Water

6. Determination of acidity of Water

7. Preparation of Phenol-Formaldehyde (Bakelite)

8. Determination of Viscosity of oils using Redwood Viscometer I

9. Determination of Viscosity of oils using Redwood Viscometer II

10. Determination of calorific value of gaseous fuels by Junker's Calorimeter

11. Conductometric estimation of strong acid using standard sodium hydroxide solution

12. Determination of Corrosion rate and inhibition efficiency of an inhibitor for mild steel in hydrochloric acid medium.

13. Potentio metric determination of iron using standard potassium dichromate

14. Colorometric estimation of manganese.

15. pH meter calibration and measurement of pH of water and various other samples.

(Any 10 experiments from the above list)

**References:**

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham J et al, Pearson Education, 2012.
2. Chemistry Practical– Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.

**Outcomes:**

- Would be confident in handling energy storage systems and would be able combat chemical corrosion
- Would have acquired the practical skill to handle the analytical methods with confidence.
- Would feel comfortable to think of design materials with the requisite properties
- Would be in a position to technically address the water related problems.

### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

**B. Tech I-II Sem. (CSE)**

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 4 | 2 |

### (15A99201) ENGINEERING & I.T. WORKSHOP

**ENGINEERING WORKSHOP**

*Course Objective:*

*The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.*

**1. TRADES FOR EXERCISES:**

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock

b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock

c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet

d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.

e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.

f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint.

**2. TRADES FOR DEMONSTRATION:**

    a.   Plumbing
    b.   Machine Shop
    c.   Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

*References:*

1. *Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009*
2. *Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.*
3. *Engineering Practices Lab Manual, Jeyapoovan, SaravanaPandian, 4/e Vikas*
4. *Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.*


**I.T. WORKSHOP**

**Course Objective:**

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

**Learning Outcome:**

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing

- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

## Preparing your Computer ( 5 weeks)

**Task 1: Learn about Computer:** Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

**Task 2: Assembling a Computer:** Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

**Task 3: Install Operating system:** Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

**Task 4**: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

## Networking and Internet (4 weeks)

**Task 5: Networking**: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

**Task 6:  Browsing Internet**: Student should access the Internet for Browsing. Students should search the Internet for required information.  Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc.

If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

**Task 7: Antivirus:** Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

**Productivity tools (6 weeks)**

**Task 8: Word Processor:** Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

**Task 9: Spreadsheet:** Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

**Task 10: Presentations :** creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

**Optional Tasks**:

**Task 11: Laboratory Equipment**: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system

- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

**Task 12: Software**: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

**References:**

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

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

**B. Tech  II-I Sem. (CSE)**

### (15A54301) MATHEMATICS-III

### (Common to All Branches)

**Objectives:**

- This course aims at providing the student with the concepts of Matrices, Numerical Techniques and Curve fitting.

**UNIT – I**

Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.

**UNIT – II**

Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.

**UNIT – III**

**Interpolation:** Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.

**UNIT – IV**

Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration:  Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

**UNIT – V**

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.

**TEXT BOOKS:**

3.  Higher Engineering Mathematics, B.S.Grewal, Khanna publishers.
4.  Introductory Methods of Numerical Analysis, S.S. Sastry, PHI publisher.

**REFERENCES:**

2.  Engineering Mathematics, Volume - II, E. Rukmangadachari  Pearson Publisher.
3.  Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and M.V.S.S.N.Prasad, S. Chand publication.
3.  Higher Engineering Mathematics, by B.V.Ramana, Mc Graw Hill publishers.

4.  Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley India.

**Outcomes:**The student will be able to analyze engineering problems using the concepts of Matrices and Numerical methods.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech II-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### (15A05301) DATABASE MANAGEMENT SYSTEMS

**Objectives:**

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

**UNIT-I**

Introduction-Database System Applications, Purpose of Database Systems, View of Data - Data Abstraction, Instances and Schemas, Data Models, Database Languages - DDL, DML, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design , ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model - Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.

**UNIT-II**

Relational Algebra and Calculus: Relational Algebra - Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus - Tuple relational Calculus - Domain relational calculus - Expressive Power of Algebra and calculus.

Form of Basic SQL Query - Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set - Comparison Operators, Aggregate Operators, NULL values - Comparison using Null values - Logical connectives - AND, OR and NOT - Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

**UNIT-III**

Introduction to Schema Refinement - Problems Caused by redundancy, Decompositions - Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms - BCNF - Properties of Decompositions - Loss less join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design - Multi valued Dependencies - FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

## UNIT-IV

Transaction Management - Transaction Concept - Transaction State - Implementation of Atomicity and Durability - Concurrent - Executions - Serializability - Recoverability - Implementation of Isolation - Testing for serializability.

Concurrency Control - Lock - Based Protocols - Timestamp Based Protocols - Validation - Based Protocols - Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity - Log - Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with loss of nonvolatile storage - Advance Recovery systems - Remote Backup systems.

## UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree indexes, Indexed Sequential Access Methods(ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

## TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, McGrawHill Education, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw Hill, VI edition, 2006.

**REFERENCES:**

1. Database Systems, 6th edition, Ramez Elmasri, Shamkat B. Navathe, Pearson Education, 2013.
2. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3. Introduction to Database Systems, C.J. Date, Pearson Education.
4. Database Management Systems, G.K. Gupta, McGrawHill Education.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system,
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### (15A05302) DISCRETE MATHEMATICS

**Course Objectives**

- Understand the methods of discrete mathematics such as proofs, counting principles, number theory, logic and set theory.
- Understand the concepts of graph theory, binomial theorem, and generating function in analysis of various computer science applications.

**Course Outcomes**

- Able to apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology.
- Able to apply the concepts in courses like Computer Organization, DBMS, Analysis of Algorithms, Theoretical Computer Science, Cryptography, Artificial Intelligence

**UNIT I:**

**Mathematical Logic:**
Introduction, Connectives, Normal Forms, The theory of Inference for the Statement Calculus,
The Predicate Calculus, Inference Theory of Predicate Calculus.

**UNIT II:**

**SET Theory:**
Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.

**UNIT III:**
**Algebraic Structures:**

Algebraic Systems: Examples and General Properties, Semi groups and Monoids, Polish expressions and their compilation, Groups: Definitions and Examples, Subgroups and Homomorphism's, Group Codes.

**Lattices and Boolean algebra:**
Lattices and Partially Ordered sets, Boolean algebra.

**UNIT IV:**
**An Introduction to Graph Theory:**
Definitions and Examples, Sub graphs, complements, Graph Isomorphism, Vertex Degree: Euler Trails and Circuits, Planar Graphs, Hamilton Paths and Cycles, Graph Coloring and Chromatic Polynomials
**Trees:**
Definitions, Properties, Examples, Rooted Trees, Trees and Sorting, Weighted trees and Prefix Codes, Biconnected Components and Articulation Points

**UNIT V:**
**Fundamental Principles of Counting:**
The rules of Sum and Product, Permutations, Combinations: The Binomial Theorem, Combinations with Repetition

**The Principle of Inclusion and Exclusion:**
The Principle of Inclusion and Exclusion, Generalizations of Principle, Derangements: Nothing is in Its Right Place, Rook Polynomials, Arrangements with Forbidden Positions

**Generating Functions:**
Introductory Examples, Definitions and Examples: Calculation Techniques, Partitions of Integers, The Exponential  Generating Functions, The Summation Operator.

**TEXT BOOKS:**
1. "Discrete Mathematical Structures with Applications to Computer Science", J.P. Tremblay and R. Manohar, Mc Graw Hill Education,2015.
2. "Discrete and Combinatorial Mathematics, an Applied Introduction", Ralph P. Grimaldi and B.V.Ramana, Pearson, 5th Edition, 2016.

**REFERENCE BOOKS:**
1.   Graph Theory with Applications to Engineering by NARSINGH DEO, PHI.

2. Discrete Mathematics by R.K.Bishtand H.S. Dhami, Oxford Higher Education.

3. Discrete Mathematics theory and Applications by D.S.Malik and M.K.Sen, Cenegage Learning.

4. Elements of Discrete Mathematics, A computer Oriented approach by C L Liu and D P Mohapatra, MC GRAW HILL Education.

5. Discrete Mathematics for Computer scientists and Mathematicians by JOE L.Mott, Abraham Kandel and Theodore P.Baker, Pearson ,2nd Edition

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|

**B. Tech  II-I Sem. (CSE)**　　　　　　　　**3　1　0　3**

### (15A99301) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
### PART – A
### BASIC ELECTRICAL ENGINEERING

**Objective:**
Basic Electrical Engineering contains basic Circuits, Network theorems, two port networks, DC generators & motors, Transformers, Induction motors. The objective is to study their performance aspects.

## UNIT – I   Introduction to DC & AC Circuits
Ohm's Law, R, L, C Components, Kirchhoff's Laws, Types of Sources, Simple problems on Resistive Networks,   Series Parallel Circuits, Star Delta and Delta Star Transformation.  Sinusoidal waveforms and Basic Definitions, Root Mean Square and average values of sinusoidal Currents and Voltages. Form Factor and Peak Factor.
**Network Theorems:** Thevenin's, Norton's, Maximum Power Transfer and Superposition Theorems for DC Excitations.
**Two Port Networks:** Two Port Network Parameters – Impedance, Admittance, Transmission and Hybrid Parameters and Their Relations.

## UNIT-II     DC Machines
**D.C Generators:** Constructional details of D.C. machines, Principle of Operation of D.C. generators, Types of D.C Generators, E.M.F Equation, O.C.C. of a D.C. Shunt Generator
**D.C Motors**: Principle of Operation of DC Motors, Torque Equation, Losses and Efficiency Calculation, Speed Control of D.C. shunt motor (Armature voltage control and Field flux control). Swinburne's Test and Applications.

## UNIT-III   AC Machines
**1-phase Transformers:** Principle of Operation, Constructional Details, E.M.F. equation, Losses and Efficiency, OC & SC Tests, Regulation of Transformers.
**3-Phase Induction Motors**: Principle of Operation, Slip, Torque (Simple Problems), Slip-Torque characteristics.
**3-phase Alternators:** Principle of Operation-Constructional Details-EMF Equation.

Outcome:

After going through this course the student acquires knowledge on basics of Electrical Circuits, Network theorems, two port networks, DC generators & motors, Transformers, Induction motors and Alternators.

**TEXT BOOKS:**

1. Basic Electrical Engineering, V. N. Mittle and Arvind Mittle, Mc Graw Hill (India) Pvt. Ltd., 2nd Edition, 2005.

2. Basic Electrical Engineering, T.K.Nagsarkar and M.S. Sukhija, Oxford University Press, 2nd Edition, 2011.

**REFERENCES:**

1. Basic Electrical Engineering, M.S.Naidu and S. Kamakshiah, Tata Mc Graw Hill, 3rd Edition, 2009.

2. Electrical and Electronic Technology, Hughes, Pearson Education.

**PART-B**

**UNIT I**

**Semiconductor Devices:** Intrinsic semiconductors-Electron-Hole Pair Generation, Conduction in Intrinsic Semiconductors, Extrinsic Semiconductors-N-Type and P-Type Semiconductors, Comparison of N-Type and P-Type Semiconductors. The p-n Junction – Drift and Diffusion Currents, The p-n Junction Diode-Forward Bias, Reverse Bias, Volt-Ampere Characteristics- Diode Specifications, Applications of Diode, Diode as a Switch. Diode as a Rectifier-Half-wave Rectifier, Full-Wave Rectifier, Full-Wave Bridge Rectifier, Rectifiers with Filters, Zener Diode- Volt-Ampere Characteristics, Zener Diode as Voltage Regulator.

**UNIT II**

**BJT and FETs:** Bipolar Junction Transistor (BJT) **–** Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT-CB, CE and CC Configurations, Relation between $I_C$, $I_B$ and $I_E$. Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications- Transistor as an Amplifier, Transistor as a Switch,. Junction Field Effect Transistor (JFET)- Theory and Operation of JFET, Output Characteristics, Transfer Characteristics, Configurations of JFET-CD, CS and CG Configurations, JFET Applications- JFET as an Amplifier, JFET as a Switch, Comparison of BJT and JFET,MOSFET-The Enhancement and Depletion MOSFET, Static Characteristics of MOSFET, Applications of MOSFET.

**UNIT III**

**Oscillators and Op-Amps:** Sinusoidal Oscillators, Barkhausen Criteria for Oscillator Operation, Components of an Oscillator-Transistor Amplifier Circuits, Feedback Circuits and Oscillator Circuits, Classification of Oscillators, LC Tuned, RC Phase Shift Oscillator circuits.

**Operational Amplifiers(Op-Amps)-**Symbol of an Op-Amp, single Input and Dual Input Op-Amps(Differential Amplifier), Characteristics of an Ideal Op-Amp, Basic Forms of Op-Amps-Inverting & Non-Inverting Amplifiers, Applications of Op-Amps, summing, Differential, Integrator, differentiator Amplifier.

TEXT BOOKS:

1. Basic Electrical and Electronics Engineering, M.S.Sukhija, T.K.Nagsarkar, Oxford University
    Press, 1st Edition, 2012.
2. Basic Electrical and Electronics Engineering, S.K Bhattacharya, Pearson Education, 2012.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

## (15A04306) DIGITAL LOGIC DESIGN

**UNIT I**
**BINARY SYSTEMS:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.
**BOOLEAN ALGEBRA AND LOGIC GATES:** Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

**UNIT II**
**GATE – LEVEL MINIMIZATION:** The Map Method, Four Variable Map, Five-Variable Map, Product of Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Other Two Level Implementations, EX-OR Function, Other Minimization Methods

**UNIT III**
**COMBINATIONAL LOGIC:** Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

**UNIT IV**
**SYNCHRONOUS SEQUENTIAL LOGIC:** Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other counters.

**UNIT V**
**MEMORY AND PROGRAMMABLE LOGIC:** Random access memory, memory decoding, Error Detection and Correction, Read-only Memory, Programmable Logic Array, Programmable Array Logic.
**DIGITAL LOGIC CIRCUITS:** RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families.

**TEXT BOOKS:**
1. Digital Design, M.Morris Mano & Micheal D. Ciletti, Pearson, 5th Edition, 2013.
2. Digital Logic & State Machine Design, David J. Comer, Oxford University Press, 3rd

Reprinted Indian Edition, 2012.

**REFERENCES:**
1.  Digital Logic Design, R.D. Sudhakar Samuel, Elsevier
2.  Fundamentals of Logic Design, 5/e, Roth, Cengage
3.  Switching and Finite Automata Theory,3/e,Kohavi, Jha, Cambridge.
4.   Digital Logic Design, Leach, Malvino, Saha,TMH
5.   Modern Digital Electronics, R.P. Jain, TMH

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B. Tech  II-I Sem. (CSE)

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

**(15A52301) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

<u>**Course Objectives:**</u> The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

**Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS**

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics - Relationship of Managerial Economics with Financial Accounting and Management. **Demand Analysis**: Concept of Demand-Demand Function -   Law of Demand - Elasticity of Demand-  Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting.

**UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS**

**Production Function**- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts and cost behavior- Break-Even Analysis (BEA) -Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of  Break- Even Point.

 **UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT**

**Market structures**: Types of Markets - Perfect and Imperfect Competition  - Features of  Perfect  Competition- Monopoly-Monopolistic  Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization.

## UNIT IV: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

 Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping-  Journal -  Ledger – Trial Balance - Financial Statements -  Trading Account – Profit & Loss Account – Balance Sheet  (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

## UNIT V: CAPITAL AND CAPITAL BUDGETING

Concept of Capital -  Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital -  Estimating Working Capital Requirements – Capital Budgeting – Features  of Capital Budgeting  Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

**Learning Outcome**: After completion of this course, the student will able to understand various aspects of Managerial Economics and analysis of financial statements and inputs therein will help them to make sound and effective decisions under different economic environment and market situations.

**TEXT BOOKS:**

1. Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.

2. Financial Management, I.M.Pandey,  Vikas Publications, 2013.

## REFERENCES

1. Managerial Economics and Financial Analysis, 1/e, Aryasri, TMH, 2013.

2. Managerial Economics and Financial Analysis, S.A. Siddiqui and A.S. Siddiqui, New Age International, 2013.

Accounting and Financial Mangement, T.S.Reddy & Y. Hariprasad Reddy, Margham Publishers.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-I Sem. (CSE)** | 0 | 0 | 4 | 2 |

### (15A05303)  DATABASE MANAGEMENT SYSTEMS LABORATORY

**Course Objectives:**

- To create a database and query it using SQL, design forms and generate reports.
- Understand the significance of integrity constraints, referential integrity constraints, triggers, assertions.

**Course Outcomes:**

- Design databases
- Retrieve information from data bases
- Use procedures to program the data access and manipulation
- Create user interfaces and generate reports

**List of Experiments:**

1. Practice session: Students should be allowed to choose appropriate DBMS software, install it, configure it and start working on it. Create sample tables, execute some queries, use SQLPLUS features, use PL/SQL features like cursors on sample database. Students should be permitted to practice appropriate User interface creation tool and Report generation tool.

2. A college consists of number of employees working in different departments. In this context, create two tables **employee** and **department**. Employee consists of columns empno, empname, basic, hra, da, deductions, gross, net, date-of-birth. The calculation of hra,da are as per the rules of the college. Initially only empno, empname, basic have valid values. Other values are to be computed and updated later. Department contains deptno, deptname, and

description columns. Deptno is the primary key in department table and referential integrity constraint exists between employee and department tables. Perform the following operations on the the database:

- Create tables department and employee with required constraints.
- Initially only the few columns (essential) are to be added. Add the remaining columns separately by using appropriate SQL command
- Basic column should not be null
- Add constraint that basic should not be less than 5000.
- Calculate hra,da,gross and net by using PL/SQL program.
- Whenever salary is updated and its value becomes less than 5000 a trigger has to be raised preventing the operation.
- The assertions are: hra should not be less than 10% of basic and da should not be less than 50% of basic.
- The percentage of hra and da are to be stored separately.
- When the da becomes more than 100%, a message has to be generated and with user permission da has to be merged with basic.
- Empno should be unique and has to be generated automatically.
- If the employee is going to retire in a particular month, automatically a message has to be generated.
- The default value for date-of-birth is 1 jan, 1970.
- When the employees called daily-wagers are to be added the constraint that salary should be greater than or equal to 5000 should be dropped.
- Display the information of the employees and departments with description of the fields.
- Display the average salary of all the departments.
- Display the average salary department wise.
- Display the maximum salary of each department and also all departments put together.
- Commit the changes whenever required and rollback if necessary.
- Use substitution variables to insert values repeatedly.
- Assume some of the employees have given wrong information about date-of-birth. Update the corresponding tables to change the value.

- Find the employees whose salary is between 5000 and 10000 but not exactly 7500.
- Find the employees whose name contains 'en'.
- Try to delete a particular deptno. What happens if there are employees in it and if there are no employees.
- Create alias for columns and use them in queries.
- List the employees according to ascending order of salary.
- List the employees according to ascending order of salary in each department.
- Use '&&' wherever necessary
- Amount 6000 has to be deducted as CM relief fund in a particular month which has to be accepted as input from the user. Whenever the salary becomes negative it has to be maintained as 1000 and the deduction amount for those employees is reduced appropriately.
- The retirement age is 60 years. Display the retirement day of all the employees.
- If salary of all the employees is increased by 10% every year, what is the salary of all the employees at retirement time.
- Find the employees who are born in leap year.
- Find the employees who are born on feb 29.
- Find the departments where the salary of atleast one employee is more than 20000.
- Find the departments where the salary of all the employees is less than 20000.
- On first January of every year a bonus of 10% has to be given to all the employees. The amount has to be deducted equally in the next 5 months. Write procedures for it.
- As a designer identify the views that may have to be supported and create views.
- As a designer identify the PL/SQL procedures necessary and create them using cursors.

Use appropriate Visual programming tools like oracle forms and reports, visual basic etc to create user interface screens and generate reports.

**Note**: As a designer identify other operations that may be required and add to the above list. The above operations are not in order. Order them appropriately. Use SQL or PL/SQL depending on the requirement.

3. Students may be divided into batches and the following experiments may be given to them to better understand the DBMS concepts. Students should gather the required information, draw ER diagrams, map them to tables, normalize, create tables, triggers, procedures, execute queries, create user interfaces, and generate reports.

- Student information system
- APSRTC reservation system
- Hostel management
- Library management
- Indian Railways reservation
- Super market management
- Postal system
- Banking system
- Courier system
- Publishing house system

**References:**

1. "Oracle Database 11g PL/SQL Programming", M.Mc Laughlin,TMH.
2. "Learning Oracle SQL and PL/SQL", Rajeeb C. Chatterjee, PHI.
3. "Introduction to SQL", Rick F.Vander Lans, Pearson education.
4. "Oracle PL/SQL", B.Rosenzweig and E.Silvestrova, Pearson education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-I Sem. (CSE)** | 0 | 0 | 4 | 2 |

## (15A99302) BASIC ELECTRICAL AND ELECTRONICS LABORATORY

## PART – A

### BASIC ELECTRICAL ENGINEERING LAB

**OBJECTIVES:** The student has to learn about:
- ➢ Practical verification of Superposition and Thevenin's theorem
- ➢ Experimental determination of O.C. and S.C. parameters of two – port network
- ➢ Swinburne's Test on DC Shunt Machine and Predetermination of Efficiency of a Given DC Shunt Machine (i) while working as a Motor and (ii) while working as a Generator
- ➢ Brake Test on DC Shunt Motor and determination of Performance Characteristics
- ➢ OC & SC Tests on Single-Phase Transformer and Predetermination of Efficiency and Regulation at any given load and Power Factor.

### PART- A : ELECTRICAL LAB

1. Verification of Superposition Theorem.
2. Verification of Thevenin's Theorem.
3. Determination of Open circuit and Short circuit parameters of two – port network.
4. Swinburne's Test on DC Shunt Machine (Predetermination of Efficiency of a Given DC Shunt Machine Working as Motor and Generator).
5. Brake Test on DC Shunt Motor. Determination of Performance Characteristics.
6. OC & SC Tests on Single-Phase Transformer (Predetermination of Efficiency and Regulation at any given load and Power Factor).

**OUTCOMES**: At the end of the course the student should be able to

- Practically verify Superposition and Thevenin's theorem.
- Experimentally determine the O.C. and S.C. parameters of two-port network.
- Conduct Swinburne's Test on DC Shunt Machine and Predetermine the Efficiency of a given DC Shunt Machine (i) while working as a Motor and (ii) while working as a Generator
- Conduct Brake Test on DC Shunt Motor and determine the Performance Characteristics
- Conduct OC & SC Tests on Single-Phase Transformer and Predetermine the Efficiency and Regulation at any given load and Power Factor.

## PART – B

### ELECTRONICS LABORATORY
### (Any Six Experiments)

1. P-N Junction Diode and Zener Diode Volt-Ampere Characteristics.

2. Bipolar Junction Transistor in CB Configuration-Input and Output Characteristics, Computation of α.

3. Half-Wave Rectifier- a) Without Filter b) With Capacitor Filter.

4. Full-Wave Rectifier- a) Without Filter b) With Capacitor Filter.

5. Bipolar Junction Transistor in CE Configuration-Input and Output Characteristics, Computation of β.

6. Junction field effect Transistor in Common Source Configuration Output and Transfer Characteristics.

7. Verification of Logic Gates- AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

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

**B. Tech  II-II Sem. (CSE)**

### (15A54401)  PROBABILITY AND STATISTICS

### (Common to CSE, IT, Civil, Mech.)

**Objectives:** To help the students in getting a thorough understanding of the fundamentals of probability and usage of statistical techniques like testing of hypothesis, Statistical Quality Control and Queuing theory

### UNIT – I

Basic concepts of Probability – Random variables – Expectation – Discrete and continuous Distributions – Distribution functions. Binomial and poison distributions Normal distribution – Related properties.

### UNIT – II

Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance. Test of significance - Test based on normal distribution - Z test for means and proportions.

### UNIT – III

Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).

### UNIT – IV

Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality characteristics- Constructions and operation of $\overline{X}$ - Chart, R-Chart,

p - Chart and C-Chart.

### UNIT – V

Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems.

**TEXT BOOKS:**

1.  Probability & Statistics by E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.
2.  Probability & Statistics for engineers by Dr. J. Ravichandran WILEY-INDIA publishers.

**REFERENCES:**

1.  Probability & Statistics by T.K.V. Iyengar, B.Krishna Gandhi, S.Ranganatham and

    M.V.S.S.N.Prasad, S.Chand publications.

2.  Statistical methods by S.P. Gupta, S.Chand publications.

3.  Probability & Statistics for Science and Engineering by G.Shanker Rao, Universities Press.

4.  Probability and Statistics for Engineering and Sciences by Jay L.Devore, CENGAGE.

5.  Probability and Statistics by R.A. Jhonson and Gupta C.B.

**Outcomes:** The student will be able to analyze the problems of engineering & industry using the techniques of testing of hypothesis, Statistical Quality Control and Queuing theory and draw appropriate inferences.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech II-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

### (15A05401) SOFTWARE ENGINEERING

**Course Objectives**

- To understand the software life cycle models.
- To understand the software requirements and SRS document.
- To understand the importance of modeling and modeling languages.
- To design and develop correct and robust software products.
- To understand the quality control and how to ensure good quality software.
- To understand the planning and estimation of software projects.
- To understand the implementation issues, validation and verification procedures.
- To understand the maintenance of software

**Course Outcomes**

- Define and develop a software project from requirement gathering to implementation.
- Ability to code and test the software
- Ability to plan, Estimate and Maintain software systems

**Unit I:**

**Software and Software Engineering:** The Nature of Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths

**Process Models:** A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

**Agile Development:** Agility, Agility and the Cost of Change, Agile Process, Extreme Programming, Other Agile Process Models

**Unit II:**

**Understanding Requirements**: Requirements Engineering, Establishing the groundwork, Eliciting Requirements, Developing Use Cases, Building the requirements model, Negotiating Requirements, Validating Requirements.

**Requirements Modeling (Scenarios, Information and Analysis Classes):** Requirements Analysis, Scenario-Based Modeling, UML Models that Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

**Requirements Modeling (Flow, Behavior, Patterns and WEBAPPS):** Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirements Modeling for WebApps.

**Unit III:**
**Design Concepts**: Design with Context of Software Engineering, The Design Process, Design Concepts, The Design Model.
**Architectural Design:** Software Architecture, Architecture Genres, Architecture Styles, Architectural Design, Assessing Alternative Architectural Designs, Architectural Mapping Using Data Flow.

**Component-Level Design:** Component, Designing Class-Based Components, Conducting Component-level Design, Component Level Design for WebApps, Designing Traditional Components, Component-Based Development.

**Unit IV:**
**User Interface Design**: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation.
**WebApp Design:** WebApp Design Quality, Design Goal, A Desigin Pyramid for WebApps, WebApp Interface Design, Aestheic Design, Content Design, Architecture Design, Navigation Design, Component-Level Design, Object-Oriented Hypermedia Design Method(OOHMD).

**Unit V:**
**Software Testing Strategies**: A strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Test Strategies for WebApps, Validation Testing, System Testing, The Art of Debugging.
**Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, basic Path testing, Control Structure Testing, Black-Box Testing, Model-based Testing, Testing for Specialized Environments, Architectures and Applications, Patterns for Software Testing.Testing Object-Oriented Applications: Broadening the View of Testing, Testing with OOA and OOD Models, Object-Oriented Testing Strategies, Object-Oriented Testing Methods, Testing Methods Applicable at the Class level, Interclass Test-Case Design.

**Textbook**:
1. "Software engineering A practitioner's Approach", Roger S. Pressman, McGraw Hill International Education, Seventh Edition, 2016.

**Reference Textbooks:**
1. Fundamentals of Software Engineering, Fourth Edition, Rajib Mall, PHI,
2. Software Engineering, Ninth Edition, IAN Sommerville, Pearson, Ninth edition.
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications,2008.

8. Software Engineering Principles and Practice, Hans Van Vliet,3rd edition, John Wiley &Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D.Bjorner, Springer International Edition.
10. Introduction to Software Engineering R.J.Leach, CRC Press

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

### (15A05402) COMPUTER ORGANIZATION

**Course Objectives:**

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- To make the students understand the structure and behavior of various functional modules of a computer.
- To understand the techniques that computers use to communicate with I/O devices
- To study the concepts of pipelining and the way it can speed up processing.
- To understand the basic characteristics of  multiprocessors

**Course Outcomes:**

- Ability to use memory and I/O devices effectively
- Able to explore the hardware requirements for cache memory and virtual memory
- Ability to design algorithms to exploit pipelining and multiprocessors

**Unit I:**
**Basic Structure of Computer**: Computer Types, Functional Units, Basic operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.
**Machine Instructions and Programs**: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

**Unit II:**
**Arithmetic**: Addition and Subtraction of Signed Numbers, Design and Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations.
**Basic Processing Unit:** Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control, Multiprogrammed Control.

**Unit III:**

**The Memory System:** Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage.

**Unit IV:**

**Input/output Organization:** Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces.

**Unit V:**

**Pipelining:** Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

**Large Computer Systems:** Forms of Parallel Processing, Array Processors, The Structure of General-Purpose, Interconnection Networks.

**Textbook:**

1) "Computer Organization", Carl Hamacher, Zvonko Vranesic, Safwat Zaky, McGraw Hill Education, 5th Edition, 2013**.**

**Reference Textbooks:**

1. Computer System Architecture, M.Morris Mano, Pearson Education, 3rd Edition.
2. Computer Organization and Architecture, Themes and Variations, Alan Clements, CENGAGE Learning.
3. Computer Organization and Architecture, Smruti Ranjan Sarangi, McGraw Hill Education.
4. Computer Architecture and Organization, John P.Hayes, McGraw Hill Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

## (15A04407)  MICROPROCESSORS & INTERFACING

*Course Objective:*
- *Study the instruction set of 8086 microprocessor and its architecture*
- *Learn assembly language programming using 8086 microprocessor*
- *Interfacing 8051, 8255, 8237, and 8259*

*Learning Outcome:*
- *Program the 8086 microprocessor*
- *Interface the 8086 microprocessor with various devices and program them*

## UNIT  I

Microprocessors-Evolution and Introduction: Microprocessors and Micro Controllers, Microprocessor based system, Origin of Microprocessor, Classification of Microprocessors, Types of Memory, I/O Devices, Technology Improvements Adapted to Microprocessors and Computers, Introduction to 8085 processor, Architecture of 8085, Microprocessor instructions, classification of instructions, Instruction set of 8085.

Intel 8086 Microprocessor architecture, Features, and Signals: Architecture of 8086, Accessing memory locations, PIN details of 8086.

## UNIT  II

Addressing Modes, Instruction Set and Programming of 8086: Addressing modes in 8086, Instruction set of 8086, 8086 Assembly Language Programming, Modular Programming.

## UNIT  III

8086 Interrupts: Interrupt types in 8086, Processing of Interrupts by 8086, Dedicated interrupt types in 8086, Software interrupts-types 00H-FFH, Priority among 8086 interrupts, Interrupt service routines, BIOS interrupts or functional calls, Interrupt handlers, DOS services-INT 21H, System calls-BIOS services.

Memory and I/O Interfacing: Physical memory organization in 8086, Formation of system bus, Interfacing RAM and EPROM chips using only logic gates, Interfacing RAM/ EPROM chips using decoder IC and logic gates, I/O interfacing, Interfacing 8-bit input device with 8086, Interfacing output device using 8086, Interfacing printer with 8086, Interfacing 8-bit and 16-bit I/O devices or ports with 8086, Interfacing CRT terminal with 8086.

**UNIT IV**

Features and Interfacing of programmable devices for 8086 systems: Intel 8255 programmable peripheral interface, Interfacing switches and LEDS, Interfacing seven segment displays, Traffic light control, Interfacing analog to digital converters, Intel Timer IC 8253, Introduction to serial communication, 8259 programmable controller, 8237 DMA controller.

**UNIT V**

Introduction to 8051 Micro controllers: Intel's MCS-51 series micro controllers, Intel 8051 architecture, Memory organization, Internal RAM structure, Power control in 8051, Stack operation.

8051, Hardware features of 8051: Introduction, Parallel ports in 8051, External memory interfacing in 8051, Timers, Interrupts, Serial ports.

Interfacing Examples: Interfacing 8255 with 8051, Interfacing of push button switches and LEDS, Interfacing of seven segment displays.

**Text Books:**
- "Microprocessor and Interfacing 8086,8051, 8096 and advanced processors", Senthil Kumar,
  Saravanan, Jeevanathan, Shah, 1st edition, 2nd impression, 2012, Oxford University Press.
- "The X86 Microprocessors", Lyla B. Das. , 2010, Pearson.

**Reference Books:**
1. "Microprocessor and Interfacing: Programming and Hardware", Douglas V.Hall, McGrawHill
2. "8086 microprocessor: Programming and Interfacing the PC", Kenneth Ayala, Cengage
   Learning
3. "ARM system-on-chip architecture", Steve Furber, Addison-Wesley Professional
4. "The Intel Microprocessors", Barry B. Brey, Prentice Hall

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

## (15A05403) OBJECT ORIENTED PROGRAMMING USING JAVA

**Course Objectives:**
- Study the syntax, semantics and features of Java Programming Language
- Learn the method of creating Multi-threaded programs and handle exceptions
- Learn Java features to create GUI applications & perform event handling

**Course Outcomes:**

- Ability to solve problems using object oriented approach and implement them using Java
- Ability to write Efficient programs with multitasking ability and handle exceptions
- Create user friendly interface

**UNIT I:**

**The History and Evolution of Java:**

Java's Lineage, The Creation of java, how java changed the internet, Java's magic: The byte code, Servlets: java on the server side, java Buzzwords, Evolution of java.

**An Overview of Java:**

Object Oriented Programming, Two control statements, Using blocks of codes, Lexical issues,
The java class Libraries.

**Data Types, Arrays and Variables:**

Primitive Types, Integers, Floating-point Types, Characters, Booleans, literals, variables, Type conversion and casting, Automatic Type Promotion in Expressions, Arrays, strings, Pointers.

**UNIT II:**

**Operators:**
Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logic operators, The assignment operator, The ? Operator, Operator Precedence, Using Parentheses.

**Control Statements:**
Java's selection Statements, Iteration statements, Jump Statements.

**Introducing Classes:**

Class Fundamentals, Declaring Objects, Assuming Object reference Variables, Introducing Methods, Constructors, The this Keyword, Garbage Collection, The Finalize() method, A

Stack class. Overloading Methods, Using Object as Parameter, Argument Passing, Returning Objects, Recursion, Introducing Access control, Understanding static, Introducing Nested and Inner classes, Exploring the String class, Using Command line Arguments, Varargs: variable-Length Arguments.

**UNIT III:**

**Inheritance:** Basics, Using super, creating a multi level hierarchy, when constructors are executed, method overriding, dynamic method dispatch, using abstract class, using final with inheritance, the object class.
**Packages and Interfaces:**
Packages, Access protection, Importing Packages, Interfaces, Default Interfaces, Default interface methods, Use static methods in an Interface, Final thoughts on Packages and interface**s.**

**Exception Handling:**

Exception handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and                                                                                        catch,
Multiple catch clauses, Nested try statements, throw, throws, finally, Java Built-in Exceptions, Creating your own exception subclasses, Chained Exceptions, Three Recently added Exceptions features, Using Exceptions.

**UNIT IV:**
**Multithreaded Programming:**

The java Thread Model, The main thread , Creating Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Interthread Communication, Suspending, resuming and stopping threads, Obtaining a thread state, Using Multithreading.

**I/O, Applets, and Other Topics:**

I/O basics, Reading Console input, Writing console Output, The PrintWriter class, Reading and writing files, Automatically closing a file, Applet fundamentals, enumerations type wrappers auto boxing annotations, Generics: The general form of a generics class, creating a generic method, generics interfaces.

**UNIT V:**
**Introduction the AWT: Working with windows, graphics and Text:**
AWT classes, window fundamentals, working with frame windows, creating a frame window in a an AWT Based applet, creating a window program, displaying information within a window, Graphics, working with color, setting the paint mode, working with fonts, managing text output using font metrics,.
**Using AWT controls, Layout Mangers, and Menus:**
AWT control fundamentals, Labels, using buttons, applying check boxes, check box group, choice controls, using lists, Managing scroll bars, using a Text field, Using a Text area, understanding layout managers, Menu bars and Menus, dialog boxes, file dialog, Overriding paint().

**TEXT BOOKS:**
1."Java The Complete Reference",  Herbert Schildt, MC GRAW HILL Education, 9th Edition,2016.

**REFENCE BOOKS:**

1. "Programming with Java" T.V.Suresh Kumar, B.Eswara Reddy, P.Raghavan Pearson Edition.
2. "Java Fundamentals - A Comprehensive Introduction", Herbert Schildt and Dale Skrien, Special Indian Edition, McGrawHill, 2013.
3. "Java – How to Program", Paul Deitel, Harvey Deitel, PHI.
4. "Core Java", NageswarRao, Wiley Publishers.
5. "Thinking in Java", Bruce Eckel, Pearson Education.
6. "A Programmers Guide to Java SCJP", Third Edition, Mughal, Rasmussen, Pearson.

"Head First Java", Kathy Sierra, Bert Bates, O'Reilly "SCJP – Sun Certified Programmer for Java Study guide" – Kathy Sierra, Bert Bates, McGrawHill

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

## (15A05404) FORMAL LANGUAGES AND AUTOMATA THEORY

*Course Objective:*

- ⬚  *Understand formal definitions of machine models.*
- ⬚  *Classify machines by their power to recognize languages.*
- ⬚  *Understanding of formal grammars, analysis*
- ⬚  *Understanding of hierarchical organization of problems depending on their complexity*
- ⬚  *Understanding of the logical limits to computational capacity*
- ⬚  *Understanding of undecidable problems*

*Learning Outcome:*

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

- ⬚  *Construct finite state diagrams while solving problems of computer science*
- ⬚  *Find solutions to the problems using Turing machines*
- ⬚  *Design of new grammar and language*

## UNIT I

**Introduction:** Basics of set theory, Relations on sets, Deductive proofs, Reduction to definitions, Other theorem forms, Proving equivalences about sets, The Contrapositive, Proof by contradiction, Counter examples, Inductive proofs, Alphabets, Strings, Languages, Problems, Grammar formalism, Chomsky Hierarchy

**Finite Automata:** An Informal picture of Finite Automata, Deterministic Finite Automata (DFA), Non Deterministic Finite Automata (NFA), Applying FA for Text search, Finite Automata with

Epsilon transitions (є-NFA or NFA- є ), Finite Automata with output, Conversion of one machine to another, Minimization of Finite Automata, Myhill-Nerode Theorem.

## UNIT II

**Regular Languages:** Regular Expressions (RE), Finite Automata and Regular Expressions,

Applications of Regular Expressions, Algebraic laws for Regular Expressions, The Arden's Theorem, Using Arden's theorem to construct RE from FA, Pumping Lemma for RLs, Applications of Pumping Lemma, Equivalence of Two FAs, Equivalence of Two REs, Construction of Regular Grammar from

RE, Constructing FA from Regular Grammar, Closure properties of RLs, Decision problem's of RLS,

Applications of REs and FAs

## UNIT III

**Context Free Grammars and Languages:** Definition of Context Free Grammars (CFG), Derivations and Parse trees, Ambiguity in CFGs, Removing ambiguity, Left recursion and Left factoring, Simplification of CFGs, Normal Forms, Linear grammars, Closure properties for CFLs, Pumping Lemma for CFLs, Decision problems for CFLs, CFG and Regular Language..

## UNIT IV

**Push Down Automata (PDA):** Informal introduction, The Formal Definition, Graphical notation, Instantaneous description, The Languages of a PDA, Equivalence of PDAs and CFGs, Deterministic Push Down Automata, Two Stack PDA.

## UNIT V

**Turing Machines and Undecidability:** Basics of Turing Machine (TM), Transitional Representation of TMs, Instantaneous description, Non Deterministic TM, Conversion of Regular Expression to TM, Two stack PDA and TM, Variations of the TM, TM as an integer function, Universal TM, Linear Bounded Automata, TM Languages, Unrestricted grammar , Properties of Recursive and Recursively enumerable languages, Undecidability, Reducibility, Undeciadable problems about TMs, Post's Correspondence Problem(PCP), Modified PCP.

***Text Books:***

1. *Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu kandar, Pearson.*
2. *Introduction to Automata Theory, Languages, and Computation, Third Edition, John E.Hopcroft, Rajeev Motwani, Jeffery D. Ullman, Pearson.*

***Reference Books:***

1. *Introduction to Languages and the Theory of Computation, John C Martin, TMH, Third Edition.*
2. *Theory of Computation, Vivek Kulkarni, OXFORD.*
3. *Introduction to the Theory of Computation., Michel Sipser, 2nd Edition, Cengage Learning*
4. *Theory of computer Science Automata, Languages and Computation, K.L.P. Mishra,*
   *Chandrasekaran, PHI, Third Edition.*
5. *Fundamentals of the Theory of Computation, Principles and Practice, Raymond Greenlaw, H. James Hoover, Elsevier, Morgan Kaufmann.*
6. *Finite Automata and Formal Language A Simple Approach, A.M. Padma Reddy, Pearson*

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| B. Tech  II-II Sem. (CSE) | 0 | 0 | 4 | 2 |

### (15A04408) MICRO PROCESSORS & INTERFACING LAB

*Course Objective:*
- *To become skilled in 8086 Assembly Language programming.*
- *To understand programmable peripheral devices and their Interfacing.*
- *To understand and learn 8051 microcontroller.*
- *To learn 8051 assembly Language programming*

*Learning Outcome:*
- *Able to write8086 Assembly Language programs.*
- *Able to understand programmable peripheral devices and their Interfacing.*
- *Able to write 8051 assembly Language programs.*

Minimum **Ten** Experiments to be conducted (**Five** from each section)

I) **8086 Microprocessor Programs using MASM/8086 kit.**
1. Introduction to MASM Programming.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Length of the string, String comparison.
**Interfacing:**
1. 8259 – Interrupt Controller and its interfacing programs
2. 8255 – PPI and its interfacing programs (A /D, D/A, stepper motor,)
3. 7-Segment Display.

II) **Microcontroller 8051 Trainer kit**
1. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation.
2. Logic operations – Shift and rotate.
3. Sorting- Ascending and descending order.

**Interfacing using 8051 Trainer kit:**
1. Key board Interfacing
2. Seven Segment display
3. Switch Interfacing
4. Relay Interfacing
5. UART

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  II-II Sem. (CSE)** | 0 | 0 | 4 | 2 |

## (15A05405) JAVA PROGRAMMING  LABORATORY

**Course Objectives:**

- Learn to use object orientation to solve problems and use java language to implement them.
- To experiment with the syntax and semantics of java language and gain experience with java programming

**Course Outcomes:**

- Ability to write portable programs which work in all environments
- Ability to create user friendly interfaces
- Ability to solve the problem using object oriented approach and design solutions which are robust

**List of Experiments**

1) Preparing and practice – Installation of Java software, study of any Integrated development environment, sample programs on operator precedence and associativity, class and package concept, scope concept, control structures, constructors and destructors. Learn to compile, debug and execute java programs.
2) Write Java program(s) on use of inheritance, preventing inheritance using final, abstract classes.
3) Write Java program(s) on dynamic binding, differentiating method overloading and overriding.
4) Write Java program(s) on ways of implementing interface.
5) Write a program for the following
      - Develop an applet that displays a simple message.
      - Develop an applet for waving a Flag using Applets and Threads.
6) Write Java program(s) which uses the exception handling features of the

language, creates exceptions and handles them properly, uses the predefined exceptions, and create own exceptions

7) Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.

Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads

10) Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part<n> where n is the sequence number of the part file.

11) Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively.

12) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds

13) Design a simple calculator which performs all arithmetic operations. The interface should look like the calculator application of the operating system. Handle the exceptions if any.

14) Write a java program to handle mouse events

15) Write a java program to handle keyboard events

16) Write a java program that allows conduction of object type examination containing multiple choice questions, and true/false questions. At the end of the examination when the user clicks a button the total marks have to be displayed in the form of the message.

17) Write a java program that creates menu which appears similar to the menu of notepad application of the Microsoft windows or any editor of your choice.

18) Write a java program that creates dialog box which is similar to the save dialog box of the Microsoft windows or any word processor of your choice.

19) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

20) Write a java program to find and replace pattern in a given file.

21) Use inheritance to create an exception super class called ExceptionA and exception sub classes ExceptionB and ExceptionC, where ExceptionB inherits from ExceptionA and ExceptionC inherits from ExceptionB. Write a java program

to demonstrate that the catch block for type ExceptionA catches exception of type ExceptionB and ExceptionC.

22) Write a Java program which opens a connection to standard port on well known server, sends the data using socket and prints the returned data.

23) Write a Java program to create a URLConnection and use it to examine the documents properties and content.

24) Write a Java program which uses TCP/IP and Datagrams to communicate client and server.

25) Create an interface for stack with push and pop operations. Implement the stack in two ways: fixed size stack and Dynamic stack (stack size is increased when stack is full).

26) Create multiple threads to access the contents of a stack. Synchronize thread to prevent simultaneous access to push and pop operations.

**References:**

1. "Java: How to Program", P.J.Deitel and H.M.Deitel, PHI.
2. "Object Oriented Programming through Java", P.Radha Krishna, Universities Press.
3. "Thinking in Java", Bruce Eckel, Pearson Education
4. "Programming in Java", S.Malhotra and S.Choudhary, Oxford Univ. Press.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech III-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

### 15A05501          OPERATING SYSTEMS

**Course Objectives:**
- To make the students understand the basic operating system concepts such as processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection.
- To get acquaintance with the class of abstractions afford by general purpose operating systems that aid the development of user applications.


**Course Outcomes:**
- Able to use operating systems effectively.
- Write System and application programs to exploit operating system functionality.
- Add functionality to the exiting operating systems
- Design new operating systems

**UNIT I**
**Operating Systems Overview:** Operating system functions, Operating system structure, operating systems Operations, protection and security, Computing Environments, Open- Source Operating Systems
**System Structures:** Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating system debugging, System Boot.
**Processes:** Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.


**UNIT II**
**Threads:** overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.
**Process Synchronization:** The critical-section problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic problems of synchronization, Monitors, Synchronization examples, Alternative approaches.
**CPU Scheduling:** Scheduling-Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

## UNIT III
**Memory Management:** Swapping, contiguous memory allocation, segmentation, paging, structure of the page table.
**Virtual memory:** demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory
**Deadlocks:** System Model, deadlock characterization, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery from deadlock.

## UNIT IV
**Mass-storage structure:** Overview of Mass-storage structure, Disk structure, Disk attachment, Disk scheduling, Swap-space management, RAID structure, Stable-storage implementation.
**File system Interface:** The concept of a file, Access Methods, Directory and Disk structure, File system mounting, File sharing, Protection.
**File system Implementation:** File-system structure, File-system Implementation, Directory
Implementation, Allocation Methods, Free-Space management.

## UNIT V
**I/O systems:** I/O Hardware, Application I/O interface, Kernel I/O subsystem, Transforming I/O requests to Hardware operations.
**Protection:** Goals of Protection, Principles of Protection, Domain of protection, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection
**Security:** The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

**Text Books:**
1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Wiley , Eight  Edition, 2014.

**Reference Books:**
1. Operating systems by A K Sharma, Universities Press,
2.  Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
3. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
4. Operating Systems, A.S.Godbole, Second Edition, TMH.
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.

6. Operating Systems, G.Nutt, N.Chaki and S.Neogy, Third Edition, Pearson Education.
7. Operating Systems, R.Elmasri, A,G.Carrick and D.Levine, Mc Graw Hill.
8. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.
9. Operating System Desgin, Douglas Comer, CRC Press, 2nd Edition.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech III-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

### 15A05502 COMPUTER NETWORKS

**Course Objectives:**

- Study the evolution of computer networks and future directions.
- Study the concepts of computer networks from layered perspective.
- Study the issues open for research in computer networks.

**Course Outcomes:**

- Ability to choose the transmission media depending on the requirements.
- Ability to design new protocols for computer network.
- Ability to configure a computer network logically.

**Unit I**
**Introduction**: Networks, Network Types, Internet History, Standards and Administration, Network Models: Protocol Layering, TCP/IP Protocol Suite, The ISO Model.
**The Physical layer**: Data and Signals, Transmission impairment, Data rate limits, Performance, Transmission media: Introduction, Guided Media, Unguided Media, Switching: Introduction, Circuit Switched Networks, Packet switching.

**Unit II**
**The Data Link Layer**: Introduction, Link layer addressing, Error detection and Correction: Cyclic codes, Checksum, Forward error correction, Data link control: DLC Services, Data link layer protocols, HDLC, Point to Point Protocol, Media Access control: Random Access, Controlled Access, Channelization, Connecting devices and virtual LANs: Connecting Devices.

**Unit III**
**The Network Layer**: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of service, Internetworking, The network layer in the Internet: IPV4 Addresses, IPV6, Internet Control protocol, OSPF, BGP, IP, ICMPv4, IGMP.

**Unit IV**

**The Transport Layer**: The Transport Service, Elements of Transport Protocols, Congestion Control, The internet transport protocols: UDP, TCP, Performance problems in computer networks, Network performance measurement.

**Unit V**
**The Application Layer**: Introduction, Client Server Programming, WWW and HTTP, FTP, e-mail, TELNET, Secure Shell, Domain Name System, SNMP.

**Text Books:**
1. "Data communications and networking", Behrouz A. Forouzan, Mc Graw Hill Education, 5th edition, 2012.
2. "Computer Networks", Andrew S. Tanenbaum, Wetherall, Pearson, 5th edition, 2010.

**References:**
1. Data Communication and Networks, Bhushan Trivedi, Oxford
2. "Internetworking with TCP/IP – Principles, protocols, and architecture- Volume 1, Douglas E. Comer, 5th edition, PHI
3. "Computer Networks", 5E, Peterson, Davie, Elsevier.
4. "Introduction to Computer Networks and Cyber Security", Chawan- Hwa Wu, Irwin, CRC Publications.
5. "Computer Networks and Internets with Internet Applications", Comer.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  III-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05503    OBJECT ORIENTED ANALYSIS & DESIGN

**Course Objectives**

- To understand how to solve complex problems
- Analyze and design solutions to problems using object oriented approach
- Study the notations of Unified Modeling Language

**Course Outcomes:**

- Ability to find solutions to the complex problems using object oriented approach
- Represent classes, responsibilities and states using UML notation
- Identify classes and responsibilities of the problem domain

**Unit-I**

**Introduction**: The Structure of Complex systems, The Inherent Complexity of Software, Attributes of Complex System, Organized and Disorganized Complexity, Bringing Order to Chaos, Designing Complex Systems, Evolution of Object Model, Foundation of Object Model, Elements of Object Model,  Applying the Object Model.

**Unit-II**

**Classes and Objects**: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

**Unit-III**

**Introduction to UML**: Why model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

**Unit-IV**

**Structural Modeling**: Package Diagram, Composite Structure Diagram, Component Diagram, Deployment Diagram, Profile Diagram.

**Unit-V**

**Behavioral Modeling**: Use Case Diagram, Activity Diagrams, State Machine Diagrams, Sequence Diagram, Communication Diagram, Timing Diagram, Interaction Overview Diagram.

**Text Books:**

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, PEARSON, 3rd edition, 2013.
2. "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, Ivar Jacobson, PEARSON 12th Impression, 2012.
3. http://www.omg.org/

**References:**

1. "Object-oriented analysis and design using UML", Mahesh P. Matha, PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, Dave West, O'Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning
4. "The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson, Grady Booch, Addison-Wesley

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech III-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05504    PRINCIPLES OF PROGRAMMING LANGUAGES

**Course Objectives:**
- To study various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages

**Course Outcomes:**
- Ability to select appropriate programming language for problem solving
- Ability to design new programming language.

**Unit I:**
**Introduction:** Software Development Process, Language and Software Development Environments, Language and Software Design Models, Language and Computer Architecture, Programming Language Qualities, A brief Historical Perspective.
**Syntax and Semantics**: Language Definition, Language Processing, Variables, Routines, Aliasing and Overloading, Run-time Structure.

**Unit II:**
**Structuring the data**: Built-in types and primitive types, Data aggregates and type constructors, User-defined types and abstract data types, Type Systems, The type Structure of representative languages, Implementation Models

**Unit III:**
**Structuring the Computation**: Expressions and Statements, Conditional Execution and Iteration, Routines, Exceptions, Pattern Matching, Nondeterminism and Backtracking, Event-driven computations, Concurrent Computations
**Structuring the Program**: Software Design Methods, Concepts in Support of Modularity, Language Features for Programming in the Large, Generic Units

**Unit IV:**
**Object-Oriented Languages**: Concepts of Object-oriented Programming, Inheritances and the type system, Object-oriented features in programming languages

**Unit V:**

**Functional Programming Languages:** Characteristics of imperative languages, Mathematical and programming functions, Principles of Functional Programming, Representative Functional Languages, Functional Programming in C++

**Logic and Rule-based Languages:** "What" versus "how": Specification versus implementation, Principles of Logic Programming, PROLOG, Functional Programming versus Logic Programming, Rule-based Languages

**Textbook:**

1) "Programming Language Concepts", Carlo Ghezzi, Mehdi Jazayeri, WILEY Publications. Third Edition, 2014

**Reference Textbooks:**

1. Concepts of Programming Languages, Tenth Edition, Robert W. Sebesta, Pearson Education.
2. Programming Languages Principles and Paradigms, Second Edition, Allen B. Tucker, Robert E. Noonan, McGraw Hill Education.
3. Introduction to Programming Languages, Aravind Kumar Bansal, CRC Press.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

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

**B. Tech  III-I Sem. (CSE)**

**15A05505**          **SOFTWARE TESTING**

**Course Objectives:**
- Fundamentals for various testing methodologies.
- Describe the principles and procedures for designing test cases.
- Provide supports to debugging methods.
- Acts as the reference for software testing techniques and strategies.

**Course Outcomes:**

- Understand the basic testing procedures.
- Able to support in generating test cases and test suites.
- Able to test the applications manually by applying different testing methods and automation tools.
- Apply tools to resolve the problems in Real time environment.

**UNIT I**
**Introduction:** Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs, Taxonomy of Bugs.
**Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates and Achievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.

**UNIT II**
**Transaction Flow Testing:** Transaction Flows, Transaction Flow Testing Techniques.
**Dataflow testing:** Basics of Dataflow Testing, Strategies in Dataflow Testing, Application of Dataflow Testing.

**UNIT III**
**Domain Testing:** Domains and Paths, Nice & Ugly Domains, Domain testing, Domains and Interfaces Testing, Domain and Interface Testing, Domains and Testability.

**UNIT IV**
**Paths, Path products and Regular expressions:** Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions & Flow Anomaly Detection.
**Logic Based Testing:** Overview, Decision Tables, Path Expressions, KV Charts, Specifications.

**UNIT V:**
**State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, Testability Tips.
**Graph Matrices and Application**: Motivational Overview, Matrix of Graph, Relations, Power of a Matrix, Node Reduction Algorithm, Building Tools.

**Text Books:**
1.    Software testing techniques – Boris Beizer, Dreamtech, second edition.

**Reference Books :**

1.    The craft of software testing - Brian Marick, Pearson Education.

2.    Software Testing- Yogesh Singh, Camebridge

3.    Software Testing, 3rd edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
4.    Software Testing, N.Chauhan, Oxford University Press.
5.    Introduction to Software Testing, P.Ammann & J.Offutt, Cambridge Univ. Press.
6.    Effective methods of Software Testing, Perry, John Wiley, 2nd Edition, 1999.
7.    Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press
8.    Win Runner in simple steps by Hakeem Shittu,2007 Genixpress.
9.    Foundations of Software Testing, D.Graham & Others, Cengage Learning.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|     | L | T | P | C |
|-----|---|---|---|---|
| **B. Tech III-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

**15A05506          INTRODUCTION TO BIG DATA**
**(MOOCS-I)**

**Course Objectives:**
- To understand Big Data Analytics for different systems like Hadoop.
- To learn the design of Hadoop File System.
- To learn how to analyze Big Data using different tools.
- To understand the importance of Big Data in comparison with traditional databases.

**Course Outcomes:**
- To gain knowledge about working of Hadoop File System.
- Ability to analyze Big Data using different tools.

**Unit-1:** Distributed programming using JAVA: Quick Recap and advanced Java Programming: Generics, Threads, Sockets, Simple client server Programming using JAVA, Difficulties in developing distributed programs for large scale clusters and introduction to cloud computing.

**Unit-2:** Distributed File systems leading to Hadoop file system, introduction, Using HDFS, Hadoop Architecture, Internals of Hadoop File Systems.

**Unit-3:** Map-Reduce Programming:   Developing Distributed Programs and issues, why map- reduce and conceptual understanding of Map-Reduce programming, Developing Map-Reduce programs in Java, setting up the cluster with HDFS and understanding how Map- Reduce works on HDFS, Running simple word count Map-Reduce program on the cluster, Additional examples of M-R Programming.

**Unit-4:** Anatomy of Map-Reduce Jobs: Understanding how Map- Reduce program works, tuning Map-Reduce jobs, Understanding different logs produced by Map-Reduce jobs and debugging the Map- Reduce jobs.

**Unit-5:** Case studies of Big Data analytics using Map-Reduce programming: K-Means clustering, using Big Data analytics libraries using Mahout.

**Text Books:**
1. JAVA in a Nutshell 4th Edition.
2. Hadoop: The definitive Guide by Tom White, 3rd Edition, O'reily.

**References:**
    1. Hadoop in Action by Chuck Lam, Manning Publications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  III-I Sem. (CSE)**

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

**15A05507          R-PROGRAMMING**
**(MOOCS-I)**

**Course Objectives:**
- Understand the fundamentals of 'R' programming
- Learn how to carry out a range of commonly used statistical methods including analysis of variance and linear regression.
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests.

**Course Outcomes:**
- Ability to Work on a real life Project, implementing R Analytics to create Business Insights.
- Ability to analyze the data and results using R, a flexible and completely cross- platform.
- Ability to use a wide range of analytical methods and produce presentation quality graphics.

**UNIT-I**
**INTRODUCING R**:  Getting the Hand of R, Running the R Program, Finding Your Way with R, Command Packages.
**BECOMING FAMILIAR WITH R**: Reading and Getting Data into R, Viewing Named Objects, Types of Data Items, The Structure of Data Items, Examining Data Structure Working with History Commands, Saving your Work in R.
**WORKING WITH OBJECTS:** Manipulating Objects, Viewing Objects within Objects, Constructing Data Objects, Forms of Data Objects: Testing and Converting,

**UNIT II**
**Data**: Descriptive statistics and tabulation.
**DISTRIBUTION:** Looking at the Distribution of Data
**SIMPLE HYPOTHESIS TESTING**: Using the Student's t-test, The Wilcoxon U-Test (Mann-Whitney), Paired t- and U-Tests, Correlation and Covariance, Tests for Association.

**UNIT-III**
**INTRODUCTION TO GRAPHICAL ANALYSIS**: Box-whisker Plots, Scatter Plots, Pairs Plots(Multiple Correlation Plots) Line Charts, Pie Charts, Cleveland Dot Charts, Bar Charts, Copy Graphics to Other Applications.
**FORMULA NOTATION AND COMPLEX STATISTICS**: Examples of Using Formula Syntax for Basic tests, Formula Notation in Graphics, Analysis of Variance (ANOVA).

**UNIT-IV**
**MANIPULATING DATA AND EXTRACTING COMPONENTS**: Creating Data for Complex Analysis, Summarizing Data.
**REGRESSION (LINEAR MODELING**): Simple Linear Regression, Multiple Regression, Curvilinear Regression, Plotting Linear Models and Curve Fitting, Summarizing Regression Models.

**UNIT-V**
Adding elements to existing plots, Matrix plots, multiple plots in one window, exporting graphs
**WRITING YOUR OWN SCRIPTS**:
BEGINNING TO PROGRAM: Copy and Paste Scripts, Creating Simple Functions, Making Source Code.

**Text Books:**
 1) "Beginning R the statistical programming language" Dr. Mark Gardener, Wiley Publications, 2015.

**References Books:**
 **1)** Hands-On Programming with R Paperback by Grolemund (Author), Garrett (Author), SPD,2014.
**2)** The R Book, Michael J. Crawley, WILEY, 2012.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  III-I Sem. (CSE)**

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

## 15A05508    INTRODUCTION TO OPERATIONS MANAGEMENT
### (MOOCS-I)

**Course Objectives:**
Study key aspects of business operations and lean management including capacity, productivity, quality, and supply chain.

**Course Outcomes:**
- Identify an operations system with some known standard configurations
- Make an assessment of the complexity of an operations system
- Understand the various components of a supply chain and the need to configure them appropriately
- Identify methods for reducing bullwhip effect in supply chains
- Understand and relate the concept of Lean Management to one's own business situation
- Understand & use specific tools and techniques to analyze quality problems

**UNIT I**
**Understanding Operations**
Introduction, Operations in an Organization, Alternative Configurations in Operations, Performance Measures in Operations.

**UNIT II**
**Analyzing Capacity in Operations**
Introduction, The Notion of Capacity in Organizations, Process Design and Capacity Analysis, Capacity Estimation and De-bottlenecking, Other Issues in Capacity Planning.

**UNIT III**
**Supply Chain in Operations**
Introduction, Supply Chain Management: Components, Design of an Appropriate Supply Chain, Issues in Inventory Planning, Reverse Supply Chain.

**UNIT IV**
**Productivity Improvement in Operations**

Introduction, Productivity Paradox in Organizations, Productivity Management: Philosophy, Tools & Techniques, Tools for Sustaining Productivity Improvements, Challenges in Lean Management.

## UNIT V
### Assuring Quality in Operations
Introduction, Six Sigma Quality in Organizations, Total Quality Management: Philosophy, Tools & Techniques, Statistical Process Control, Establishing Quality in Service Organizations.

### Text Book:
1. B. Mahadevan, "Operations Management: Theory & Practice", third edition, Pearson education-2015.

### Reference Books:
1. Nigel Slack, Stuart Chambers and Robert Johnston, "Operations Management", Sixth Edition, Pearson-2010.
2. Robert Johnston, Graham Clark and Michael Shulver, "Service Operations Management", *4th Edition, Pearson.*
3. S. N. Chary, "Production And Operations Management", Third edition, Tata McGraw-Hill Education-2004

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech III-I Sem. (CSE)** | 0 | 0 | 4 | 2 |

### 15A05509    OBJECT ORIENTED ANALYSIS AND DESIGN & SOFTWARE TESTING LABORATORY

**Course Objectives:**
- Practice the notation for representing various UML diagrams
- Analyze and design the problem by representing using UML diagrams
- Become familiar with all phases of OOAD

**Course Outcomes:**
- Find solutions to the problems using object oriented approach
- Represent using UML notation and interact with the customer to refine the UML diagrams

### Part A: OOAD Lab

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.

Problems that may be considered are
1. College information system
2. Hostel management
3. ATM system

### Part B : Software Testing Lab

1  Write programs in 'C' Language to demonstrate the working of the following constructs:
      i)    do...while
      ii)   while….do
      iii)  if…else
      iv)  switch
      v)   for

2　"A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.

3　Take any system (e.g. ATM system) and study its system specifications and report the various bugs.

4　Write the test cases for any known application (e.g. Banking application)

5　Create a test plan document for any application (e.g. Library Management System)

6　Study of Win Runner Testing Tool and its implementation

　　a)　Win runner Testing Process and Win runner User Interface.

　　b)　How Win Runner identifies GUI (Graphical User Interface) objects in an application and describes the two modes for organizing GUI map files.

　　c)　How to record a test script and explains the basics of Test Script Language (TSL).

　　d)　How to synchronize a test when the application responds slowly.

　　e)　How to create a test that checks GUI objects and compare the behaviour of GUI objects in different versions of the sample application.

　　f)　How to create and run a test that checks bitmaps in your application and run the test on different versions of the sample application and examine any differences, pixel by pixel.

　　g)　How to Create Data-Driven Tests which supports to run a single test on several sets of data from a data table.

　　h)　How to read and check text found in GUI objects and bitmaps.

　　i)　How to create a batch test that automatically runs the tests.

　　j)　How to update the GUI object descriptions which in turn supports test scripts as the application changes.

Apply Win Runner testing tool implementation in any real time applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  III-I Sem. (CSE)** | **0** | **0** | **4** | **2** |

### 15A05510     OPERATING SYSTEMS LABORATORY

**Course Objectives:**
- To understand the design aspects of operating system
- To solve various synchronization problems

**Course out comes:**
- Ensure the development of applied skills in operating systems related areas.
- Able to write software routines modules or implementing various concepts of operating system.

  1. Simulate the following CPU scheduling algorithms
           a) Round Robin b) SJF c) FCFS d) Priority
  2. Simulate all file allocation strategies
           a) Sequential b) Indexed c) Linked
  3. Simulate MVT and MFT
  4. Simulate all File Organization Techniques
           a) Single level directory b) Two level c) Hierarchical d) DAG
  5. Simulate Bankers Algorithm for Dead Lock Avoidance
  6. Simulate Bankers Algorithm for Dead Lock Prevention
  7. Simulate all page replacement algorithms
           a) FIFO b) LRU c) LFU Etc. …
  8. Simulate Paging Technique of memory management
  9. Control the number of ports opened by the operating system with
           a) Semaphore b) monitors
10. Simulate how parent and child processes use shared memory and address space
11. Simulate sleeping barber problem
12. Simulate dining philosopher's problem
13. Simulate producer and consumer problem using threads (use java)
14. Simulate little's formula to predict next burst time of a process for SJF scheduling algorithm.
15. Develop a code to detect a cycle in wait-for graph
16. Develop a code to convert virtual address to physical address
17. Simulate how operating system allocates frame to process
18. Simulate the prediction of deadlock in operating system when all the processes announce their resource requirement in advance.

**Reference Books :**

1. "Operating System Concepts", Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. "Operating Systems: Internals and Design Principles", Stallings, Sixth Edition– 2009,Pearson Education
3. "Modern Operating Systems", Andrew S Tanenbaum, Second Edition, PHI.
4. "Operating Systems", S.Haldar, A.A.Aravind, Pearson Education.
5. "Principles of Operating Systems", B.L.Stuart, Cengage learning, India Edition.2013-2014
6. "Operating Systems", A.S.Godbole, Second Edition, TMH.
7. "An Introduction to Operating Systems", P.C.P. Bhatt, PHI.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  |  | L | T | P | C |
|---|---|---|---|---|---|
| B. Tech III-I Sem. (CSE) | | 2 | 0 | 2 | 0 |

**15A99501     SOCIAL VALUES & ETHICS (AUDIT COURSE)**
*(Common to all Branches)*

**UNIT - I**
**Introduction and Basic Concepts of Society: Family and Society:** Concept of family, community, PRIs and other community based organizations and society, growing up in the family – dynamics and impact, Human values, Gender Justice.
**Channels of Youth Moments for National Building: NSS & NCC:** History, philosophy, aims & objectives; Emblems, flags, mottos, songs, badge etc.; Organizational structure, roles and responsibilities of various NSS functionaries. **Nehru Yuva Kendra (NYK):**   Activities – Socio Cultural and Sports.

**UNIT – II**
Activities of NSS, NCC, NYK:
**Citizenship:** Basic Features Constitution of India, Fundamental Rights and Fundamental Duties, Human Rights, Consumer awareness and the legal rights of the consumer, RTI.
**Youth and Crime:** Sociological and psychological Factors influencing youth crime, Peer Mentoring in preventing crimes, Awareness about Anti-Ragging, Cyber Crime and its prevention, Juvenile Justice
**Social Harmony and National Integration:** Indian history and culture, Role of youth in peace-building and conflict resolution, Role of youth in Nation building.

**UNIT – III**
**Environment Issues:** Environment conservation, enrichment and Sustainability, Climate change, Waste management, Natural resource management (Rain water harvesting, energy conservation, waste land development, soil conservations and afforestation).

**Health, Hygiene & Sanitation:** Definition, needs and scope of health education, Food and Nutrition, Safe drinking water, Sanitation, Swachh Bharat Abhiyan.
**Disaster Management:** Introduction to Disaster Management, classification of disasters, Role of youth in Disaster Management. Home Nursing, First Aid.
 **Civil/ Self Defense:** Civil defense services, aims and objectives of civil defense, Need for self defense training – Teakwondo, Judo, karate etc.,

**UNIT – IV**

**Gender Sensitization:** Understanding Gender – Gender inequality – Role of Family, Society and State; Challenges – Declining Sex Ratio – Sexual Harassment – Domestic Violence; Gender Equality – Initiatives of Government – Schemes, Law; Initiates of NGOs – Awareness, Movements;

**UNIT - V**

**Physical Education :** Games & Sports: Health and Recreation – Bialagical basis of Physical activity – benefiets of exercise – Physical, Psychological, Social; Physiology of Musucular Activity, Respiration, Blood Circulation**.**

**Yoga:** Basics of Yoga – Yoga Protocol, Postures, Asanas, Pranayama: Introduction of Kriyas, Bandhas and Mudras.

**TEXT BOOKS:**
1. NSS MANUAL
2. SOCIETY AND ENVIRONMENT: A.S.Chauha, Jain Brothers Publications, 6th Edition, 2006
3. INDIAN SOCIAL PROBLEM: G.R.Madan, Asian Publisher House
4. INDIAN SOCIAL PROBLEM: Ram Ahuja, Rawat Publications
5. HUMAN SOCIETY: Kingsley Davis, Macmillan
6. SOCIETY: Mac Iver D Page, Macmillan
7. SOCIOLOGY – THEMES AND PERSPECTIVES: Michael Honalambos, Oxford University Press
8. CONSTITUTION OF INDIA: D.D.Basu, Lexis Nexis Butterworth Publishers
9. National Youth Policy 2014 (available on www.yas.nic.in)
10. TOWARS A WORLD OF EQUALS: A.Suneetha, Uma Bhrugudanda, Duggirala Vasantha, Rama Melkote, Vasudha Nagraj, Asma Rasheed, Gogu Shyamala, Deepa Streenivas and Susie Tharu
11. LIGHT ON YOGA : B.K.S.Iyengar, Penguin Random House Publishers

www.un.org
www.india.gov.in
www.yas.nic.in
http://www.who.int/countries/ind/en/
http://www.ndma.gov.in
http://ayush.gov.in/event/common-yoga-protocol-2016-0

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  III-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05601    COMPILER DESIGN

**Course Objectives:**
This course is a *de facto* capstone course in Computer Science, as it combines skills in software design, programming, data structures and algorithms, theory of computing, documentation, and machine architecture to produce a functional compiler.

- Realize that computing science theory can be used as the basis for real applications
- Introduce the major concept areas of language translation and compiler design.
- Learn how a compiler works
- Know about the powerful compiler generation tools and techniques, which are useful to the other non-compiler applications
- Know the importance of optimization and learn how to write programs that execute faster

**Course Outcomes**

- Able to design a compiler for a simple programming language
- Able to use the tools related to compiler design effectively and efficiently
- Ability to write optimized code

**Unit - I**

**Introduction:** Language processors, The Structure of a Compiler, the science of building a complier
**Lexical Analysis**: The Role of the lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, The lexical analyzer generator Lex,  Design of a Lexical Analyzer generator

**Unit II**

**Syntax Analysis**: Introduction, Context Free Grammars, Writing a grammar, TOP Down Parsing**,**
Bottom Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using ambiguous grammars, Parser Generators

**UNIT III**

**Syntax Directed Translation:** Syntax Directed Definitions, Evaluation orders for SDD's, Application of SDT, SDT schemes, Implementing L-attribute SDD's.
**Intermediate Code Generation:** Variants of syntax trees, three address code, Types and declarations, Translations of expressions, Type checking, control flow statements, backpatching, switch statements, intermediate code for procedure.

**UNIT IV**
**Run Time Environment :** storage organization, , Stack allocation of space, Access to non-local data on stack , Heap management
**Symbol Table:** Introduction, symbol table entries, operations on the symbol table, symbol table organizations, non block structured language, block structured language.

**UNIT V**
**Code Generation:** Issues in the design of a code generator, The Target language, Basic blocks and flow graphs, optimization of basic blocks, a simple code generator, register allocation and assignment, optimal code generation for expressions, dynamic programming code generation.

**Code Optimization**: Introduction, where and how to optimize, principle source of optimization, function preserving transformations, loop optimizations, global flow analysis, machine dependent optimization

**Text Books :**
1. "Compilers Principles, Techniques and Tools", Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson,2014.
2. "Compiler Construction", K.V.N Sunitha, Pearson, 2013


Reference Books :
1. Compiler Design", K. Muneeswaran., Oxford University Press, 2012
2. "Engineering A Compiler", Second Edition, Keith D. Cooper & Linda Torczon., MK(Morgan Kaufmann) (ELSEVIER)
3. "Compilers Principles and Practice", Parag H. Dave, Himanshu B. Dave.,PEARSON
4. "Compiler Design", SandeepSaxena, Rajkumar Singh Rathore., S.Chand publications
5. "Compiler Design", SantanuChattopadhyay., PHI
6. "Principals of Compiler Design", Nadhni Prasad, Elsevier

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  | L | T | P | C |
|---|---|---|---|---|
| B. Tech III-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### 15A05602    DATA WAREHOUSING & MINING

**Course Objectives:**
- To know the basic concepts and principles of data warehousing and data mining
- Learn pre-processing techniques and data mining functionalities
- Learn and create multidimensional models for data warehousing
- Study and evaluate performance of Frequent Item sets and Association Rules
- Understand and Compare different types of classification and clustering algorithms

**Course Outcomes:**
- Understand the basic concepts of data warehouse and data Mining
- Apply pre-processing techniques for data cleansing
- Analyze and evaluate performance of algorithms for Association Rules
- Analyze Classification and Clustering algorithms

**UNIT I**
Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

**UNIT II**
Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining. Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction.

**UNIT III**
Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules,

From Association Mining to Correlation Analysis, Constraint-Based Association Mining, Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

## UNIT IV
Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Analysis.

## UNIT V
Mining Streams, Time Series and Sequence Data: Mining Data Streams, Mining Time-Series Data, Mining Sequence Patterns in Transactional Databases, Mining Sequence Patterns in Biological Data, Graph Mining, Social Network Analysis and Multi relational Data Mining, Mining Object, Spatial, Multimedia, Text and Web Data: Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Data Mining, Multimedia Data Mining, Text Mining, Mining the World Wide Web.

**TEXT BOOKS**:
1. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

**REFERENCES**:
1. Data Mining Techniques, Arun  KPujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory& Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar,V.Ajay, PHI,2008.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech III-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### 15A05603    DESIGN PATTERNS

**Course Objectives:**
- To understand design patterns and their underlying object oriented concepts.
- To understand implementation of design patterns and providing solutions to real world software design problems.
- To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.

**Course Outcomes:**
- Know the underlying object oriented principles of design patterns.
- Understand the context in which the pattern can be applied.
- Understand how the application of a pattern affects the system quality and its tradeoffs.

**UNIT-I**
**Introduction to Design Patterns**
Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.

**UNIT-II**
**Designing A Document Editor: A Case Study**
Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

**UNIT-III**
**Structural Patterns-1**: Adapter, Bridge, Composite.
**Structural Patterns-2**: Decorator, Façade, Flyweight, Proxy, Discuss of Structural Patterns.

**UNIT-IV**
Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.
Behavioral Patterns-2: Mediator, Memento, Observer.

**UNIT-V**
Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.
What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

**TEXT BOOK :**
    1.    Design Patterns By Erich Gamma, Pearson Education

**REFERENCE BOOKS:**
1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd
5. Design Patterns Explained By Alan Shalloway,Pearson Education.
6. Pattern Oriented Software Architecture, F.Buschmann &others, John Wiley & Sons.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

B. Tech  III-II Sem. (CSE)

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

### 15A05604    DESIGN AND ANALYSIS OF ALGORITHMS

**Course Objectives:**
- To know the importance of the complexity of a given algorithm.
- To study various algorithm design techniques.
- To utilize data structures and/or algorithmic design techniques in solving new problems.
- To know and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.
- To study some techniques for solving hard problems.

**Course Outcomes:**
- Analyze the complexity of the algorithms
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
- Able to prove that a certain problem is NP-Complete.

**UNIT I**
**Introduction**: What is an Algorithm, Algorithm specification, Performance analysis.
**Divide and Conquer:** General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, Stressen's matrix multiplication.

**UNIT II**
**Greedy Method**: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.
**Dynamic programming:** General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

**UNIT III**
**Basic Traversal and Search Techniques**: Techniques for binary trees, Techniques for Graphs,
Connected components and Spanning trees, Bi-connected components and DFS
**Back tracking:** General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

## UNIT IV

**Branch and Bound:** The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency
Considerations.

**Lower Bound Theory**: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure.

## UNIT V

**NP – Hard and NP – Complete Problems:** NP Hardness, NP Completeness, Consequences of beingin P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

## Text Books:
1. "Fundamentals of Computer Algorithms", Ellis Horowitz, S. Satraj Sahani and Rajasekhran, 2nd edition, University Press.2014,
2. "Design and Analysis of Algorithms", Parag Himanshu Dave, Himanshu Bhalchandra Dave, Pearson Education, Second Edition, 2009.

## Reference Books:
1. "Introduction to Algorithms", second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd./ Pearson Education.
2. "Introduction to Design and Analysis of Algorithms A strategic approach", R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
3. "Data structures and Algorithm Analysis in C++", Allen Weiss, Second edition, Pearson education.
4. "Design and Analysis of algorithms", Aho, Ullman and Hopcroft,Pearson education.
5. "Algorithms" – Richard Johnson baugh and Marcus Schaefer, Pearson Education

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech III-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05605    WEB AND INTERNET TECHNOLOGIES

**Course Objectives:**
- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java servlets, JSP and PHP.
- To learn the basic web concepts and Internet protocols

**Course Outcomes:**
- Ability to create dynamic and interactive web sites
- Gain knowledge of client side scripting using java sript and DHTML.
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servelets, JSP and PHP.
- Able to design rich client presentation using AJAX.

**UNIT I**
Introduction to Web Technologies: Introduction to Web servers like Apache 1.1, IIS XAMPP(Bundle Server), WAMP(Bundle Server),Handling HTTP Request and Response, installations of above servers, HTML and CSS: HTML 5.0 , XHTML, CSS 3.

**UNIT II**

**Java Script:** An introduction to JavaScript–JavaScript DOM Model-Date and Objects,-Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling-DHTML with JavaScript. **Servlets**: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies.

**Installing and Configuring Apache Tomcat Web Server**;- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - **JSP**: Understanding Java Server Pages-JSP Standard Tag Library(JSTL)-Creating HTML forms by embedding JSP code.

**UNIT III**
Introduction to PHP: The problem with other Technologies (Servelets and JSP), Downloading, installing, configuring PHP, Programming in a Web environment and The anatomy of a PHP Page.
Overview of PHP Data types and Concepts:  Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.

PHP Advanced Concepts: Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables, Working with Date and Time.

## UNIT IV

Creating and Using Forms: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions ofa form.
XML: Basic XML- Document Type Definition XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

## UNIT V

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application – SOAP.

## TEXT BOOKS:

1. Beginning PHP and MySQL, 3rd Edition , Jason Gilmore, Apress Publications (Dream tech.).
2. PHP 5 Recipes A problem Solution Approach Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens.
3. Deitel and Deitel and Nieto, "Internet and World Wide Web - How to Program", Prentice Hall, 5 th Edition, 2011.
4. Herbert Schildt, "Java-The Complete Reference", Eighth Edition, Mc Graw Hill Professional, 2011.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech III-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### 15A05606  ARTIFICIAL INTELLIGENCE
### (CBCC-I)

**Course Objectives:**
To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences.

**Course Outcomes:**
- Select 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
- Possess the ability to apply AI techniques to solve problems of game playing, expert systems, machine learning and natural language processing.

**UNIT I**
**PROBLEM SOLVING**
Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – informed search strategies – constraint satisfaction

**UNIT II**
**LOGICAL REASONING**
Logical agents – propositional logic – inferences – first-order logic – inferences in firstorder logic – forward chaining – backward chaining – unification – resolution

**UNIT III**
**PLANNING**
Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

**UNIT IV**
**UNCERTAIN KNOWLEDGE AND REASONING**
Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models.

**UNIT V**
**LEARNING**
Learning from observation - Inductive learning – Decision trees – Explanation based learning –Statistical Learning methods - Reinforcement Learning

**TEXT BOOK:**
1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2003.

**REFERENCES:**
1. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  III-II Sem. (CSE)**

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

### 15A05607    LINUX ENVIRONMENT SYSTEM
### (CBCC-I)

**Course Objectives:**

**The student should be made to:**
- Understand the Multiuser, Multiprocessing, Multitasking, and multiprogramming environment.
- Learn the various flavors and installation types of Linux operating system.
- Experiences the installation and configuration status of Linux system.
- Learn the file system and various commands of Linux environment system.

**Course Outcomes:**
- Able to describe and use the LINUX operating system.
- Able to describe and use the fundamental LINUX system tools and utilities.
- Able to describe and write shell scripts in order to perform basic shell programming.
- Able to describe and understand the LINUX file system.

**UNIT- I**
**INTRODUCTION TO LINUX OPERATING SYSTEM:** Introduction and Types of Operating Systems, Linux Operating System, Features, Architecture Of Linux OS and Shell Interface, Linux System Calls, Linux Shared Memory Management, Device and Disk Management in Linux, Swap space and its management. File System and Directory Structure in Linux. Multi-Processing, load sharing and Multi-Threading in Linux, Types of Users in Linux, Capabilities of Super Users and equivalents.

**UNIT -II**
**INSTALLING LINUX AS A SERVER :** Linux and Linux Distributions ; Major differences between various Operating Systems (on the basis of: Single Users vs Multiusers  vs Network Users; Separation of the GUI and the Kernel; Domains; Active Directory;).

**INSTALLING LINUX IN A SERVER CONFIGUARTION :** Before Installation; Hardware; Server Design ;Dual-Booting Issues; Modes of Installation; Installing Fedora Linux; Creating a Boot Disk; Starting the Installation; GNOME  AND  KDE

: The History of X Windows; The Downside; Enter GNOME; About GNOME ; Starting X Windows and GNOME; GNOME Basics; The GNOME Configuration Tool.

## UNIT-III

**INSTALLING SOFTWARE :** The Fedora Package Manager; Installing a New Package using dpkg and RPM; Querying a Package; Uninstalling a Package using dpkg and RPM; Compiling Software; Getting and Unpacking the Package; Looking for Documentation; Configuring the Package; Compiling Your Package; Installing the Package, Driver Support for various devices in linux.

**MANAGING USERS:** Home Directories ;Passwords; Shells; Stratup Scripts; Mail; User Databases; The / etc /passwd File; The / etc / shadow File; The / etc /group File; User Management Tools; Command-Line User Management; User LinuxConf to Manipulate Users and Groups; SetUID and SetGID Programs.

## UNIT IV

**THE COMMAND LINE :** An Introduction to BASH, KORN, C, A Shell etc. ; BASH commands: Job Control; Environment Variables; Pipes; Redirection; Command-Line Shortcuts; Documentation Tools; The man Command; the text info System; File Listings; Owner ships and permissions; Listing Files; File and Directory Types; Change Ownership; Change Group; Change Mode ; File Management and Manipulation; Process Manipulation; Miscellaneous Tools; Various Editors Available like: Vi and its modes, Pico, Joe and emacs, , Su Command.

**BOOTING AND SHUTTING DOWN:** LILO and GRUB; Configuring LILO; Additional LILO options; Adding a New Kernel to Boot ; Running LILO; The Steps of Booting; Enabling and disabling Services.

## UNIT-V

**FILE SYSTEMS:** The Makeup File Systems; Managing File Systems; Adding and Partitioning a Disk; Network File Systems; Quota Management;

**CORE SYSTEM SERVICES:** The init Service; The inetd and xinetd Processess; The syslogd Daemon; The cron Program.

**PRINTING :** The Basic of lpd; Installing LPRng; Configuring /etc/printcap; The /ETC/lpd.perms File; Clients of lpd, Interfacing Printer through Operating System.

**Text Books:**
1. *Linux Administration : A Beginner's Guide* **by Steve Shah** , Wale Soyinka, ISBN 0072262591 (0-07-226259-1), McGraw-Hill Education.
2. Unix Shell Programming, Yashavant P. Kanetkar, BPB Publications, 2003.
3. UNIX Concepts and Applications by Sumitabha Das Tata McGraw-Hill, 2006.

4.   Operating  System  Concepts  $8^{th}$  edition,  by  Galvin  Wiley  Global Education, 2012.

**References:**

1.   Unix operating system, by Grace Todino, John Strang, Jerry D. Peek Oreily publications 1993.

2.   Operating System Concepts $8^{th}$ edition, by Galvin Wiley Global Education, 2012.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech III-II Sem. (CSE)** | 3 | 1 | 0 | 3 |

### 15A05608    SYSTEM APPLICATIONS & PRODUCT  (SAP)
### (CBCC-I)

**Course Objectives:**
1. Understand the role of enterprise systems in supporting business processes.
2. Identify key integration points between financial accounting and other processes.
3. Understand the role of the credit management process in fulfillment.
4. Analyze the key concepts associated with material planning.

**Course Outcomes:**
1. Adopt and apply an integrated perspective to business processes
2. Effectively use SAP® ERP to execute the key steps in the procurement process.
3. Ability to use SAP ERP to extract meaningful information about the production process.
4. Extract and evaluate meaningful information about the material planning process using the SAP ERP system.

**Unit 1:**
**Introduction to Business Processes:** The Functional Organizational Structure, Business Processes, Global Bike Incorporated (GBI).  **Introduction to Enterprise Systems:** Enterprise Systems, Data in an Enterprise System, Reporting. **Introduction to Accounting:** Organizational Data, Master Data, Key Concepts, Processes, Reporting.

**Unit 2:**
**The Procurement Process:** Organizational Data, Master Data, Key Concepts, Process, Reporting.

**Unit 3:**
**The Fulfillment Process:** Organizational Data, Master Data, Process, Credit Management Process, Reporting.

**Unit 4:**
**The Production Process:** Master Data, Process, Reporting. **Inventory and Warehouse Management Processes:** Inventory Management, Organizational Data in warehouse Management, Master Data in Warehouse Management, Processes in Warehouse Management, Reporting.

**Unit 5:**
**The Material Planning Process:** Master Data, Process, Reporting, **Process Integration:** Procurement, Fulfillment, and IWM Processes, Procurement, Fulfillment, Production, and IWM Processes.

**Text Book:**
1. "Integrated Business Processes with ERP systems" Simha R.Magal, Jeffery word, JOHN WILEY & SON S, INC.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  III-II Sem. (CSE)**

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

## 15A01608    INTELLECTUAL PROPERTY RIGHTS
### (CBCC-I)

**Course Objectives:**
*This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations.*

**Course Outcomes:**
*On completion of this course, the student will have an understanding of the following:*
   a) *Intellectual Property Rights and what they mean*
   b) *Trade Marks and Patents and how to register them*
   c) *Laws Protecting the Trade Marks and Patents*
   d) *Copy Right and laws related to it.*

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 Trade Marks, 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 Developments 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, International Development In Trade Secrets Law.

TEXT BOOKS & REFERENCES:

1. Intellectual Property Rights, Deborah. E. Bouchoux, Cengage Learing.
2. Intellectual Property Rights– Unleashmy The Knowledge Economy, Prabuddha Ganguli, Tate Mc Graw Hill Publishing Company Ltd.,

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| B. Tech III-II Sem. (CSE) | 0 | 0 | 4 | 2 |

### 15A05609    WEB AND INTERNET TECHNOLOGIES LABORATORY

**Course Objectives:**
- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java servlets, JSP and PHP.
- To learn the basic web concepts and Internet protocols

**Course Outcomes:**
- Ability to create dynamic and interactive web sites.
- Gain knowledge of client side scripting using java sript and DHTML.
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servelets, JSP and PHP.

1. To create a simple student bio-data form using html5 . it should contain the following name (text box), address (multiline text box),gender (radio button male,female),skill sets known (check boxes – c,c++,java,C#etc), extra curricular activities (text box), nationality (combobox) ,submit and reset button.
2. To create an html page with different types of frames such as floating frame, navigation frame & mixed frame.
3. Design the webpage by applying the different styles using inline, external & internal style sheets.
4. Write a java script program to read .XML file and display data in a neat format.
5. To write a Javascript program to define a user defined function for sorting the values in an array. Use HTML5 for user interface.
6. To create an html page to demonstrate exception handling in javascript

   Create an html page named as "exception.html" and do the following.

   i. within the script tag write code to handle exception
   a) define a method RunTest() to get any string values(str) from the user and call the method Areletters(str).
   b) In Areletters(str) method check whether str contain only alphabets (a-z, A-Z), if not throw exception.
   c) Define a exception method Input Exception(str) to handle the exception thrown by the above method.
   ii. Within the body tag define a script tag to call Runtest() method define.

7. Write a jsp servlet program to implement the single text field calculator.
8.  Write a jsp servlet program to demonstrate  session handling using
    – url rewriting
    --hidden formfield
    --cookies
    --sessions
9. To create a php program to demonstrate the different predefined function
in array, Math, Data & Regular Expression.

Procedure:
  ➢ Create php file named as  Regularexpression.php
  ➢ for demonstrating the method for handling various strings with regular expression  Array.php
  ➢ for demonstrating the methods for handling the array values Math_function.php
  ➢ to demonstrate the predefined in math objects. Date_time.php to demonstrate the predefined function in date subjec

10. Write a program in PHP for a simple email processing with attachment using forms
11. Write a program for PHP for a login script ; create a login database and store username and password
12. Write a program in PHP to add, update and delete using student database
13. Create a DTD to describe a library. Library has one or more books, members and staffs.
    • Each book has BookID(Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price.
    • Each Member has MemeberID(Attribute), Name, Address, Phone number.
    • Each Staff has StaffID(Attribute), Name, Address, Phone number.
    • Each Author has AuthorID(Attribute), Name, Address, Phone number.
    • Each Publisher has PublisherID(Attribute), Name, Address, Phone number.
    •  Use it in a XML document.

14. Create a DTD to describe a Computer. A computer has following details,

    • Type of computer (this is an attribute), Which can be Desktop PC, Laptop, Palm Top, Server, Minicomputer or mainframe)
    • A Monitor with Serial Number (Attribute),  Make, Model, Year of manufacture, Size, Type (which is either colour or monochrome)
    • A keyboard with Serial Number (Attribute), Make, Model, Year of manufacture, No of keys, Type( which is either Standard or Enhanced or  Multimedia)
    • A mouse with Serial Number (Attribute), Make, Model, Year of manufacture, No of buttons, Scroll wheel (which is yes or no), Type (Which is Ball or Optical)

- A Mother board with Serial Number (Attribute), Make, Model, Year of manufacture, No of USB ports, No of IDE slots, No of SATA hubs, No of PCI slots, Display Type(Which is VGA or HDMI), Number of Processor slots, Type of Processors supported (must be a list), Type of RAM supported (Which is either SD or DDR1 or DDR2 or RD), Maximum Capacity of RAM, Form Factor (which is either AT or Baby AT), On Board sound card (Which is yes or no)
- A Microprocessor with Serial Number (Attribute), Make, Model, Year of manufacture, speed (in GHz), No of Cores (Single, Dual, Quad)
- A power supply with Serial Number (Attribute), Make, Model, Year of manufacture, Type (AT, ATX), Wattage
- One or more hard disks, each Hard disk must have Serial Number (Attribute), Make, Model, Year of manufacture, capacity and type (Which is IDE or SATAI or SATAII, SCSI)
- One or more RAM SIMM, with Serial Number (Attribute), Make, Model, Year of manufacture, Type (which must be SD, DDRI, DDRII, RD), capacity, operating frequency.
  Use it in a XML document.

15. Create a Schema to describe a Computer. Use the previous question's details and show an instance XML document.

16. Create a Schema to describe a library. Library has one or more - books, members and staffs.
    - Each book has BookID(Attribute), Title, one or more Authors, Publisher Year of Publication, ISBN and Price.
    - Each Member has MemeberID(Attribute), Name, Address, Phone number.
    - Each Staff has StaffID(Attribute), Name, Address, Phone number.
    - Each Author has AuthorID(Attribute), Name, Address, Phone number.
    - Each Publisher has PublisherID(Attribute), Name, Address, Phone number.
      Use the above DTD in a sample XML document.

17. Create a DTD to describe a bank that has one or more customers, accounts or Employee.
    - Each Customer has a Customer ID, Name and address.
    - Each account has an account ID, BranchID, CustomerID, AccountType and Balance.
    - Each Employee has aEmpID, Name, Designation, DOJ, Salary and Address.
      Use this DTD in a XML file.

18. Create Schema describe a bank that has one or more customers, accounts or depositors. Use the previous questions details. Also show a sample instance XML document.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|

B. Tech  III-II Sem. (CSE)      L 0   T 0   P 4   C 2

### 15A05610    DATA WAREHOUSING & MINING LABORATORY

**Course Objectives:**
Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics), Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA), Understand the data sets and data preprocessing, Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression, Exercise the data mining techniques with varied input values for different parameters.

**Course Outcomes:**
- Ability to build Data Warehouse and Explore WEKA
- Ability to perform data preprocessing tasks and Demonstrate performing association rule mining on data sets
- Ability to perform classification, clustering and regression on data sets
- Ability to design data mining algorithms

**Data Warehousing**

**Experiments:**
**Build Data Warehouse and Explore WEKA**

A.   Build a Data Warehouse/Data Mart (using open source tools like Pentaho Data Integration tool, Pentoaho Business Analytics; or other data warehouse tools like Microsoft-SSIS, Informatica, Business Objects, etc.).
   (i).   Identify source tables and populate sample data
  (ii).   Design multi-dimensional data models namely Star, snowflake and Fact constellation schemas for any one enterprise (ex. Banking, Insurance, Finance, Healthcare, Manufacturing, Automobile, etc.).
 (iii).   Write ETL scripts and implement using data warehouse tools
 (iv).   Perform various OLAP operations such slice, dice, roll up, drill up and  pivot
  (v).   Explore visualization features of the tool for analysis like identifying trends etc.

B.   Explore WEKA Data Mining/Machine Learning Toolkit

(i).   Downloading and/or installation of WEKA data mining toolkit,

(ii).   Understand the features of WEKA toolkit such as Explorer, Knowledge Flow interface, Experimenter, command-line interface.

(iii).   Navigate the options available in the WEKA (ex. Select attributes panel, Preprocess panel, Classify panel, Cluster  panel, Associate panel and Visualize panel)

(iv).   Study the arff file format

(v).   Explore the available data sets in WEKA.

(vi).   Load a data set (ex. Weather dataset, Iris dataset, etc.)

(vii).   Load each dataset and observe the following:
- i.   List the attribute names and they types
- ii.   Number of records in each dataset
- iii.   Identify the class attribute (if any)
- iv.   Plot Histogram
- v.   Determine the number of records for each class.
- vi.   Visualize the data in various dimensions

## Perform data preprocessing tasks and Demonstrate performing association rule mining on data sets

A.   Explore various options available in Weka for preprocessing data and apply (like Discretization Filters, Resample filter, etc.) on each dataset

B.   Load each dataset into Weka and run Aprori algorithm with different support and confidence values. Study the rules generated.

C.   Apply different discretization filters on numerical attributes and run the Apriori association rule algorithm. Study the rules generated. Derive interesting insights and observe the effect of discretization in the rule generation process.

## Demonstrate performing classification on data sets

A.   Load each dataset into Weka and run Id3, J48 classification algorithm. Study the classifier output. Compute entropy values, Kappa statistic.

B.   Extract if-then rules from the decision tree generated by the classifier, Observe the confusion matrix and derive Accuracy, F-measure, TPrate, FPrate, Precision and Recall values. Apply cross-validation strategy with various fold levels and compare the accuracy results.

C.   Load each dataset into Weka and perform Naïve-bayes classification and k-Nearest Neighbour classification. Interpret the results obtained.

D.   Plot RoC Curves

E. Compare classification results of ID3, J48, Naïve-Bayes and k-NN classifiers for each dataset, and deduce which classifier is performing best and poor for each dataset and justify.

**Demonstrate performing clustering on data sets**

A. Load each dataset into Weka and run simple k-means clustering algorithm with different values of k (number of desired clusters). Study the clusters formed. Observe the sum of squared errors and centroids, and derive insights.
B. Explore other clustering techniques available in Weka.
C. Explore visualization features of Weka to visualize the clusters. Derive interesting insights and explain.

**Demonstrate performing Regression on data sets**

A. Load each dataset into Weka and build Linear Regression model. Study the clusters formed. Use Training set option. Interpret the regression model and derive patterns and conclusions from the regression results.
B. Use options cross-validation and percentage split and repeat running the Linear Regression Model. Observe the results and derive meaningful results.
C. Explore Simple linear regression technique that only looks at one variable

**Resource Sites:**
1. **http://www.pentaho.com/**
2. **http://www.cs.waikato.ac.nz/ml/weka/**

**Data Mining**

Task 1: Credit Risk Assessment

**Description:**
The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need is some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data**:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.
In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)
A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Owns_telephone. German phone rates are much higher. So fewer people own telephones.
- Foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

**Subtasks: (Turn in your answers to the following tasks)**
1. List all the categorical (or nominal) attributes and the real-valued attributes separately.

2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes.

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.

4.  Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?

5.  Is testing on the training set as you did above a good idea? Why or Why not ?

6.  One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

7. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect?

8.  Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9.  Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?

10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees? How does the complexity of a Decision Tree relate to the bias of the model?

11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you

obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?

12.(Extra Credit): How can you convert a Decision Trees into "if-then-else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules. PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

**Task Resources:**
- [Andrew Moore's Data Mining Tutorials](#) (See tutorials on Decision Trees and Cross Validation)
- [Decision Trees](#) (Source: Tan, MSU)
- [Tom Mitchell's book slides](#) (See slides on Concept Learning and Decision Trees)
- Weka resources:
    - [Introduction to Weka](#) (html version) (download [ppt](#) version)
    - [Download Weka](#)
    - [Weka Tutorial](#)
    - [ARFF format](#)
    - [Using Weka from command line](#)

Task 2: Hospital Management System
Data Warehouse consists Dimension Table and Fact Table.
REMEMBER The following
Dimension
The dimension object (Dimension):
_ Name
_ Attributes (Levels) , with one primary key
_ Hierarchies
One time dimension is must.
About Levels and Hierarchies

Dimension objects (dimension)  consist of a set of levels and a set of hierarchies defined over those levels. The levels represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.
For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:

H1: YearL > QuarterL > MonthL > WeekL > DayL

H2: YearL > WeekL > DayL

The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.

About Unique Key Constraints

When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level)

Design a Hospital Management system data warehouse (TARGET) consistig of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.

Assume the Relational database (SOURCE) table schemas as follows

TIME (day, month, year),

PATIENT (patient_name, Age, Address, etc.,)

MEDICINE ( Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)

SUPPLIER :( Supplier_name, Medicine_Brand_name, Address, etc., )

If each Dimension has 6 levels,  decide the levels and hierarchies, Assume the level names suitably.

Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  III-II Sem. (CSE)** | **0** | **0** | **2** | **0** |

### 15A52602     ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS (AELCS) LAB (Audit Course)

## 1. Introduction

With increased globalization and rapidly changing industry expectations, employers are looking for the wide cluster of skills to cater to the changing demand. 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 globalised context.

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

- Gathering ideas and information and to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Taking part in social and professional communication.

## 2 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.

**3. SYLLABUS**:

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

**UNIT-I: COMMUNICATION SKILLS**
1. Reading Comprehension
2. Listening comprehension
3. Vocabulary Development
4. Common Errors

**UNIT-II: WRITING SKILLS**
1. Report writing
2. Resume Preparation
3. E-mail Writing

**UNIT-III: PRESENTATION SKILLS**
1. Oral presentation
2. Power point presentation
3. Poster presentation

**UNIT-IV: GETTING READY FOR JOB**
1. Debates
2. Group discussions
3. Job Interviews

**UNIT-V: INTERPERSONAL SKILLS**
1. Time Management
2. Problem Solving & Decision Making
3. Etiquettes

**4. LEARNING OUTCOMES:**
- Accomplishment of sound vocabulary and its proper use contextually
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

## 5. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infra-structural facilities to accommodate at least 60 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

## 6. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and  G

1. **Walden Infotech: Advanced English Communication Skills Lab**
2. **K-VAN SOLUTIONS-Advanced English Language Communication Skills lab**
3. **DELTA's key to the Next Generation TOEFL Test: Advanced Skills Practice.**
4. **TOEFL & GRE**( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
5. **Train2success.com**

## 7. BOOKS RECOMMENDED:

1. **Objective English for Competitive Exams**, Hari Mohana Prasad, 4th edition, Tata Mc Graw Hill.
2. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, O U Press 3rd Edn. 2015.
3. **Essay Writing for Exams, Audrone Raskauskiene, Irena Ragaisience & Ramute Zemaitience,OUP, 2016**
4. **Soft Skills for Everyone,** Butterfield Jeff, Cengage Publications, 2011.
5. **Management Shapers Series** by Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. **Campus to Corporate,** Gangadhar Joshi, Sage Publications, 2015

7. **Communicative English,**E Suresh Kumar & P.Sreehari, Orient Blackswan, 2009.
8. **English for Success in Competitive Exams,** Philip Sunil Solomon OUP, 2015

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|

**B. Tech  IV-I Sem. (CSE)**       **3   1   0   3**

### 15A52601    MANAGEMENT SCIENCE

*Course Objectives*: *The objective of the course is to equip the student the fundamental knowledge of management science and its application for effective management of human resource, materials and operation of an organization. It also aims to expose the students about the latest and contemporary developments in the field of management*.

**UNIT –I: Introduction to Management**: Concept-Nature and Importance of Management, Functions-Evaluation of Scientific Management, Modern management-Motivation Theories-Leadership Styles-Decision Making Process-Designing Organization Structure-Principles and Types of Organization.

**UNIT- II: Operations Management:** Plant location and Layout, Methods of production, Work-Study-Statistical Quality Control through Control Charts, Objectives of Inventory Management, Need for Inventory Control-EOQ&ABC Analysis(Simple Problems)**Marketing Management:**
Meaning, Nature, Functions of Marketing, Marketing Mix, Channels of distribution-Advertisement and sales promotion-Marketing strategies-Product Life Cycle.

**UNIT -III: Human Resource Management (HRM):** Significant and Basic functions of HRM-Human Resource Planning(HRP), Job evaluation, Recruitment and Selection, Placement and Induction-Wage and Salary administration. Employee Training and development-Methods-Performance  Appraisal-Employee Grievances-techniques of handling Grievances.

**UNIT –IV: Strategic Management:** Vision, Mission, Goals and Strategy- Corporate Planning Process-Environmental Scanning-SWOT analysis-Different Steps in Strateg Formulation, Implementation and Evaluation. **Project Management**: Network Analysis-PERT, CPM, Identifying Critical Path-Probability-Project Cost Analysis, Project Crashing (Simple Problems).

**UNIT-V: Contemporary Management Practices:** Basic concepts of MIS-Materials Requirement Planning(MRP),Just-In-Time(JIT)System, Total Quality Management(TQM)-Six Sigma and Capability Maturity Models(CMM) evies, Supply Chain Management, Enterprise Resource Planning(ERP),Performance Management,

Business Process Outsourcing(BPO), Business Process Re-Engineering and Bench Marking, Balance Score Card.

**Course Outcomes**: This course enables the student to know the principles and applications of management knowledge and exposure to the latest developments in the field. This helps to take effective and efficient management decisions on physical and human resources of an organization. Beside the knowledge of Management Science facilitates for his/her personal and professional development.

**TEXT BOOKS:**

1. A.R Aryasri: Management Science, TMH, 2013
2. Kumar /Rao/Chalill 'Introduction to Management Science' Cengage, Delhi, 2012.

**REFERENCE BOOKS:**

1. A.K.Gupta "Engineering Management",S.CHAND, New Delhi, 2016.
2**.** Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi, 2012.
3. Kotler Philip & Keller Kevin Lane: Marketing Mangement , PHI,2013.
5. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005.
6. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2004.
7. Memoria & S.V.Gauker, Personnel Management, Himalaya, 25/e, 2005
8. Parnell: Strategic Management, Biztantra, 2003.
9. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2005.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05701    GRID AND CLOUD COMPUTING

**Course Objectives:**

The student should be made to:
- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing. Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

**Course Outcomes:**

The student should be able to
- Apply the security models in the grid and the cloud environment.
- Use the grid and cloud tool kits.
- Apply the concept of virtualization.
- Apply grid computing techniques to solve large scale scientific problems

## UNIT I          INTRODUCTION
Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers - Grid computing Infrastructures – cloud computing - service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

## UNIT II          GRID SERVICES
Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models – OGSA services.

## UNIT III    VIRTUALIZATION
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource

Management – Virtualization for data center automation.

## UNIT IV   PROGRAMMING MODEL

Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model - Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

## UNIT V   SECURITY

Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

## TEXT BOOK:

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.

## REFERENCES:

1. Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009
2. Tom White, "Hadoop The Definitive Guide", First Edition. O'Reilly, 2009.
3. Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005
4. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2nd Edition, Morgan Kaufmann.
5. Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press, 2009.
6. Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005.
7. Barry Wilkinson, "Grid Computing: Techniques and Applications", Chapman and Hall, CRC, Taylor and Francis Group, 2010.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|       | **L** | **T** | **P** | **C** |
|-------|-------|-------|-------|-------|
| **B. Tech  IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05702    INFORMATION SECURITY

**Course Objectives:**
- Extensive, thorough and significant understanding of the concepts, issues, principles and theories of computer network security
- Identifying the suitable points for applying security features for network traffic
- Understanding the various cryptographic algorithms and implementation of the same at software level
- Understanding the various attacks, security mechanisms and services

**Course Outcomes:**
- Protect the network from both internal and external attacks
- Design of new security approaches
- Ability to choose the appropriate security algorithm based on the requirements.

**Unit-I**
Computer Security concepts, The OSI Security Architecture, Security attacks, Security services and Security mechanisms, A model for Network Security
Classical encryption techniques- symmetric cipher model, substitution ciphers, transposition ciphers, Steganography.
Modern Block Ciphers: Block ciphers principles, Data encryption standard (DES), Strength of DES, linear and differential cryptanalysis, block cipher modes of operations, AES, RC4.

**Unit-II**
Introduction to Number theory –  Integer Arithmetic, Modular Arithmetic, Matrices, Linear Congruence, Algebraic Structures, $GF(2^n)$ Fields, Primes, Primality Testing, Factorization, Chinese remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm.
Public-key cryptography - Principles of public-key cryptography, RSA Algorithm, Diffie-Hellman Key Exchange, ELGamal cryptographic system, Elliptic Curve Arithmetic, Elliptic curve cryptography

**Unit-III**
Cryptographic Hash functions: Applications of Cryptographic Hash functions, Requirements and security, Hash functions based on Cipher Block Chaining, Secure Hash Algorithm (SHA)

Message Authentication Codes: Message authentication Requirements, Message authentication functions, Requirements for Message authentication codes, security of MACs, HMAC, MACs based on Block Ciphers, Authenticated Encryption
Digital Signatures-RSA with SHA & DSS

## Unit-IV

Key Management and distribution: Symmetric key distribution using Symmetric Encryption, Symmetric key distribution using Asymmetric, Distribution of Public keys, X.509 Certificates, Public key Infrastructure.
User Authentication: Remote user Authentication Principles, Remote user Authentication using Symmetric Encryption, Kerberos, Remote user Authentication using Asymmetric Encryption, Federated Identity Management, Electronic mail security: Pretty Good Privacy (PGP), S/MIME.

## Unit-V

Security at the Transport Layer(SSL and TLS) : SSL Architecture, Four Protocols, SSL Message Formats, Transport Layer Security, HTTPS, SSH
Security at the Network layer (IPSec): Two modes, Two Security Protocols, Security Association, Security Policy, Internet Key Exchange.
System Security: Description of the system, users, Trust and Trusted Systems, Buffer Overflow and Malicious Software, Malicious Programs, worms, viruses, Intrusion Detection System(IDS), Firewalls

**Text books:**
1. "Cryptography and Network Security", Behrouz A. Frouzan and Debdeep
    Mukhopadhyay, Mc Graw Hill Education, 2nd edition, 2013.
2. "Cryptography and Network Security: Principals and Practice", William Stallings,
    Pearson Education , Fifth Edition, 2013.

**References:**
1. "Network Security and Cryptography", Bernard Menezes , Cengage Learning.
2. "Cryptography and Security", C.K. Shymala, N. Harini and Dr. T.R. Padmanabhan, Wiley-India.
3. "Applied Cryptography, Bruce Schiener, 2nd edition, John Wiley & Sons.
4. "Cryptography and Network Security", Atul Kahate, TMH.
5. 'Introduction to Cryptography", Buchmann, Springer.
6. 'Number Theory in the Spirit of Ramanujan", Bruce C.Berndt, University Press
7. "Introduction to Analytic Number Theory", Tom M.Apostol, University Press

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

| | L | T | P | C |
|---|---|---|---|---|
**B. Tech  IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05703    MOBILE APPLICATION DEVELOPMENT

**Course Objectives:**
- To understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android applications
- To understand fundamentals of android programming.

**Course Outcomes:**
- Create data sharing with different applications and sending and intercepting SMS.
- Develop applications using services and publishing android applications.
- To demonstrate their skills of using Android software development tools

**Unit 1: Introduction to Android:**
The Android 4.1 jelly Bean SDK, Understanding the Android Software Stack, installing the  Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text view Control, Using the Android Emulator, The Android Debug Bridge(ADB), Launching Android Applications on a Handset.

**Unit 2: Basic Widgets:**
Understanding the Role of Android Application Components, Understanding the Utility of Android API, Overview of the Android Project Files, Understanding Activities, Role of the Android Manifest File, Creating the User Interface, Commonly Used Layouts and Controls, Event Handling, Displaying Messages Through Toast, Creating and Starting an Activity, Using the Edit Text Control, Choosing Options with Checkbox, Choosing Mutually Exclusive Items Using Radio Buttons

**Unit 3: Building Blocks for Android Application Design:**
Introduction to Layouts, Linear Layout, Relative Layout, Absolute Layout, Using Image View, Frame Layout, Table Layout, Grid Layout, Adapting to Screen orientation.

**Utilizing Resources and Media** Resources, Creating Values Resources, Using Drawable Resources, Switching States with Toggle Buttons, Creating an Images Switcher Application, Scrolling Through Scroll View, playing Audio, Playing Video, Displaying Progress with Progress Bar, Using Assets.

**Unit 4: Using Selection widgets and Debugging:**
Using List View, Using the Spinner control, Using the GridView Control, Creating an Image Gallery Using the ViewPager Control, Using the Debugging Tool: Dalvik Debug Monitor Service(DDMS), Debugging Application, Using the Debug Perspective.

**Displaying And Fetching Information Using Dialogs and Fragments:** What Are Dialogs?, Selecting the Date and Time in One Application, Fragments, Creating Fragments with java Code, Creating Special Fragments

**Unit 5: Building Menus and Storing Data:**
Creating Interface Menus and Action Bars, Menus and Their Types, Creating Menus Through XML, Creating Menus Through Coding, Applying a Context Menu to a List View, Using the Action Bar, Replacing a Menu with the Action Bar, Creating a Tabbed Action Bar, Creating a Drop-Down List Action Bar

**Using Databases**:
Using the SQLiteOpenHelperclasss, Accessing Databases with the ADB, Creating a Data Entry Form,

**Communicating with SMS and Emails:**
Understanding Broadcast Receivers, Using the Notification System, Sending SMS Messages with Java Code, Receiving SMS Messages, Sending Email, Working With Telephony Manager.

**Text Books**
1. Android Programming by B.M Harwani, Pearson Education, 2013.

**References Text Books:**
1. Android application Development for Java Programmers, James C Sheusi, Cengage Learning
2. Android In Action by w.Frank Ableson, Robi Sen, Chris King, C. Enrique Ortiz., Dreamtech.
3. Professional Android 4 applications development, Reto Meier, Wiley India, 2012.
4. Beginning Android 4 applications development, Wei- Meng Lee, Wiley India,2013

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
**B. Tech IV-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

### 15A05704    SOFTWARE ARCHITECTURE
### (CBCC-II)

**Course Objectives:**
- Introduction to the fundamentals of software architecture.
- Software architecture and quality requirements of a software system
- Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
- Methods, techniques, and tools for describing software architecture and documenting design rationale.
- Software architecture design and evaluation processes.

**Course Outcomes:**
- The student will be able to:
- Design and motivate software architecture for large scale software systems
- Recognize major software architectural styles, design patterns, and frameworks
- Describe a software architecture using various documentation approaches and architectural
- description languages
- Generate architectural alternatives for a problem and select among them
- Use well-understood paradigms for designing new systems

**UNIT I: ENVISIONING ARCHITECTURE**
What is software Architecture-What is Software Architecture, Other Points of View, Architectural Patterns, Reference Models, and Reference Architectures, Importance of Software Architecture, Architectural Structures and views.
**ENVISIONING ARCHITECTURE:**
Architecture Business Cycle- Architectures influences, Software Processes and the Architecture Business Cycle, Making of "Good" Architecture.

**UNIT II: DESIGNING THE ARCHITECTURE WITH STYLES**
Designing the Architecture: Architecture in the Life Cycle, Designing the Architecture, Formatting the Team Structure, Creating a Skeletal System.

Architecture Styles: Architectural Styles, Pipes and Filters, Data Abstraction and Object-Oriented Organization, Event-Based, Implicit Invocation, Layered Systems, Repositories, Interpreters.2013-2014

## UNIT III: CREATING AN ARCHITECTURE-I

Creating an Architecture: Understanding Quality Attributes – Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attribute. Scenarios in Practice, Other System Quality Attributes, Business Qualities, Architecture Qualities.

Achieving Qualities: Introducing Tactics, Availability Tactics, Modifiability Tactics, Performance Tactics, Security Tactics, Testability Tactics, Usability Tactics.

## UNIT IV: CREATING AN ARCHITECTURE-II

Documenting Software Architectures: Use of Architectural Documentation, Views, Choosing the Relevant Views, Documenting a view, Documentation across Views. Reconstructing Software Architecture: Introduction, Information Extraction, Database Construction, View Fusion, and Reconstruction.

## UNIT V: ANALYZING ARCHITECTURES

The ATAM: Participants in the ATAM, Outputs of The ATAM, Phases Of the ATAM. The CBAM: Decision-Making Context, The Basis for the CBAM, Implementing the CBAM. The World Wide Web:A Case study in Interoperability- Relationship to the Architecture Business Cycle, Requirements and Qualities, Architecture Solution, Achieving Quality Goals.

## TEXT BOOKS:

1. Software Architectures in Practice , Len Bass, Paul Clements, Rick Kazman, 2nd Edition, Pearson Publication.
2. Software Architecture , Mary Shaw and David Garlan, First Edition, PHI Publication, 1996.

## REFERENCES BOOKS:

1. **Software Design: From Programming to Architecture**, Eric Braude**,** Wiley, 2004.
2. N. Domains of Concern in Software Architectures and Architecture Description Languages. Medvidovic and D. S. Rosenblum. USENIX.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

### 15A05705    COMPUTER GRAPHICS
### (CBCC-II)

**Course Objectives:**
- To provide students with an understanding of the algorithms and theories that form the basis of computer graphics and modeling.
- To give students skills necessary in the production of 2D &3D models.

**Course Outcomes:**
- Acquire familiarity with the relevant mathematics of computer graphics.
- Be able to design basic graphics application programs, including animation
- Be able to design applications that display graphic images to given specifications

**UNIT I**
**Introduction**, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices
Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT II**
**2-D Geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.
**2-D Viewing** :     The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

**UNIT III**
**3-D Object representation**: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and  B-spline surfaces. Basic illumination models, polygon rendering methods.

**UNIT IV**

**3-D Geometric transformations**: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT V**

**Visible surface detection methods**: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

### TEXT BOOKS:
1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

### REFERENCE BOOKS:

1. "Computer Graphics Second edition", Zhigand xiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.
2. "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
3. "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
5. "Computer Graphics", Steven Harrington, TMH.
6. Computer Graphics,F.S.Hill,S.M.Kelley,PHI.
7. Computer Graphics,P.Shirley,Steve Marschner&Others,Cengage Learning.
8. Computer Graphics & Animation,M.C.Trivedi,Jaico Publishing House.
9. An Integrated Introduction to Computer Graphics and Geometric Modelling,R.Goldman,CRC Press,Taylor&Francis Group.
10. Computer Graphics,Rajesh K.Maurya,Wiley India.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**B. Tech  IV-I Sem. (CSE)**

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

**15A05706      MACHINE LEARNING**
**(CBCC-II)**

**Course Objectives:**
- To understand the basic theory underlying machine learning.
- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.

**Course Outcomes:**
- Ability to understand what is learning and why it is essential to the design of intelligent machines.
- Ability to design and implement various machine learning algorithms in a wide range of real-world applications.
- Acquire knowledge  deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more

**Unit I:**
What is Machine Learning?, Examples of machine learning applications, supervised Learning: learning a class from examples, Vapnik- Chervonenkis dimension, probably approximately correct learning, noise, learning multiple classes, regression, model selection and generalization, dimensions of a supervised machine learning algorithm. Decision Tree Learning: Introduction,  Decisions 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 – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithm, Remarks on the BACKPROPGRATION Algorithm, An illustrative Example: Face Recognition, Advanced Topics in Artificial Neural Networks.

**Unit 2:**
Evaluating Hypotheses: Motivation, Estimating hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, differences in error of two hypothesis, comparing learning algorithms, Bayesian Learning: Introduction, Bayes Theorem,   Bayes Theorem and Concept Learning, Maximum Likelihood and least

squared error hypothesis, Maximum Likelihood hypothesis for predicting probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm , Naïve Bayes Classifier , Bayesian Belief Network, EM Algorithm

## Unit 3:

Dimensionality Reduction:  Introduction, Subset selection, principle component analysis, feature embedding, factor analysis, singular value decomposition and matrix factorization, multidimensional scaling, linear discriminant analysis, canonical correlation analysis, Isomap, Locally linear embedding, laplacian eigenmaps, Clustering: Introduction, Mixture densities, K- Means clustering, Expectations-Maximization  algorithm, Mixture of latent variable models, supervised learning after clustering, spectral clustering, Hierarchal clustering, Choosing the number of clusters, Nonparametric Methods: Introduction, Non Parametric density estimation, generalization to multivariate data, nonparametric classification, condensed nearest neighbor, Distance based classification, outlier detection, Nonparametric regression: smoothing models, how to choose the smoothing parameter

## Unit 4:

Linear Discrimination: Introduction, Generalizing the linear model, geometry of the linear discrimination, pair wise separation, parametric discrimination revisited, gradient descent, logistic discrimination, discrimination by regression, learning to rank, Multilayer Perceptrons: Introduction, the perceptron, training a perceptron, learning Boolean functions, multilayer perceptrons, MLP as a universal approximator, Back propagation algorithm, Training procedures, Tuning the network size, Bayesian view of learning, dimensionality reduction, learning time, deep learning

## Unit 5:

Kernel Machines: Introduction, Optimal separating hyperplane, the non separable case: Soft Margin Hyperplane, v-SVM, kernel Trick, Vectorial  kernels, defining kernels, multiple kernel learning, multicast kernel machines, kernel machines for regression, kernel machines for ranking, one-class kernel machines,  large margin nearest neighbor classifier,  kernel dimensionality reduction, Graphical models: Introduction, Canonical cases for conditional independence, generative models, d separation, belief propagation, undirected Graphs: Markov Random files, Learning the structure of a graphical model, influence diagrams.

## Text Books:

1) Machine Learning by Tom M. Mitchell, Mc Graw Hill Education, Indian Edition, 2016.
2) Introduction to Machine learning, Ethem Alpaydin, PHI, 3rd Edition, 2014

## References Books:

1) Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis,

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05707      SOFTWARE PROJECT MANAGEMENT**
**(CBCC-III)**

*Course Objectives:*

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

- Understanding the specific roles within a software organization as related to project and process management
- Describe the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
- Understanding the basic infrastructure competences (e.g., process modeling and measurement)
- Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

**Course Outcomes:**
- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organization structures and project structures
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

**UNIT I**

**Conventional Software Management:** The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation

**UNIT II**

**Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

**The old way and the new:** The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process

**UNIT III**

**Life cycle phases:** Engineering and production stages, inception, Elaboration, construction, transition phases.

**Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. Model based software architectures: A Management perspective and technical perspective.

**UNIT IV**

**Work Flows of the process:** Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic planning.

**Project Organizations and Responsibilities:** Line-of-Business Organizations, Project Organizations, evolution of Organizations.

**Process Automation:** Automation Building Blocks, The Project Environment

**UNIT V**

**Project Control and Process instrumentation:** The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example.

**Future Software Project Management:** Modern Project Profiles Next generation Software economics, modern Process transitions.

**Case Study:** The Command Center Processing and Display System-Replacement (CCPDS-R)

**Text Books:**

1. Software Project Management, Walker Royce, Pearson Education.

2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition,Tata Mc-Graw Hill

**Reference Books :**

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O"Reilly, 2006

2. Head First PMP, Jennifer Greene & Andrew Stellman, O"Reilly,2007

3. Software Engineering Project Managent, Richard H. Thayer & Edward Yourdon, second edition,Wiley India, 2004.

4. Agile Project Management, Jim Highsmith, Pearson education, 2004

5. The art of Project management, Scott Berkun, O"Reilly, 2005.

6. Software Project Management in Practice, Pankaj Jalote, Pearson Education,2002

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   | L | T | P | C |
|---|---|---|---|---|
| **B. Tech  IV-I Sem. (CSE)** | 3 | 1 | 0 | 3 |

**15A05708    DISTRIBUTED SYSTEMS**
**(CBCC-III)**

**Course Objectives:**

The student should be made to:
- Understand the issues involved in studying process and resource management.
- Understand in detail the system level and support required for distributed system.
- Introduce the idea of peer to peer services and file system.
- Understand foundations of Distributed Systems.

**Course Outcomes:**
Student should be able to:
- Design process and resource management systems.
- Apply remote method invocation and objects.
- Apply network virtualization.
- Discuss trends in Distributed Systems.

**UNIT I**
**INTRODUCTION**
Examples of Distributed Systems – Trends in Distributed Systems – Focus on resource sharing – Challenges. Case study: World Wide Web.

**UNIT II**
**COMMUNICATION IN DISTRIBUTED SYSTEM**
System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. Network virtualization: Overlay networks. Case study: MPI Remote Method Invocation And Objects: Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. Case study: Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study: Enterprise Java Beans -from objects to components.

**UNIT III**
**PEER TO PEER SERVICES AND FILE SYSTEM**
Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. Overlay case studies: Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system. File System: Features-File model -File accessing models - File sharing semantics Naming: Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

**UNIT IV**
**SYNCHRONIZATION AND REPLICATION**

Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion – Elections – Transactions and Concurrency Control– Transactions -Nested transactions – Locks – Optimistic concurrency control - Timestamp ordering – Atomic Commit protocols -Distributed deadlocks – Replication – Case study – Coda.

**UNIT V**
**PROCESS & RESOURCE MANAGEMENT**
Process Management: Process Migration: Features, Mechanism - Threads: Models, Issues, Implementation. Resource Management: Introduction- Features of Scheduling Algorithms –Task Assignment Approach – Load Balancing Approach – Load Sharing Approach.

**TEXT BOOK:**
1. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech IV-I Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05709        REAL TIME SYSTEMS**
**(CBCC-III)**

**Course Objectives:**
- Acquire skills necessary to design and develop embedded applications by means of real-time operating systems
- Understand embedded real-time operating systems

**Course Outcomes:**
- Characterize real-time systems and describe their functions
- Analyze, design and implement a real-time system
- Apply formal methods to the analysis and design of real-time systems
- Apply formal methods for scheduling real-time systems
- Characterize and describe reliability and fault tolerance issues and approaches.

**Unit-1**
**Typical Real time Applications:** Digital control, High-level control, Signal processing, other Real-time Applications.
**Hard versus Soft Real-Time Systems:** Jobs and processors, Release time, dead lines and Timing constraints, Hard and soft timing constraints, Hard Real time systems, Soft Real-time Systems.
**A Reference Model of Real Time Systems:** Processors and resources, Temporal parameters of Real time workload, periodic task model, precedence constraints and data dependency, Functional parameter, Resource Parameters of Jobs and Parameters of Resources, Scheduling Hierarchy.
**Commonly used Approaches to real time Scheduling:** Clock-Driven Approach, Weighted Round-Robin Approach, Priority driven Approach, Dynamic vs Static Systems, Effective release time and deadlines, Optimality of the EDF and LST algorithms, Nonoptimality of the EDF and LST algorithms, Challenges in validating timing constraints in priority driven System, Off line vs On line scheduling, summary.

**Unit-2**
Clock-Driven Scheduling: Notations and Assumptions, static, Timer-Driven scheduler, General Structure of the Cyclic Scheduler, Improving the average response time of Aperiodic Jobs, Scheduling sporadic Jobs, Practical considerations and generalizations, Algorithm for generating Static Schedules, Pros and cons of Clock-driven scheduling, summary.

**Unit-3**

**Priority-Driven Scheduling of periodic Tasks :** Static Assumption, Fixed-priority vs Dynamic-priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and DM Algorithms, A Schedulability test for Fixed-priority tasks with Short Response time, A Schedulability test for Fixed-priority tasks with arbitrary Response time, Sufficient Schedulability conditions for the RM and DM Algorithms, summary.

**Unit-4**

**Scheduling Aperiodic and Sporadic Jobs in Priority Driven Systems:** Assumptions and approaches, Diferrable servers, Sporadic Servers, Constant utilization, total bandwidth and weighted fair –Queueing servers, Slack stealing in Dead-line Driven System, Stack stealing in Fixed-priority systems, Scheduling of sporadic jobs, Real-time performance for jobs with soft timing constraints, A two-level scheme for Integrated scheduling.

**Unit-5**

**Resources and Resource access control:** Assumptions on Resources and their usage, Effects of Resource contention and resource access control, Non Preemptive critical section, Basic Priority inheritance protocol, Basic Priority ceiling protocol, Stack –based, Priority ceiling protocol, Use of priority ceiling protocol in Dynamic  priority systems, pre-emption ceiling protocol, Controlling accesses to Multiple unit Resources, Controlling concurrent accesses to data objects.

**Multiprocessor Scheduling, Resource access control, and Synchronization:** Model of Multiprocessor and Distributed Systems, Task assignment, Multiprocessor Priority ceiling protocol, Elements of Scheduling Algorithms for End-to-End Periodic Tasks, Schedulability of Fixed-priority End-to-End periodic Tasks, End to End tasks in heterogeneous Systems, Predictability and validation of Dynamic Multiprocessor Systems, Summary.

**Text Book:**
1.  "Real-Time Systems" by Jane W.S Liu, Pearson Edition, 2006.

**Reference Text Book:**
1.  Real-Time Systems: Scheduling, Analysis, and Verification, Cheng, A. M. K.: Wiley, 2002.
2.  Z.: Scheduling in Real-Time Systems, by Cottet, F., Delacroix, J., Kaiser, C., Mammeri John Wiley & Sons, 2002.
3.  Real-Time Systems, C. M., Shin, K. G. McGraw-Hill, Krishna 1997.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|   |   |   |   |
|---|---|---|---|
| **L** | **T** | **P** | **C** |
| **0** | **0** | **4** | **2** |

**B. Tech  IV-I Sem. (CSE)**

### 15A05710    GRID AND CLOUD COMPUTING LABORATORY

**Course Objectives:**
- The student should be made to:
- Be familiar with developing web services/Applications in grid framework.
- Be exposed to tool kits for grid and cloud environment.
- Learn to use Hadoop
- Learn to run virtual machines of different configuration.

**Course Outcomes:**

The student should be able to
Design and Implement applications on the Cloud.
Design and implement applications on the Grid.
Use the grid and cloud tool kits.

### GRID COMPUTING PROGRAMS USING GRIDSIM
1   Program to creates one Grid resource with three machines
2    *Program to to create one or more Grid users. A Grid user contains one or more Gridlets*
3   *Program to shows how two GridSim entities interact with each other ; main( ie example3 ) class creates Gridlets and sends them to the other GridSim entities, i.e. Test class*
4   Program shows how a grid user submits its Gridlets or tasks to one grid resource entity
5   Program to show how a grid user submits its Gridlets or task to many grid resource entities
6   Program to show how to create one or more grid users and  submits its Gridlets or task to many grid resource entities
7    Program to creates one Grid resource with three machines
   ***Grid computing programs using Use Globus Toolkit or equivalent:***
1   Develop a new Web Service for Calculator.
2   Develop new OGSA-compliant Web Service.
3   Using Apache Axis develop a Grid Service.
4   Develop applications using Java or C/C++ Grid APIs
5   Develop secured applications using basic security mechanisms available in Globus Toolkit.

6    Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

## CLOUD COMPUTING
### Programs on SaaS

1    Create an word document of your class  time table and store locally and on the cloud with doc,and pdf format . ( use **www.zoho.com** and *docs.google.com)*

2    Create a spread sheet which contains employee salary information and calculate gross and total sal using the formula
DA=10% OF BASIC
HRA=30% OF BASIC
PF=10% OF BASIC IF BASIC<=3000
12% OF BASIC IF BASIC>3000
TAX=10% OF BASIC IF BASIC<=1500
=11% OF BASIC IF BASIC>1500 AND BASIC<=2500
=12% OF BASIC IF BASIC>2500
( use **www.zoho.com** and *docs.google.com)*
NET_SALARY=BASIC_SALARY+DA+HRA-PF-TAX

3    Prepare a ppt on cloud computing –introduction , models, services ,and architecture
*Ppt should contain explanations, images and at least 20 pages*
( use **www.zoho.com** and *docs.google.com)*

4    Create your resume in a neat format using google and zoho cloud

### Programs on PaaS

1    Write a Google app engine program to generate n even numbers and deploy it
to google cloud

2    Google app engine program multiply two matrices

3    Google app engine program to validate user ; create a database login(username, password) in mysql  and deploy to cloud

4    Write a Google app engine program to display nth largest no from the given list
of numbers and deploy it into google cloud

5     Google app engine program to validate the user
Use mysql to store user info and deploy on to the cloud

6     Implement Prog 1-5  using Microsoft Azure

**CASE STUDY- cloud computing**

| Sr. No. | Title of Experiment | Aim of the Experiment | Demonstration Equipments/ Components to be required | Type of Experiment/ Demonstration (Lab/Classroom) |
|---|---|---|---|---|
| 1 | Case Study of Amazon | To understand the services of Amazon elastic cloud. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |
| 2 | Case Study of Azure | To understand the services of Microsoft azure. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |
| 3 | Case Study of Hadoop | To understand the services of hadoop. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |
| 4 | Case Study of Aneka | To understand the services of aneka elastic cloud. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |
| 5 | Case Study of Google Apps | To understand the services of google apps engine. | Computers with Internet Connection | Experiment: Student perform practical under supervision of |

| | | | faculty and Lab technician. |
|---|---|---|---|
| 6 | Google apps business solution for data access and data upload | To understand the business solution application of Google apps. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |
| 7 | Control panel software manager Application of hypervisors | To understand the application of hypervisors. | Computers with Internet Connection | Experiment: Student perform practical under supervision of faculty and Lab technician. |

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| **B. Tech IV-I Sem. (CSE)** | 0 | 0 | 4 | 2 |

### 15A05711      MOBILE APPLICATION DEVELOPMENT LABORATORY

**Course Objectives:**
- To understand fundamentals of android operating systems.
- Illustrate the various components, layouts and views in creating android applications
- To understand fundamentals of android programming.

**Course Outcomes:**
- Create data sharing with different applications and sending and intercepting SMS.
- Develop applications using services and publishing android applications.
- To demonstrate their skills of using Android software development tools

1. Setting Up the Development Environment
   1.1 Download/Install the SDK
For in-depth instructions, visit Android Installation Documentation. Otherwise perform the following steps.
- Go to http://developer.android.com/sdk/index.html.
- Unpack to a convenient location - Remember the full path to this location, we will refer to it as <android_sdk_dir> for the rest of the lab.
  - *<android_sdk_dir> would then be /home/<username>/android_dir.*
- Add the path to the <android_sdk_dir>/tools directory to your system PATH
  - Windows:
    1. Right-click My Computer.
    2. Click Properties.
    3. Click Advanced tab.
    4. Click Environment Variables button.
    5. Double Click Path under System Variables.
    6. Add ; <android_sdk_dir>/tools;<android_sdk_dir>/platform-tools to the end of the Variable Values text field.
- Navigate to your <android_sdk_dir>/tools directory and type android. Add the appropriate components.  See step 4 in http://developer.android.com/sdk/installing.html.
- Test your installation by running adb from the command line.  If you did everything right, you should get a long list of help instructions.

1.2 Download/Install the Eclipse Plugin
- It is recommended that you use Eclipse 3.4 or later
  - Lab Machines - Fedora Eclipse based on 3.4.2 The version of Eclipse used by the lab machines is missing a vital component and requires adding an additional Eclipse plugin in order to use the Android plugin:
    1. Click the menu Help -> Software Updates.
    2. Click the tab Available Software -> Add Site button.
    3. Enter http:// download.eclipse.org/releases/ganymede into the Location field.
    4. Click OK button.
    5. Enter WST Common UI into the search/text box at the top of the window (give it a second, it tries to search as you type and its kind of slow).
    6. Click the checkbox next to WST Common UI.
    7. Click the Install button.
    8. Click the Next button.
    9. Accept the terms, click Finish.
    10. Restart Eclipse.
    11. Follow the steps in the next bullet 3.4 Ganymede.

  - Eclipse 3.4 Ganymede:
    1. Click the menu Help -> Software Updates.
    2. Click Available Software tab -> Add Site button.
    3. Enter https://dl-ssl.google.com/andriod/eclipse into the "Location" field.
    4. Click OK button.
    5. Click the checkbox next to Developer Tools.
    6. Click the Install button.
    7. Click the Next button.
    8. Accept the terms, click Finish.
    9. Restart Eclipse.
  - Eclipse 3.5 Galileo:
    1. Click Help -> Install New Software .
    2. Click Add... button.
    3. Enter a name for the site into the Name field.
    4. Enter htpps://dl-ssl/google.com/android/eclipse/ into the Location field.
    5. Click OK button.
    6. Click the checkbox next to Developer Tools.
    7. Click the Next button.
    8. Accept the terms, click Finish.
    9. Restart Eclipse.

- Point Eclipse to <android_sdk_dir>:
    1. Click the menu Window -> Preferences.
    2. Click Android from the Hierarchy view on the left hand side.
    3. Enter <android_sdk_dir> into the SDK Location field.
    4. Click the Apply button.
    5. Click the OK button.

1.3 Download/Install the SDK Platform Components

At the time of writing this lab there are are eight different versions of the Android Platform available, ranging from 1.1 to 2.2. It is best practice to develop for the oldest platform available that still provides the functionality you need. This way you can be assured that your application will be supported by as many devices as possible. However, you will still want to download newer versions of the platforms so that you can test your applications against these as well. Due to the size of each platform component you will only be required to download and develop on one platform for the whole class. We will target the highest platform that the G1 phones support, Android 1.6 (API 4).  Before we can begin developing we must download and install this platform:

- Select the menu Window -> "Android SDK and AVD Manager", or click on the black phone shaped icon in the toolbar.
- Select Available Packages on the left hand side.
- Expand the Google Android site in the "Site, Packages, and Archives" Tree.
- Check the following items:
    o SDK Plaform Android 1.6, API 4 Revision 3
    o Google APIs by Google Inc., Android API 4, Revision 2
    o *NOTE: Those of you developing on Lab Machines should follow these instructions:* http://sites.google.com/site/androidhowto/how-to-1/set-up-the-sdk-on-lab-machines-linux.
- Click Install Selected.
- Accept the Terms for all packages and click Install Accepted.

We're now ready to develop our application.

2. Create "Hello World" Application
    2.1 Create a new Android Project
    2.2 Run "Hello World" on the Emulator
    2.3  On a Physical Device
    2.4 Greeting the User

3. Create Application by Using Widgets
    3.1 Creating the Application by using the Activity class
        (i)    onCreate()
        (ii)   onStart()
        (iii)  onResume()

        (iv)     onPause()
        (v)     onStop()
        (vi)    onDestroy()
        (vii)   onRestart()

3.2 Creating the Application by using Text Edit control.

3.3 Creating the Application Choosing Options

    (i) CheckBox
    (ii) RadioButton
    (iii) RadioGroup
    (iv) Spinner

4. Create Application by Using Building Blocks for Android Application Design

4.1 Design the Application by using

    (i) Linear Layout
    (ii) Relative Layout
    (iii) Absolute Layout

4.2 Create the Application to play the Audio and Video clips.

5. Create Application by Using Building Menus and Storing Data

5.1 Design the Application for Menus and Action Bar

    5.2 Design the application to display the Drop-Down List Action Bar

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| **B. Tech IV-II Sem. (CSE)** | | **3** | **1** | **0** | **3** |

### 15A05801    DATA  ANALYTICS
### (MOOCS-II)

**Course Objectives:**
- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle

**Course Outcomes:**
- Ability to work with different data types.
- Ability to solve various problems related to businesses.
- Ability to effectively utilize the time and involve in collaborative tasks.

**Unit I**
**Introduction to Analytics and R programming (NOS 2101)**
Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt,.csv etc. Outliers, Combining Datasets, R Functions and loops. Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution. Central Limit Theorem etc.

**Unit II**
**SQL using R & Correlation and Regression Analysis (NOS 2101)**
Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector. Regression Analysis, Assumptions of OLS Regression, Regression Modelling. Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

**Unit III**
**Understand the Verticals - Engineering, Financial and others (NOS 2101)**
Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc. Understanding Business problems related to various businesses

**Unit IV**
**Manage your work to meet requirements (NOS 9001)**

Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,
**Unit V**
**Work effectively with Colleagues (NOS 9002)**
Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc. NOS * National Occupational Standards

**Text Books:**
**1.** Student's Handbook for Associate Analytics.
**2.** Introduction to Scientific Programming and Simulation Using R, Owen Jones, Robert Maillardet and Andrew Robinson, Second Edition, CRC Press, 2014
**3.** A First Course in Statistical Programming with R, Braun W. J., Murdoch D. J.. — Cambridge
University Press, 2007
**4.** Data Manipulation with R, Jaynal Abedin and Kishor Kumar Das, Second Edition, Packt
publishing, BIRMINGHAM – MUMBAI.
**5.** Beginning R The Statistical Programming language- Mark Gardener, John Wiley & Sons,
Inc, 2012

**Reference Books:**
**1.** Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook
written for an undergraduate course in probability and statistics.
**2.** An Introduction to R, by Venables and Smith and the R Development Core Team. This may
be downloaded for free from the R Project website (http://www.r-project.org/, see Manuals).
There are plenty of other free references available from the R Project website.
**3.** Time Series Analysis and Mining with R**,** Yanchang Zhao
**4.** Graphics for Statistics and Data Analysis with R – Kevin J. Keen, CRC Press, 2010
**5.** Data Analysis and Graphics Using R, Third Edition, John Maindonald, W. John Braun,
Cambridge University Press, 2010
**6.** Exploratory Data Analysis with R – Roger D. Peng, Leanpub publications, 2015
**7.** Introduction to Probability and Statistics Using R, G. jay Kerns, First Edition, 2011
**8.** The Art of Data Science- A Guide for anyone Who Works with Data – Roger D. Peng and
Elizabeth Matsui, Leanpub Publications, 2014
**9.** Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for

engineers. John Wiley & Sons, 2010.The Basic Concepts of Time Series Analysis.
http://anson.ucdavis.edu/~azari/sta137/AuNotes.pdf

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  IV-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05802    MOBILE COMPUTING**
**(MOOCS-II)**

**Course Objectives:**
- Understand mobile ad hoc networks, design and implementation issues, and available solutions.
- Acquire knowledge of sensor networks and their characteristics.

**Course Outcomes:**
- Students able to use mobile computing more effectively
- Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
- Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

**UNIT-I:**
**Wireless LANS and PANS:** Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF.
**Wireless Internet:**
Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web over Wireless.

**UNIT-II:**
**AD HOC Wireless Networks**: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.
**MAC Protocols for Ad Hoc Wireless Networks:** Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

**UNIT -III:**
**Routing Protocols:** Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand

Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

**Transport Layer and Security Protocols:** Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

**UNIT –IV:**
**Quality of Service:** Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.
**Energy Management:** Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

**UNIT –V:**
**Wireless Sensor Networks:** Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

**TEXT BOOKS:**
1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, PHI, 2004.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan
Sarangapani, CRC Press

**REFERENCE BOOKS:**
1. Ad hoc Mobile Wireless Networks – Subir Kumar sarkar, T G Basvaraju, C Puttamadappa, Auerbach Publications,2012.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh , Pearson Education.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

|  | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  IV-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05803      INNOVATIONS AND IT MANAGEMENT**
**(MOOCS-II)**

**Course Objectives:**
- Understand the rule of information technology in businesses, in state or central government departments and in remote parts of India.
- Understand the future of information systems and the manner in which they are shaping the world around us.
- Understand the Ethical and Social issues concerning information systems.

**Course Outcomes:**
- Ability to do Business over the Internet.
- Ability to solve Business problems by applying analytics.
- Ability to use ICT to participate in Democratic process.

**Unit-1:**
**Organisations and Information Systems:** Modern organization, Information systems in organisations, The role of Internet, , Managing in the Internet Era, Managing Information Systems in Organisations, Challenges for the Manager. **Concepts of MIS:** Data and information, Information as a Resource, Information in Organisational Functions, Types of Information Technology, Types of Information Systems, Decision Making with MIS, Communication in Organisations. **Information systems and Management Strategy:** The Competitive environment of Business, Using IT for Competing, Information goods, Information systems and competitive Strategy.

**Unit- 2:**E-Commerce technology, HTML and E-mail, Business over the Internet, E-Business, E-Governance. **Managing Information Systems:** Challenges of managing the IT Function, Vendor Management, The role of CIO, Ethical Issues, and Social Issues.

**Unit- 3: Infrastructure of IT:** What is IT Infrastructure, IT infrastructure Decisions, Infrastructure components, networks, solutions, cloud computing, Virtualization, Enterprise systems, IT Outsourcing, Networks in organisation and what has to be managed. **Information systems security and control:** Threats to the organization, Technologies for handling security, managing security.

**Unit- 4:** Analysis of Business Process, Business Process Integration, Motivation for Enterprise systems (ES), Supply chain management systems, Customer Relationship Management systems, Challenges for ES implementations, International Information systems, Decision support systems (DSS), Components of DSS, Analytical and Business Intelligence, Knowledge Management.

**Unit-5:** ICT Development, Types of ICT interventions, Examples, E-Governance concepts, E-Government, E-Participation, Social Dynamics of the internet, Services of the Internet, Technology of the Internet, Social Issues, Social networks in the Enterprise, concept of open source software, open source licences, open source in business and Government, open Data Standards and the open community.

**Text book:**
1. "MIS: Managing information Systems and in Business, Government and Society" Rahul De, Wiley publications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech IV-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05804      BUILDING LARGE SCALE SOFTWARE SYSTEMS**
**(MOOCS-III)**

**Course Objectives:**
- To introduce the architecture of large c programs.
- To introduce the concept Case study for design of large C programs using Linux kernel.
- To introduce the tools, technologies & programming languages.

**Course Outcomes:**
- Student able to understand coupling and cohesion
- Student able to design large c and c++ programs using Linux kernel
- Student able to understand how to design Linux kernel
- Ability to solve various problems related to Object Oriented Software using patterns

**Unit I:** Architecture of Large C Programs : Coupling and Cohesion concepts , types of cohesion  functional, sequential, procedural, temporal, logical and coincidental; types of coupling – data,stamp, control, common, content coupling.

**Unit II:** Designing Large C programs having good cohesion and coupling; C modules-notion of separate compilation; Case study for design of large C programs using linux kernel.

**Unit III:** Tools for building large programs – version control using git and building large programs using make – bug tracking systems – bugzilla.

**Unit IV:** Building Large C++ programs – Architecture of Large C ++ programs – Coupling and Cohesion of C++ programs, Metrics for measuring the quality of C++ programs, Chidamber and Krammer. Metric suite- MOOD metrics – improving the design of C++ programs; Case study of redesigning Linux kernel into Minimalistic Object Oriented Linux (MOOL).

**Unit V:** Pattern Oriented Software Architecture: Building object oriented programs using design patterns identification of design patterns in source code- refactoring existing programs into design pattern based programs- case studies of building software with design patterns.

**Text Books:**
1. D. Janakiram, "Building Large Scale Software Systems", McGraw Hill Education, 2013.
2. John Lakos , "Large-Scale C++ Software Design", Addison Wesley, 1996.

**References:**
1. Scott W. Ambler, Barbara Hanscome, "Process Patterns: Building Large-Scale Systems Using Object Technology", 1st Edition, Camebridge University Press, 1998.
2. Peter van der Linden, "Expert C Programming: Deep C Secrets 1st Edition", Prentice Hall.
3 . Andrei Alexandrescu, "Modern C++ Design: Generic Programming and Design Patterns Applied", 1st Edition, Addison Wesley, 2011.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | **L** | **T** | **P** | **C** |
|---|---|---|---|---|
| **B. Tech  IV-II Sem. (CSE)** | **3** | **1** | **0** | **3** |

**15A05805        ENABLING TECHNOLOGIES FOR DATA SCIENCE
&  ANALYTICS: IoT**

**Course objectives:**
- Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IoT Devices.

**Course Outcomes:**
- Able to understand the application areas of IoT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics.

**UNIT I: Introduction to Internet of Things**
Introduction, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies**.**
**Domain Specific IoTs**
Introduction, Home Automation, cities, Environment, Retail, Agriculture, Industry, Health & Lifestyle.

**UNIT II:**
 **IoT and M2M**
Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT.
**IoT System Management with NETCONF-YANG**
 Need for IoT Systems Management, Simple Network Management Protocol (SNMP), Network Operator requirements, NETCONF, YANG, IoT System Management with NETCONF-YANG.

**UNIT III: Developing Internet of Things**
Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring.
**Case Studies Illustrating IoT Design:**
Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.

**UNIT IV**
**Advanced Topics:**
Introduction, Apache Hadoop, Using Hadoop Map Reduce for Batch Data Analysis.

**IEEE 802.15.4:**
The IEEE 802 committee family of protocols, The physical layer, The Media Access control layer, Uses of 802.15.4, The Future of 802.15.4: 802.15.4e and 802.15.4g.

**UNIT V:**
**ZigBee:**
Development of the standard, ZigBee Architecture, Association, The ZigBee network layer, The ZigBee APS Layer, The ZigBee Devices Object (ZDO) and the ZigBee Device Profile (ZDP), Zigbee Security, The ZigBee Cluster Library (ZCL), ZigBee Applications profiles, The ZigBee Gateway Specifications for network devices.


**TEXT BOOKS:**
1. Internet of Things a Hands-on Approach by Arshdeep Bahga and Vijay Madisetti. University Press.
2. The Internet of Things key applications and protocols by Oliver Hersent, David Boswarthick and Omar elloumi, Wiley Student Edition.

**REFFERENCE BOOOKS:**
1. Internet of Things: Architecture, Design Principles and Applications by Raj Kamal MCGraw Hill Edition.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

| | L | T | P | C |
|---|---|---|---|---|
| B. Tech IV-II Sem. (CSE) | 3 | 1 | 0 | 3 |

### 15A05806    CYBER SECURITY
### (MOOCS-III)

**Course Objectives:**
- Appraise the current structure of cyber security roles across the DoD enterprise, including the roles and responsibilities of the relevant organizations.
- Evaluate the trends and patterns that will determine the future state of cyber security

**Course Out comes:**
- Analyze threats and risks within context of the cyber security architecture
- Appraise cyber security incidents to apply appropriate response
- Evaluate decision making outcomes of cyber security scenarios

**Unit-I**
Cyber crime: Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations-Organizational measurement for Handling mobile-Security policies and measures in mobile computing era. Cases.

**Unit-II**
Tools and methods used in cyber crime-Proxy servers and Anonymizers-PhishingPassword cracking-Key loggers and Spy wares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQL Injection-Buffer overflow-Attacks on wireless network. Cases.

**Unit-III**
Understanding computer forensic-Historical background of cyber forensicForensic analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory-Relevance of the OSI 7 Layer model to computer Forensic-Computer forensic from compliance perspectives. Cases.

**Unit-IV**
Forensic of Hand –Held Devices-Understanding cell phone working characteristics-Hand-Held devices and digital forensic- Toolkits for Hand-Held device-Forensic of i-pod and digital music devices-Techno legal Challenges with evidence from hand-held Devices. Cases.

**Unit-V**
Cyber Security –Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing Security and privacy Implications-Protecting people privacy in the organizations Forensic best practices for organizations. Cases.

**Text book:**
 1. Nina Godbole & Sunit Belapure "Cyber Security", Wiley India, 2012.

**REFERENCES:**
  1. Harish Chander, "cyber laws & IT protection", PHI learning pvt.ltd, 2012.
  2. Dhiren R Patel, "Information security theory & practice",PHI learning pvt ltd,2010.
  3. MS.M.K.Geetha & Ms.Swapne Raman"Cyber Crimes and Fraud Management, "MACMILLAN,2012. Pankaj Agarwal : Information Security& Cyber Laws (Acme Learning), Excel, 2013.
  4. Vivek Sood, Cyber Law Simplified, TMH, 2012.