# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**S.V. UNIVERSITY COLLEGE OF ENGINEERING::TIRUPATI – 517502**


**B.Tech (CSE) SYLLABUS**

2019-20

## About the Department

The Department of Computer Science and Engineering was established in 1986 offering B.Tech Program with initial intake of 20. Now the B.Tech (CSE) intake is increased to 40. The new programme 6 Year B.Tech & M.Tech Dual Degree course was introduced in 2015 .

The post graduate program i.e. M.Tech (CSE) was started in the year 2005 with initial intake of 18 and now it is increased to 25. The MTech students, qualified in GATE receive Rs 8000 fellowship per month from AICTE. The Ph.D admissions in CSE started in the year 2002 and there are nearly 34 scholars are working for their doctoral degree. The thrust areas of research of the department are Natural Language Processing, Distributed Systems, Grid Computing, Artificial Intelligence, Software Architecture, Data Mining, Wireless Networks and Speech Processing.

### Vision

To be one of the premier departments for achieving excellence in teaching and research with social responsibility and for producing innovative technical graduates in Computer Science and Engineering.

### Mission

- To impart Computer Science and Engineering education by utilizing state of the art computing facilities.
- To infuse scholarly inquisitiveness, professional behavior and ethical values among students and research scholars, thereby making an imprint in the technological, economic and social development of the nation.
- To impart high quality professional training of international standards to meet the current and future demands of the industry and academia.
- To develop adequate e-infrastructure, environment and culture for the state of the art research work in Computer Science and Engineering.

PEO'S

PEO1: To Provide quality learning through effective teaching-learning process enabled by free and open learning environment in turn Producing high quality graduate.

PEO2: For Prepare students for proper positioning them in the society (academic, industrial, research and entrepreneurial areas in particular) with reference to trans-disciplinary activities, regular professional activities with high degree of innovation, competence, and commitment.

PEO3: To create broad based expertise in the areas of CSE in general and a few (minimum of 4 to 5) focused areas for in-depth study and high quality research such as e-technologies, very large databases, data mining / warehousing, networking, security, high performance computing systems, embedded systems, software engineering methodology, s/w quality testing, multimedia, theoretical computer science aspects and so on.

PEO4: To inculcate the culture of Lifelong learning during the evolution of the student to a full-fledged professional through educating the applicant about the ever increasingneeds of the society, technological trends and ethical values.

PEO5: To set up a sense of efficient administrative / economical practices, to evolve the applicant with the required leadership qualities and managerial skills.

PROGRAMME OUTCOMES:

PO1: An ability to apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to the discipline

PO2: An ability to analyze a problem, and identify and formulate the computing requirements appropriate to its solution.

PO3: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

PO4: An ability to design and conduct experiments, as well as to analyze and interpret data

PO5: An ability to use current techniques, skills, and modern tools necessary for computing practice.

PO6: An ability to analyze the local and global impact of computing on individuals, organizations, and society.

PO7: Knowledge of contemporary issues.

PO8: An understanding of professional, ethical, legal, security and social issues and responsibilities.

PO9: An ability to function effectively, individually as well as in teams.

PO10: An ability to communicate fluently with a variety of audiences.

PO11: Recognition of the need for and an ability to engage in continuing professional development.

PO12: An understanding of engineering and management principles and applying these as a member/leader in a team, in managing projects.

## I Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| MABST101 | Mathematics I | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| PYBST102 | Modern Physics | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| CSEST103 | Programming for Problem Solving | 2 | 1 | | 3 | 3 | 40 | 60 | 100 |
| CSEST104 | Python Programming | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| MEESP105 | Workshop / Manufacturing Practices | | | 3 | 3 | 1.5 | 40 | 60 | 100 |
| CSESP106 | Programming for Problem Solving Laboratory | | | 3 | 3 | 1.5 | 40 | 60 | 100 |
| CEMCT107 | Environmental Science | 4 | | | 4 | | 40 | 60 | 100 |
| Total | | 15 | 4 | 6 | 25 | 18 | 280 | 420 | 700 |

**SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING :: TIRUPATI – 517 502**

Department of Computer Science and Engineering B.Tech (CSE)

– Choice Based Credit System – 2018 Regulations

(With effect from the academic year 2019-20) Scheme of Instruction and Examinations

## II Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| MABST201 | Mathematics II | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| CYBST202 | Engineering Chemistry | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| ENHST203 | English | 2 | | | 2 | 2 | 40 | 60 | 100 |
| EEEST204 | Basic Electrical Engineering | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| MEEST205 | Engineering Graphics | 2 | | 3 | 5 | 3.5 | 40 | 60 | 100 |
| ENHSP206 | English Communication Laboratory | | | 3 | 3 | 1.5 | 40 | 60 | 100 |
| Total | | 13 | 3 | 6 | 22 | 19 | 240 | 360 | 600 |

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Department of Computer Science and Engineering B.Tech (CSE)

## III Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| CSPCT 301 | Data structure and Algorithms | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| COHST 302 | Managerial Accountancy | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 303 | Discrete Mathematics | 3 | 1 | | 4 | 4 | 40 | 60 | 100 |
| MABST 304 | Probability and Statistics | 2 | | | 2 | 2 | 40 | 60 | 100 |
| ECPCT 305 | Analog Electronics | 3 | | | 3 | 3 | 40 | 60 | 100 |
| ECPCP306 | Analog Electronics Lab | | | 3 | 3 | 1.5 | 40 | 60 | 100 |
| CSPCP307 | Data structure and Algorithms Lab | | | 3 | 3 | 1.5 | 40 | 60 | 100 |
| CSPCW308 | IT Workshop (Sci Lab/MAT Lab) | 2 | | 2 | 4 | 3 | 40 | 60 | 100 |
| PAMCT309 | Constitution of India | 2 | | | 2 | | 40 | 60 | 100 |
| Total | | 18 | 2 | 8 | 28 | 22 | 360 | 540 | 900 |

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## IV Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| MABST 401 | Complex Analysis and Numerical Techniques | 3 | | | 3 | 3 | 40 | 60 | 100 |
| ECPCT 402 | Digital Electronics and Logic Design | 3 | | | 3 | 3 | 40 | 60 | 100 |
| MEPCT 403 | Simulation and Modeling | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 404 | Design and Analysis of Algorithms | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 405 | Computer Organization | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 406 | Database Management Systems | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCP 407 | Algorithms Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 408 | Assembly Language Programming and VHDL Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 409 | Database Management Systems Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| Total | | 18 | 0 | 6 | 24 | 21 | 360 | 540 | 900 |

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## V Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| CSPCT 501 | Operating Systems | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 502 | Formal Languages and Automata Theory | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 503 | Software Engineering | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 504 | Embedded Systems and Internet of Things | 3 | | | 3 | 3 | 40 | 60 | 100 |
| MEEST 505 | Optimization Techniques | 3 | | | 3 | 3 | 40 | 60 | 100 |
| MEBST 506 | Basics of Mechanical Engineering | 2 | | | 2 | 2 | 40 | 60 | 100 |
| CSPCP 507 | Operating Systems Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 508 | Software Engineering Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 509 | Internet of Things Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSSEP 510 | Seminar I | | | 2 | 2 | | 40 | 60 | 100 |
| Total | | 17 | 0 | 8 | 25 | 20 | 400 | 600 | 1000 |

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**VI Semester**

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| CSPCT 601 | Principles of Programming Languages | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 602 | Computer Networks | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 603 | Language Processors | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPCT 604 | Artificial Intelligence | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CEEST 605 | Basics of Civil Engineering | 2 | | | 2 | 2 | 40 | 60 | 100 |
| CSPCT 606 | Cryptography | 2 | | | 2 | 2 | 40 | 60 | 100 |
| CSOET 607 | Open Elective – I Online | | | | | 3 | MOOCs | | 100 |
| CSPCP 608 | Computer Networks Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 609 | Language Processors Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPCP 610 | Artificial Intelligence Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSCVP 611 | Comprehensive Viva-Voce | | | | | | 40 | 60 | 100 |
| Total | | 16 | 0 | 6 | 22 | 22 | 400 | 600 | 1000 + 100 (MOOCs) |

Note: Open Elective I (MOOCs) : Shall study in III to VI Semesters and the performance reflected in the VI Semester
Industry Internship (not less than 4 weeks) at the end of IV or VI semesters and the performance reflected in the VII Semester

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## VII Semester

| Course Code | Course Title | Scheme of Instruction in Hrs | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Sem Marks | Total |
| CSPET 701 | Program Elective - I | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPET 702 | Program Elective - II | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSPEP 703 | Program Elective - I Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPEP 704 | Program Elective - II Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPWP 705 | Project Work Phase-1 | | | 6 | 6 | 3 | 40 | 60 | 100 |
| CSINP 706 | Internship / Mini Project | | | 6 | 6 | 3 | 40 | 60 | 100 |
| CSSEP 707 | Seminar – II | | | 2 | 2 | | 40 | 60 | 100 |
| Total | | 6 | | 18 | 24 | 14 | 280 | 420 | 700 |

Note: Industry Internship (not less than 4 weeks) at the end of IV or VI semesters and the performance reflected in the VII Semester

**Program Electives I & II (Any two shall be chosen)**

1. Web and Mobile Technologies
2. Computer Graphics
3. Soft Computing
4. Cloud Computing
5. Data Mining
6. Software Project Management

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## VIII Semester

| Course Code | Course Title | Scheme of Instruction (Hours/Week) | | | | No. of Credits | Scheme of Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Total | | Sessional Marks | End Semester Marks | Total |
| MEPCT 801 | Industrial Management | 3 | | | 3 | 3 | 40 | 60 | 100 |
| COPCT 802 | Managerial Economics | 2 | | | 2 | 2 | 40 | 60 | 100 |
| CSPET 803 | Program Elective – III | 3 | | | 3 | 3 | 40 | 60 | 100 |
| CSOET 804 | Open Elective – II Online | | | | | 3 | MOOCs | | 100 |
| CSOET 805 | Open Elective – III Online | | | | | 3 | MOOCs | | 100 |
| CSPEP 806 | Program Elective - III Laboratory | | | 2 | 2 | 1 | 40 | 60 | 100 |
| CSPWP 807 | Project Work Phase-2 | | | 18 | 18 | 9 | 40 | 60 | 100 |
| Total | | 8 | 0 | 20 | 28 | 24 | 200 | 300 | 500 + 200 (MOOCs) |

Note: Open Elective II, III (MOOCs) : Shall study in III to VIII Semesters and the performance reflected in the VIII Semester

**Program Electives III**

1. Big Data Analytics
2. Cyber Security
3. Image Processing

# MABST 101 MATHEMATICS - I

Instruction Hours/Week: 3(L) +1(T) Credits:4
Sessional Marks : 40 End Semester Examinations Marks: 60

**UNIT I**

Differential Equations: Linear differential equations of second and higher order with constant coefficients-particularintegrals-homogeneous differential equations with variable coefficients-method of parameters-simulation equations.

**UNIT II**

Laplace Transforms I: Laplace transforms of standard functions-inverse transforms-
transforms of derivatives and integrals-derivatives of transforms-integrals of transforms.

**UNIT III**

Laplace Transforms II: Transforms of periodic functions-convolution theorem-applications to solution of ordinary differential equations.

**UNIT IV**

Calculus: Roll's and Mean value theorems - Taylor's and Maclaurins's series-maxima and minima for functions of two variables - Infinite series - Convergence Tests series of positive terms - comparison, Ratio tests - Alternating series - Leibnitz's rule - Absolute and conditional convergence.

**UNIT V**

Multiple Integrals: Curve tracing (both Cartesian and polar coordinate) - Evaluations of double and Triple integrals-change of order of integrations-change of variables of integrations-simple applications to areas and volumes.

**Text/Reference Books**


1. B S Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. M K Venkataraman, Engineering Mathematics, National Publishing Company, Chennai.
3. B V Ramana, Higher Engineering Mathematics, 6th Reprint, Tata McGraw-Hill, 2008.
4. Bali and Iyengar, Engineering Mathematics, 6th Edition, Laxmi Publications, 2006.


**Course Outcomes:**

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

1. analyze differential equations and solve them
2. applydifferential equations to engineering problems.
3. usetransformationto convert one type into another type presumably easier to solve.
4. use shift theorems to compute the Laplace transform, inverse Laplace transform and the solutions of second order, linear equations with constant coefficients.
5. solve an initial value problem for an $n^{th}$ order ordinary differential equation using the Laplace transform.
6. expand functions as power series using Maclaurin's and Talor's series
7. optimize the problems related to OR, Computer science, Probability and Statistics
8. draw an approximate shape by the study of some of its important characteristics such as symmetry, tangents, regions etc using curve tracingmethodto find length, area, volume.

9. use multiple integral in evaluating area and volume of any region bounded by the given curves.

**CO-PO Mapping**

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | **1** | | | | | | | | | | | |
| CO2 | | **2** | | | **2** | | | | | | | |
| CO3 | | | **3** | **1** | | | | | | | | |
| CO4 | | | **1** | | | | | | | | | |
| CO5 | | | | | **3** | **2** | | | | | | |
| CO6 | | | | | | | | | | | | |
| CO7 | | | | | | | | | | | | |
| CO8 | | | | | | | | | | | | |
| CO9 | | | | | | | | | | | | |

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018 (With effect from the academic year 2019-20)**

## COMPLEX ANALYSIS AND NUMERICAL TECHNIQUES

No.of Credits: 3 Instruction Hours/Week:3

### Course Objectives:

The objective of the course is to impart to the students

1. the knowledge of the basic theory of holomorphic functions and of important results such as Cauchy's integral formula and the residue theorem.
2. the basic properties of complex integration and having the ability to compute such integrals.
3. the fundamentals of numerical methods used for the solution of engineering problems

### UNIT I

Complex analysis - I: Analytical functions - Cauchy-Reimann equations – Construction of Analytic functions- Complex integration - Cauchy's theorem - Integral formula - Evaluation of integrals.

### UNIT II

Complex analysis - II: Taylor's and Laurents' series, Singularities - Poles - Residues - Residue theorem – Contour integration- Evaluation of real integrals

### UNIT III

Numerical Interpolation and Differentiation: Newton's forward & backward interpolation formulae - Legranges interpolation formula - Numerical diffentiation

### UNIT IV

Solutions of Algebraic, Transcendental, Linear equations : Bisection Method, Newton Raphson method, Regula Falsi Method, Gauss Elimination & Jordon methods, Iterative method, Triangular factorization method.

### UNIT V

Solution of Ordinary & Partial Differential Equations : Euler's method- Euler's modified method- Runge-Kutta second, third, and fourth order methods- Milne's Predictor and Corrector methods - Solutions of Laplace and Poisson's equations by iterative methods.

### Course Outcomes

Having successfully completed this course the students will be able to:

- Apply Cauchy's Theorem and Cauchy's Integral Formula
- Compute logarithms and inverse trigonometric functions and calculate Taylor and Laurent series
- Use complex analysis techniques such as the residue theorem to evaluate real integrals

- Apply appropriate algorithms to solve selected problems, both manually and by writing computer programs.
- Compare different algorithms with respect to accuracy and efficiency of solution.
- Conduct numerical integration and differentiation.

## Text Books:

1. B S Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publications, 2007.
2. Venkataraman M K, Engineering Mathematics, National Publishing Company, 1995.
3. Schilling R J, and Harries S L, Applied Numerical Methods for Engineers Using MATLAB and C, Thomson Brooks/Cole, 2006.
4. Niyogi P, Numerical Analysis and Algorithms, Tata McGraw Hill, 2003.

## Reference Books:

1. Kreyszig E, Advanced Engineering Mathematics, 8th edition, Wiley, 1998.
2. Chapra S C, Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd edition, Tata McGraw-Hill, 2007.
   Gerald C F, and Wheatley P O, Applied Numerical Analysis, 6th edition, Pearson Education Asia, 2002.

**ECPCT 402**

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2019-20)**

## DIGITAL ELECTRONICS AND LOGIC DESIGN

No.of Credits: 3 Instruction Hours/Week: 3

### Course Objectives

- To understand the essential knowledge on the fundamental of digital circuits
- To understand the overview on the design principles of digital computing systems

### UNIT I

Number Representation, Signed and Unsigned, Code Conversion, Review of Boolean Algebra and DeMorgan's Theorem, Sum-of-Product and Product-of-Sum forms, Canonical forms, Karnaugh maps up to 6 variables.

### UNIT II

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half andFull Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU

### UNIT III

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, PseudoRandom Binary Sequence generator, Clock generation

### UNIT IV

Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Conceptof Programmable logic devices like FPGA. Logic implementation using Programmable Devices.

### UNIT V

VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data typesand objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits.

### Course outcomes:

At the end of this course students will demonstrate the ability to

1. Design and analyze combinational logic circuits
2. Design and analyze synchronous sequential logic circuits
3. Design and implement complicated digital systems using Verilog
4. Design a VLSI circuit for an application

**Text/Reference Books:**


1. R.P. Jain, “Modern digital Electronics”, Tata McGraw Hill, 4th edition, 2010.
2. Douglas Perry, “VHDL: Programming by Example”, Tata McGraw Hill, 4th edition.
3 Brown S, and Vranesic Z, Fundamentals of Digital Logic with VHDL Design, 3rd edition, McGraw Hill, 2012.
4 Kinney L L, and Roth Jr. C H, Fundamentals of Logic Design, 7th edition, Cengage Learning, 2015.

**MEPCT 403**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2019-20)**

## SIMULATION AND MODELING

No.of Credits: 3 Instruction Hours/Week: 3

### Course Objectives

- To introduce various system modeling and simulation techniques, and highlight their applications in different areas.
- To provide an overview of modeling, through the basic concepts of systems analysis.
- To provide the elements needed to understand how the models can be used in simulation, forecasting, planning and management, and how they can be integrated to support decision-making

### UNIT -I

Introduction to Simulation, Definitions, Types of Simulation Models, Applications, System and Environment, Components of System, Scope, Advantages and Limitations of Simulation.

### UNIT- II

Introduction to Sampling, Statistical Distributions – Discrete and Continuous, Generation of Random Numbers and Random Variates.

### UNIT- III

Introduction to Mathematical Modeling and Types, Applications, Simulations of Queuing, Inventory and Manufacturing Systems.

### UNIT- IV

Introduction to Input data and output Analysis for single Model, Comparing Alternative System Configurations.

### UNIT- V

Simulation of computer system, Introduction, Simulation Tools – Process and Event Orientation, CPU and Memory simulation, Simulation of Complex Systems.

### Course Outcomes

After successful completion of the course the students would be able to

- describe the components of continuous and discrete systems and simulate the same.
- model any system from different fields.
- discuss the simulation methods and select the suitable technique on the problems.
- implement the model on the computer and from the results, check for the validity of the model and correcness of the assumptions present in the model.
- understand the limitations of their model and nuances in computer modeling of systems.

### Text Books:

1. Banks J, Carson II J S, Nelson B L, Nicole D M and Shahabudeen P, Discrete-Event System Simulation, Pearson Education, 2007.
2. Geoffrey Gordon, System Simulation, 2nd edition, Pearson Education, 2015.

**Reference Book:**

1. Seila A F, Ceric V, and Tadimalla P, Applied Simulation Modeling, Thomson Brooks/Cole, 2003.

**CSPCT 404**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2019-20)**

## DESIGN AND ANALYSIS OF ALGORITHMS

No.of Credits: 3 Instruction Hours/Week: 3

### Course Objectives:

- To understand how to design an algorithm for the given problem.
- To analyze the complexity of an algorithm in terms of time and space.
- To get better insight on different strategies of algorithm design.

### UNIT-I

Introduction: What is an Algorithm?, Algorithm Specification, Performance Analysis - Space Complexity, Time Complexity, Amortized Complexity, Asymptotic Notation ($O$, $\Omega$, $\Theta$), Practical Complexities, Performance Measurement, Randomized Algorithms: An Informal Description, Identifying the Repeated Element, Primality Testing, Advantages and Disadvantages.

Sets and Disjoint Set Union: Introduction, Union and Find Operations.

### UNIT-II

Divide-and-Conquer: General Method, Defective Chess Board, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quicksort, Selection, Strassen's Matrix Multiplication, Convex Hull.

### UNIT-III

The Greedy Method: The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single-Source Shortest Paths.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected Components and Spanning Trees, Biconnected Components and DFS.

### UNIT-IV

Dynamic Programming: The General Method, Multistage Graphs, All Pairs Shortest Paths, Single-Source Shortest Paths: General Weights, Optimal Binary Search Trees, String Editing, 0/1-Knapsack, Reliability Design, The Traveling Salesperson Problem, Flow Shop Scheduling.

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

### UNIT-V

Branch-and-Bound: The Method, 0/1 Knapsack Problem, Traveling Salesperson, Efficiency Considerations.

*NP*-Hard and *NP*-Complete Problems: Basic Concepts, Cook's Theorem, NP-Hard Graph Problems, NP-Hard Scheduling Problems.

PRAM Algorithms: Introduction, Computational Model, Fundamental Techniques and Algorithms, Selection.

## Course Outcomes:

Upon successful completion of this course, the student should be able to

- Develop systematically an algorithm for solving a problem
- Analyze the time and space complexity of the given algorithm
- Identify algorithm design methodology to solve problems.
- Distinguish between P and NP classes of problems

## Text Books:

1. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, *Fundamentals of Computer Algorithms*, 2nd edition, Universities Press, 2008.
2. Cormen T H, Leiserson C E, Rivest R L, and Stein C, *Introduction to Algorithms*, 3rd edition, Prentice-Hall of India, 2009.

## Reference Books:

1. Levitin A, *Introduction to the Design and Analysis of Algorithms*, 3rd edition, Pearson Education, 2012.
2. Goodrich M T, Tamassia R, *Algorithm Design*, Wiley, 2008.
3. Skiena S S, *The Algorithm Design Manual*, 2nd edition, Springer, 2012.
4. Heineman G T, Pollice G, Selkow S, *Algorithms in a Nutshell*, 2nd edition, O'Reilly, 2016.
5. Dave P H, and Dave H B, *Design and Analysis of Algorithms*, 2nd edition, Pearson Education, 2008.

**CSPCT 405**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2019-20)**

## COMPUTER ORGANIZATION

No.of Credits: 3 Instruction Hours/Week: 3

### Course Objectives

The course is designed to

- make the students understand the basic structure and operations of various functional units of a digital computer.
- familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- Make the stdents understand how to design processing unit using hardwired control and microprogrammed control approaches.
- familiarize the students with hierarchical memory system.
- expose the students with different ways of communicating with I/O devices and standard I/O interfaces

### UNIT I

Structure of Computers: Introduction, Performance, Memory addressing and Operations, Instructions and Instruction sequencing, Addressing modes, Basic l/0 operations, Pushdown stacks, Subroutines, Encoding of machine instructions, Brief description and functional classification of IA-32 Pentium instruction set

### UNIT II

Basic Processing Unit: Fundamental concepts, Single and Multiple bus organization, Hardwired control, Multiprogrammed control – Microinstructions, Microprogram sequencing, Wide-branch addressing, Microinstructions with next-address field, Prefetching microinstructions.

Arithmetic: Multiplication – Booth algorithm; Integer division, Floating-Point Addition and Subtraction.

### UNIT III

The memory System: Basic concepts, RAM and ROM Memories and their internal organization, Cache Memories - Mapping functions, Replacement algorithms; Performance Considerations, Virtual Memories, Secondary Storage.

### UNIT IV

Input/ Output Organization: Accessing l/O devices; Interrupts –Enabling and disabling, Handling multiple devices; Direct Memory Access - Bus Arbitration; Buses – Synchronous and Asynchronous; Interface circuits – Parallel port, Serial port

### UNIT V

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets, Data path and control considerations, Superscalar operation.
Processor Families: The ARM family, The Motorola 680x0 and Coldfire families, The IA-32 family.

## Course Outcomes:

On successful completion of this course the students will be able to

- Identify the basic structure and functional units of a digital computer.
- Analyze the effect of addressing modes on the execution time of a program.
- Design processing unit using the concepts of hardwired control or microprogrammed control.
- Select appropriate interfacing standards for I/O devices.
- Identify the roles of various functional units of a computer in instruction execution.
- Understand memory hierarchy and its impact on computer cost/performance.
- Understand the advantage of instruction level parallelism and pipelining for high performance processor design.

## Text Books

1. Hamacher C, Vranesic Z, and Zaky S, Computer Organization, 5th edition, McGraw-Hill

## Reference Books

1. Heuring V P, and Jordan H F, Computer systems Design and Architecture Addison-Wesley
2. Carpinelli J D, Computer System Organization and Architecture. Addison-Wesley 2001
3. Mano M M, Computer system Architecture, 4th edition, Pearson Education Asian 2002

**CSPCT 406**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2019-20)**

## DATABASE MANAGEMENT SYSTEMS

No.of Credits: 3 Instruction Hours/Week: 3

### Course Objectives:

- To learn data models, conceptualize and depict a database system using ER diagram
- To understand the internal storage structures in a physical DB design
- To demonstrate the fundamental concepts, operation and function of different components of database systems.
- To describe the roles of transaction processing and concurrency control in a modern DBMS.
- To demonstrate key issues in the operation of a DBMS including query processing, security and integrity.
- To design and implement a database application.

### UNIT-I

Introduction: Managing Data, File Systems versus a DBMS, Advantages of a DBMS, Storing data in a DBMS, Queries in a DBMS, Transactions, Structure of a DBMS.

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 , Relational calculus, Expressive Power of Algebra and calculus.

SQL: Form of Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, NULL values , Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases

### UNIT-III

Schema Refinement and Normal Forms: Introduction, Functional Dependencies, Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms, BCNF, Properties of Decompositions, Normalization, Schema Refinement in Data base Design, Multi valued Dependencies , FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

Database Application Development: Accessing Databases from Applications, Introduction to JDBC, JDBC Classes and Interfaces, SQLJ, Stored Procedures.

## UNIT-IV

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-based Concurrency Control, Performance Locking, Transaction Support in SQL, Introduction to Crash Recovery.
Concurrency Control: 2PL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques, Concurrency Control without Locking

Crash Recovery: Introduction to ARIES, Log, Recovery related Structures, Write-Ahead Log Protocols, Checkpointing, Recovering from a System Crash, Media Recovery, Interaction with Concurrency Control

## UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index data Structures, Comparison of File Organizations, Indexes and Performance Tuning.

Indexing and Hashing: Intuitions for tree indexes, Indexed Sequential Access Method, B+ Trees: A Dynamic Index Structure, Search, Insert, Delete, Duplicates, B+ Trees in Practice, Static Hashing, Extendable Hashing, Linear Hashing, Extendible vs. Linear Hashing.

Parallel and Distributed Databases: Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Introduction to Distributed Databases, Distributed DBMS Architectures, Storing Data in Distributed DBMS, Distributed Catalog Management, Distributed Query Processing

## Course Outcomes:

Upon successful completion of this course, the student should be able to

- Use relational algebra and relational calculus, to express database queries.
- Use SQL to interact with database management systems.
- Design appropriate database tables, using functional dependencies and normal forms.
- Implement a disk-oriented database storage manager with heap table and indexes.
- Understand, compare, and implement the major concurrency control algorithms.
- Implement database recovery algorithms and verify their correctness.
- Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing andon-line analytical workloads.

## Text Books:

1. Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems*, Third Edition, McGraw-Hill, 2014.
2. C. J. Date, A. Kannan and S. Swamynathan, *An Introduction to Database Systems*, 8th edition, Pearson Education, 2006.

**Reference Books:**


1. Silberschatz A, Korth H F, and Sudarshan S, *Database System Concepts*, 6th edition, McGraw-Hill, 2011.
2. Ramez Elmasri and Shamkant B. Navathe, *Fundamentals of Database Systems*, Fourth Edition, Pearson/Addision wesley, 2007.
3. J D Ullman, H. Garcia-Molina and J. Widom, *Database Systems: The Complete Book*, Prentice-Hall, 2009.
4. Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi, *Modern Database Management*, 12th edition, Pearson, 2015.

**CSPCP 407**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018(With effect from the academic year 2019-20) ALGORITHMS LABORATORY**

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the courses, "Design and Analysis of Algorithms".

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**CSPCP 408**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018(With effect from the academic year 2019-20)**
**ASSEMBLY LANGUAGE PROGRAMMING AND VHDL LABORATORY**

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the course, "Assembly Language Programming and VHDL".

**IV SEMESTER B.Tech (CSE) – CBCS Regulations-2018(With effect from the academic year 2019-20)**

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the course, "DatabaseManagement Systems".

**CSPCP 409**

CSPCT
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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) CBCS Regulations-2018**

## OPERATING SYSTEMS

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- provide knowledge about the services rendered by operating systems
- present detail discussion on processes, threads and scheduling algorithms.
- discuss various file-system design and implementation issues
- provide good insight on various memory management techniques
- expose the students with different techniques of handling of deadlocks
- familiarize students the basics of Linux system and perform administrative tasks on Linux servers
- discuss how the protection domains help to achieve security in a system

### 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, operatingsystem debugging, System Boot.

### UNIT II

Process Concept: Process scheduling, Operations on processes, Interprocess communication, Communication in client server systems.

Multithreaded Programming: Multitheading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

### UNIT III

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

### UNIT IV

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization. Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling,RAID structure, Stable storage implementation.

**UNIT V**

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.
System Security: Introduction, Program threats, System and network threats, Cryptography for security, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer security classification.
Case Studies: Linux, Microsoft Windows 7.

## Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013.
2. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (for Interprocess Communication and File systems.)

## Reference Books:

1. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
3. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

## Course Outcomes

By the end of this course students will be able to:

1. Recognize how the applications interact with the operating system as the later working as intermediary program between the machine and the application.
2. Understand how operating system manages resources such as processors, memory and I/O.
3. Demonstrate knowledge and understanding of how concurrency in OS is handled.
4. Understand the techniques used to implement the process manager
5. Implement various memory management and demand paging techniques.
6. Comprehend virtual memory abstractions in operating systems
7. Design and develop file system interface.
8. Understand various schemes available for achieving system protection and system security

CSPCT
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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## FORMAL LANGUAGES AND AUTOMATA THEORY

No.of Credits: 3 Instruction Hours/Week:3

### Course Objectives:

The course is designed to

- Identify different formal language classes and their relationships
- Design grammars and recognizers for different formal languages
- Understand the logical limits to computational capacity
- Get proper insight on un-decidable problems

### UNIT I

Why study Automata Theory, Central Concepts of Automata Theory, Informal Picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata and Applications, Finite Automation with Epsilon Transitions.

### UNIT II

Regular Expressions and their Applications, Finite Automata and Regular Expressions, Algebraic Laws for Regular Expressions.
Properties of Regular Languages, Equivalence and Minimization of Automata.

### UNIT III

Context Free Grammars (CFG), Parse Trees, Applications of CFG, Ambiguity in Grammars and Languages.
Definition of Pushdown Automaton, The Languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

### UNIT IV

Normal forms for CFG, Pumping Lemma for Context Free Languages, Closure and Decision Properties of CFLs
Turing Machine Model, Representation of Turing Machines, Language Acceptability by TM, Design of TMs, Universal Turing Machine, Halting Problem of TM, Church-Turing Thesis.

### UNIT V

A Language that is not Recursively Enumerable, An Undecidable Problem that is RecursivelyEnumerable, Undecidable Problems about Turing Machines,
The Classes of P and NP, An NP Complete Problem.

### Text Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

2. Martin J C, Introduction to Languages and the Theory of Computation, 3rd edition, Tata McGraw-Hill, 2003.

## Reference Books:

1. Krithivasan K, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education, 2009.
2. Rich E, Automata, Computability, and Complexity – Theory and Applications, Pearson Education, 2012.
3. Singh A, Elements of Computation Theory, Springer, 2009.
4. Cohen D I A, Introduction to Computer Theory, 2nd edition, John Wiley, 2000.
5. Lewis H, Papadimitriou C H, Elements of the Theory of Computation, 2nd edition, Prentice Hall, 1997.

## Course Outcomes

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

- Write a formal notation for strings, languages and machines.
- Design finite automata to accept a set of strings of a language.
- Determine whether the given language is regular or not.
- Design context free grammars to generate strings of context free language.
- Determine equivalence of languages accepted by pushdown automata and languages generated by context free grammars
- Distinguish between computability & non-computability and decidability & undecidability.

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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## SOFTWARE ENGINEERING

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to understand

- Software life cycle models.
- Software requirements and SRS document.
- Different software design strategies
- Quality control and how to ensure good quality software.
- Planning and estimation of software projects.
- Maintenance of software and gain knowledge of the overall project activities.

### UNIT I

**Introduction to Software Engineering:** The Nature of Software, The Unique Nature of WebApps, Software Engineering, 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, Extreme Programming, Agile Process Models

### UNIT II

**Understanding Requirements:** Requirements Engineering, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

**Requirements Modeling:** Requirements Analysis, Scenario based Modeling, Class based Modeling, Requirements Modeling Strategies, Flow Oriented Modeling, Patterns for Requirement Modeling, Requirements Modeling for WebApps

**Design Concepts:** Design Process, Design Concepts, Design Model.

**Architectural Design**: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Alternative Architectural Designs, Architectural Mapping using Data flow.

### UNIT III

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

**User Interface Design**: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, WebApp Interface Design, Design Evaluation.

**Pattern Based Design**: Design Patterns, Pattern based Software Design, Architectural Patterns, Component Level Design Patterns, User Interface Design Patterns.

## UNIT IV

**Software Quality Concepts:** Software Quality, Software Quality Dilemma, Achieving Software Quality.

**Software Quality Assurance:** Elements of Software Quality Assurance, SQA Goals and Metrics, Formal Approaches to SQA, Statistical SQA, Software Reliability.

**Software Testing Strategies:** A Strategic Approach to Software Testing, Strategic Issues, Unit Testing and Integration Testing (both Conventional and OO Software), Test Strategies for WebApps, Validation Testing, System Testing, Art of Debugging.

**Testing Conventional Applications:** Software Testing Fundamentals, Internal and External View of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black- Box Testing, Model based Testing, Testing for Specialized Environments, Patterns for Software Testing.

**Computer Aided Software Engineering:** CASE and its Scope, CASE Environment, CASE Support in Software Life Cycle, Characteristics of CASE Tools, Towards Second Generation CASE Tool.

## UNIT V

**Managing Software Projects:** Project Management Concepts, Metrics in the Process and Project Domains, Software Measurement, Metrics for Software Quality, Project Planning Process, Software Scope and Feasibility, Software Project Estimation, Decomposition Techniques, Empirical Estimation Models, Estimation for OO Projects, Project Scheduling – Basic Principles, Defining a Task Set and Task Network, Scheduling, Introduction to Risk Management, Software Maintenance, Software Supportability, Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering, Economics of Reengineering.

## Text Book:

1. Pressman R S, *Software Engineering: A Practitioner's Approach*, 7th edition, McGraw-Hill, 2010.

## Reference Books:

1. Sommerville I, *Software Engineering*, 9th edition, Pearson Education, 2011.
2. Jalote P, *Software Engineering: A Precise Approach*, Wiley, 2010.
3. Braude E J, Bernstein M E, *Software Engineering: Modern Approaches*, 2nd edition, Wiley, 2010.
4. Saleh K A, *Software Engineering*, J Ross Publishing, 2009.
5. Bruegge B, Dutoit A H, *Object-Oriented Software Engineering Using UML, Patterns, and Java*, 3rd edition, Prentice Hall, 2009.
6. Bennett S, McRobb S, Farmer R, *Object-Oriented System Analysis and Design Using UML*, 4nd edition, McGraw-Hill, 2010.
7. Lethbridge T C, Laganiere R, *Object-Oriented Software Engineering*, 2nd edition, McGraw-Hill, 2005.

## Course Outcomes

By the end of this course students will be able to

- Define and develop a software project from requirement gathering to implementation.
- Obtain knowledge about principles and practices of software engineering.
- Focus on the fundamentals of modeling a software project.
- Obtain knowledge about estimation and maintenance of software systems

- Comprehend, assess, and calculate the cost of risk involved in a project management
- Implement testing methods at each phase of SDLC

CSPCT
504

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## EMBEDDED SYSTEMS AND INTERNET OF THINGS

No.of Credits: 3 Instruction Hours/ Week: 3

**Course Objectives:**

The course is designed to

**UNIT I**

Introduction to Internet of Things: Physical design of IoT, Logical design of IoT, IoTenabling technologies, IoT levels and deployment templates.
Domain Specific IoTs: Home automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle.

**UNIT II**

IoT and M2M: M2M, Difference between IoT and M2M, SDN and NFV for IoT.
IoT System Management with NETCONF-YANG: Simple Network Management Protocol,Network operator requirements, NETCONF, YANG, IoT system management with NETCONF-YANG.

**UNIT III**

IoT Platforms Design Methodology: IoT design methodology, Case study on IoT system forweather monitoring.
IoT Systems - Logical Design Using Python: Python data types, data structures, and control flow, Functions, Modules, Packages, File handling, Classes, Python packages of interest forIoT.

**UNIT IV**

IoT Physical Devices and Endpoints: Building blocks of an IoT device, Examples of IoT devices, Raspberry Pi board, Linux on Raspberry Pi, Interfaces, Programming with python,IoT Physical Servers and Cloud Offerings: Cloud storage models and communication APIs,WAMP, Xively cloud for IoT, Django, Designing a RESTful Web API, Amazon web services for IoT, SkyNet IoT messaging platform.

**UNIT V**

Case Studies Illustrating IoT Design: Home automation, Cities, Environmental, Agriculture, Productivity applications.
Data Analytics for IoT: Apache Hadoop, Hadoop YARN, Apache Oozie, Apache Spark,Apache Storm and Real-time data analysis, Structural health monitoring case study.
Tools for IoT: Case studies with Chef, Puppet, NETCONF-YANG, IoT code generator.

**Text Book:**

Bahga A, Madisetti V, Internet of Things – A Hands-on Approach, Universities Press, 2015.

**Reference Books:**

1. Raj Kamal, Internet of Things, McGraw Hill, 2017.
2. Sundaram Shriram RMD, Vasudevan K, Nagarajan A S, Internet of Things, Wiley, 2019.
3. Ramgir M, Internet of Things - Architecture, Implementation, and Security, Pearson, 2019.
4. Srinivasa K G, Siddesh G M, Hanumantha Raju R, Internet of Things, Cengage, 2018.
5. Mcewen A, Cassimally H, Designing The Internet of Things, Wiley, 2015.
6. Greengard S, The Internet of Things, MIT Press, 2015.

**Course Outcomes**

By the end of this course students will be able to:

MEEST
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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## OPTIMIZATION TECHNIQUES

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Cast engineering extrema (minima/maxima) problems into optimization framework.
- Learn efficient computational procedures to solve optimization problems.

### UNIT I

Overview of Operations Research, Modeling approach, Decision analysis and Games-Decision environments, Decision making under certainty, Decision making under risk, Decision making under uncertainty, Game theory.

### UNIT II

Liner Programming – Formulation, Graphical method, Simplex method, Duality, Formulationof transportation, Assignment and Transshipment models. Goal programming – Formulation, Weighting and Preemptive methods.

### UNIT III

Integer Linear Programming – Applications, Branch and bound, and Cutting plane algorithms.

### UNIT IV

Nonlinear Programming - Sample applications, Graphical illustration of nonlinear programming problems, Types of nonlinear programming problems, One-variable unconstrained optimization, Multivariable unconstrained optimization.

### UNIT V

Karush-Kuhn-Tucker conditions for constrained optimization, Quadratic programming, Separable programming, Convex programming and Non-convex programming.

### Text Books:

1. Hillier F S, and Lieberman G J, *Introduction to Operations Research*, 7th edition, Tata McGraw-Hill, 2003.

### Reference Books:

1. Taha H A, Operations Research – An Introduction, 8th edition, Prentice Hall of India, 2006.
2. Wagner H M, Principles of Operations Research with Applications to Managerial Decisions, 2nd edition, Prentice Hall of India, 2004.
3. Tulsian P C, and Pandey V, Quantitative Techniques – Theory and Problems, Pearson Education Asia, 2002.

## Course Outcomes

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

- Apply basic concepts of mathematics to formulate an optimization problem
- Analyse and appreciate variety of performance measures for various optimization problems
- Select appropriate solution technologies and strategies,
- Interpret the solution of an optimization problem
- Understand the effects of problem variation on the optimal solution.

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MEBST 507

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## BASICS OF MECHANICAL ENGINEERING

No.of Credits: 2 Instruction Hours/ Week: 2

### Course Objectives:

The course is designed

1. To give overall picture of mechanical engineering from the point of view of basic concepts.
2. To learn about basic laws of thermodynamics.
3. To give insight into IC engines, steam engines, and steam turbines, gas turbines.
4. To make known the basic manufacturing processes and machine tools.
5. To learn about power transmission devices.

### UNIT I

Introduction to Thermodynamics – Concept of a system – Types of Systems, Thermodynamic Equilibrium – Properties, State, Process and Cycle, Zeroth Law, Energy Interactions – Heat and work, Types of work.

First and Second Laws of Thermodynamics : First law, Cycle and process, Specific heats, Heat interactions in a closed system for various processes, Limitations of First law, Concept of Heat Engine (H.E.) and reversed heat engine (Heat pump and refrigerator) , Efficiency/COP, Second Law: Kelvin – Plank and Clausius Statements , Carnot Cycle, Carnot Efficiency, Property of Entropy – T- S and P – V diagrams.

### UNIT II

Thermal Power Plant: Thermal power plant layout – Four circuits – Rankine cycle, Boilers: Fire tube Vs Water Tube; BobCock and Wilcox, Cochran Boilers, Steam Turbines, Impulse Vs. Reaction Turbines, Compounding of Turbines.

### UNIT III

Internal Combustion Engines (IC): I.C. 2 – Stroke and 4 – Stroke engines – S.I. engines and

C.I. engines – Differences Heat transfer – Modes – Thermal resistance concept, Conduction, Composite walls and Cylinders. Combined Conduction and Convection – Overall Heat transfer Coefficient, Simple Numerical Problems in Heat transfer.

### UNIT IV

Manufacturing Processes : Engineering Materials ; Classification , Properties of materials, Metal Casting, Moulding, Patterns, Hot working and Cold working , Extrusion, Forging, Rolling and Drawing.

Machine Tools and Machining Processes – Lathe Machines and Lathe operations, Milling machines, Types – Milling operations , Shaper, Planer, Drilling and Grinding machines.

Welding – Gas welding, Arc Welding, Soldering and Brazing.

### UNIT V

Power Transmission – Transmission of Mechanical Power, Belt drives, Simple Numerical

Problems, Gear Drives – Simple Numerical Problems
Basics of Automotive vehicle – Brakes – Types - Clutch and Differential.

## Text Books:

1. Mathur, M.L., Mehta F.S. and Tiwari R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2011.
2. Roy K.P. and HazraChowdary, S.K., Elements of Mechanical Engineering, Media Promoters and Publishers Pvt., Ltd, 2002.
3. Rudramoorthy R., Thermal Engineering, Tata McGrawHill Book Company, New Delhi, 2003.
4. HazraChowdary, S.K., and Bose, Workshop Technology , Vol. I and II, Media Promoters and Publishers Pvt. Ltd., 2002.

## Course Outcomes

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

1. Understand basics of thermodynamics and components of thermal plant
2. Identify engineering materials and their properties, manufacturing methods encountered in engineering practice.
3. Understand basics of heat transfer, refrigeration and internal combustion engines.
4. Understand mechanism of power transfer through belt, chain, rope and gear drives.
5. Understand functions and operations of machine tools including milling, grinding, and shaping machines.

**CSPCP 508**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## OPERATING SYSTEMS LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the courses, "OperatingSystems".

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**CSPCP 509**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2020-21)**

## SOFTWARE ENGINEERING LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the courses, "SoftwareEngineering".

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**CSPCP 510**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**
**(With effect from the academic year 2020-21)**

## INTERNET OF THINGS LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the courses, "EmbeddedSystems and Internet of Things".

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**CSSEP 511**

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**V SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## SEMINAR I

No.of Credits: Nil Instruction Hours/Week: 2

Each student must give a minimum of 2 seminars of at least 15 minutes duration each ontechnical topics, with the use of slides.

CSPCT
601

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## PRINCIPLES OF PROGRAMMING LANGUAGES

No. of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed

- To understand and describe syntax and semantics of programming languages (PLs).
- To understand data, data types, and statement level control structures.
- To understand different parameter passing mechanisms the PLs supports.
- To understand object-orientation, concurrency, and event handling in PLs.

### UNIT I

Why to study the concepts of Programming Languages (PLs), Language Evaluation Criteria, Influences on Language Design, Language Categories, Design Trade-Offs, Implementation Methods, Programming Environments, Evolution of the major PLs.

### UNIT II

Describing Syntax and Semantics: Introduction, Problem and Formal Method of DescribingSyntax, Introduction to Attribute Grammars and Dynamic Semantics.
Binding, Scope and Life time of Variables, Referencing Environments, Named Constants,Overview of different Data types, Type checking, Strong Typing, Type Equivalence.

### UNIT III

Expressions and Assignments: Arithmetic expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment statements, Mixed-mode assignments.
Overview of Statement Level Control Structures.
Subprograms: Introduction, Design issues, Local referencing, Parameter passing, Overloaded Subprograms, Generic subprograms, Design issues for functions, User-defined Overloaded Operators, Closures, Coroutines, Subprograms with Stack dynamic local variables, Nested Subprograms.

### UNIT IV

Design Issues of Object Oriented Languages, Support for Object Oriented Programming inSmalltalk, C++, Java, C#, Ada95 and Ruby, Implementation of Object Oriented Constructs, Concurrency: Introduction, Subprogram level Concurrency, Semaphores, Monitors, Messagepassing, Ada support for Concurrency, Java Threads, C# Threads, Concurrency in FunctionalLanguages, Statement level concurrency.

### UNIT V

Exception handling in Ada, C++, Java - Even handling in Java, C#
Functional Programming: Introduction, Mathematical Functions, Fundamentals of functional programming languages: LISP, Scheme, Common LISP, ML, Haskell, F# - Comparison of Functional and Imperative Languages.

An Overview of Logic Programming – Origins, Basic Elements and Deficiencies of Prolog –Applications of Logic Programming

## Text Books:

1. Robert W. Sebesta, "Concepts of Programming Languages", Tenth Edition, Addison Wesley, 2013.

## Reference Books:


1. Louden K C, Lambert K, Programming Languages - Principles and Practice, 3nd Edition, Course Technology, 2011.
2. Tucker A B, Noonan R E, Programming Languages - Principles and Paradigms, 2nd Edition, Tata McGraw-Hill, 2007.
3. Pratt T W, Zelkowitz M V, and Gopal T V, Programming Languages - Design and Implementation, 4th Edition, Pearson Education, 2006.
4. Scott M L, Programming Language Pragmatics, 3rd edition, Morgan Kaufmann, 2009
5. R. Kent Dybvig, "The Scheme Programming Language", Fourth Edition, MIT Press, 2009.
6. Jeffrey D. Ullman, "Elements of ML Programming", Second Edition, Prentice Hall, 1998.
7. W. F. Clocksin and C. S. Mellish, "Programming in Prolog: Using the ISO Standard", Fifth Edition, Springer, 2003.


## Course Outcomes

By the end of this course students will be able to:

- Describe syntax and semantics of programming languages
- Analyze the design issues involved in various constructs of programming languages
- Explain data, data types, and basic statements of programming languages
- Apply object-oriented, concurrency, and exception handling features of PLs.
- Design and implement programs in Scheme, ML, and Prolog

CSPCT
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# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## COMPUTER NETWORKS

No. of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Provide insight about fundamental concepts, basic taxonomy and terminology of Computer Networks.
- Gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP

### UNIT I

Introduction to Computer Networks: Networks, Component and Categories, Topologies, Transmission Media, Reference Models: ISO/OSI Model and TCP/IP Model.
Physical Layer: Analog and Digital Signals, Periodic Analog Signals, Transmission Impairments, Data rate limits, Performance, Digital data transmission techniques, Analog data transmission techniques, Multiplexing: FDM, WDM and TDM; Spread Spectrum, Switching: Circuit and Packet.

### UNIT II

Data Link Layer and Medium Access Sub Layer: Design Issues, Error Detection and Error Correction, Elementary Data Link Protocols, Sliding Window Protocols, Channel allocation problems, Multiple Access Protocols: Pure ALOHA, Slotted ALOHA, CSMA/CD, CSMA/CA; IEEE 802.3 Ethernet.

### 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, CongestionControl, Internet Transport Protocols: UDP, TCP; Network Performance Measurement.

### UNIT V

The Application Layer: Introduction, Client-Server Programming, Domain Name System (DNS), WWW and HTTP, FTP, E-mail, TELNET, Secure Shell, SNMP, IP Security Architecture, Firewalls.

### Text Books:

1. Computer Networks, Andrew S. Tanenbaum, Wetherall, Pearson, 5th edition, 2010.
2. Data communications and Networking, Behrouz A. Forouzan, Mc Graw Hill Education, 5th edition, 2012.

## Reference Books:


1. Kurose J F, Ross K W, *Computer Networking – A Top-Down Approach*, 5th edition, Pearson Education, 2010.
2. Peterson L L, Davie B S, *Computer Networks - A Systems Approach*, 5th edition, Morgan Kaufmann, 2011.
3. Forouzan B A, Mosharraf F, *Computer Networks – A Top-Down Approach*, Tata McGraw-Hill, 2012.
4. Olifer N, Olifer V, *Computer Networks – Principles, Technologies, and Protocols for Network Design*, Wiley, 2006.


## Course Outcomes

By the end of this course students will be able to:

- Choose the transmission media depending on the requirements.
- Explain the functions of different layer of the OSI Protocol
- Analyze MAC layer protocols and LAN technologies
- Implement routing and congestion control algorithms
- Design new protocols for computer network.
- Configure DNS, DDNS, TELNET, EMAIL, FTP, WWW, HTTP, SNMP, Bluetooth, Firewalls using open source software and tools.

CSPCT 603

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## LANGUAGE PROCESSORS

No. of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Enrich the knowledge in various phases of compiler and its use
- Identify different methods of lexical analysis
- Design top-down and bottom-up parsers
- Develop syntax directed translation schemes
- Develop algorithms to generate code for a target machine
- Use the tools related to compiler design effectively and efficiently

### UNIT I

Introduction to Assembler, Compiler and Interpreter; Elements of ALP, Single Pass and TwoPass Assemblers, Structure of a Compiler

Lexical Analysis: Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, Lexical Analyzer Generator (Lex)

### UNIT II

Syntax Analysis: Introduction, Context Free Grammars, Writing a Grammar, Top-down Parsing, Bottom-up Parsing, Introduction to LR Parsing, More Powerful LR Parsers, Introduction to YAAC.

### UNIT III

Syntax Directed Translation (SDT): Syntax Definitions, Evaluation Orders for SDTs, Applications of SDTs, Schemes of SDTs

Run Time Environments: Storage Organization, Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management.

### UNIT IV

Intermediate Code Generation: Variants of Syntax Trees, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow Statements, Back Patching.

### UNIT V

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization.

### Text Books:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers Principles, Techniques and Tools, Second Edition, Pearson Education, 2014.
2. D M Dhamdhere, Systems Programming, TMH Education, 2011.

## Reference Books:

1. Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", BS Publications, 2005
2. Dhamdhere, D. M., "Compiler Construction Principles and Practice", 2nd edition, Macmillan India Ltd., New Delhi, 2008

## Course Outcomes

By the end of this course students will be able to:

- Design a compiler for a simple programming language
- Understand phases in the design of compiler
- Design top-down and bottom-up parsers
- Develop syntax directed translation schemes
- Comprehend and adapt to Lex and Yacc tools in compiler design

CSPCT
604

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## ARTIFICIAL INTELLIGENCE

No. of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand the basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.
- Introduce the concepts of machine learning and neural networks.
- Examine the applications of AI techniques in intelligent agents, artificial neural networks and other machine learning models.

### UNIT I

The History of AI: What is Intelligence, Search for Mechanical Intelligence, Evolution of Artificial Intelligence (AI), Systems Approach, Overview of topics.
Uninformed Search: General state space search, General Search Paradigms Depth-First Search, Depth-Limited Search, Iterative Deepening Search, Breadth-First Search, Bi-directional Search, Uniform-Cost Search.
Informed Search: Best-First Search, N-Queens problem, A* Search, Eight Puzzle problem, Hill Climbing Search, Simulated Annealing, Tabu Search, Constraint Satisfaction, Constraint Satisfaction algorithms: Generate and Test, Backtracking, Forward Checking and Look Ahead, Min-Conflicts Search.

### UNIT II

AI and Games: Two Player Games, The Minimax Algorithm, Tic-Tac-Toe problem, Minimax with Alpha-Beta Pruning, Classical Game AI, Checkers, Chess, Scrabble, Video Game AI, Movement and Path finding, Table Lookup with Offensive and Defensive Strategy,NPC Behavior, Team AI, Real-Time Strategy AI.
Knowledge Representation (KR): Types and Role of Knowledge, Semantic Nets, Frames, Propositional Logic, First Order Logic (Predicate Logic), Semantic Web, Computational Knowledge Discovery, Ontology, Common Sense.

### UNIT III

Machine Learning: Machine Learning Algorithms, Supervised Learning, Decision Trees, Unsupervised Learning, Markov Models and implementation, Nearest Neighbor Classification, 1NN and k-NN Examples. Evolutionary Computation: Introduction to Evolutionary Computation, Biological Motivation, Genetic Algorithms, Genetic Programming, Evolutionary Strategies, Differential Evolution.

### UNIT IV

Neural Networks I: Concept of Neural Networks, Biological Motivation, Fundamentals of Neural Networks, The Perceptron, Least-Mean-Square (LMS) Learning, Learning with Backpropagation, Probabilistic Neural Networks, Tips for Building Neural Networks. Neural Networks II: Unsupervised Learning, Hebbian Learning, Simple Competitive Learning, k- Means Clustering, Adaptive Resonance Theory, Hopfield Auto-Associative Model.

## UNIT V

Robotics and AI: Introduction, Taxonomy of Robotics, Hard vs. Soft Robotics, Braitenburg Vehicles, Natural Sensing and Control, Perception with Sensors, Actuation with Effectors, Robotic Control Systems, Simple Control Architectures, Movement Planning, Distributed Robotics. Intelligent Agents: Anatomy of an Agent, Agent Properties and AI, Hybrid Agent, Agent Architectures, Types of Architectures, Agent Languages, Agent Communication. Biologically Inspired and Hybrid Models: Cellular Automata, Artificial Immune Systems, Artificial Life, Fuzzy Logic, Evolutionary Neural Networks, Ant Colony Optimization, Affective Computing.

## Text Books:

1. M Tim Jones, Artificial Intelligence - A Systems Approach, Infinity Science Press, 2008.

## Reference Books:

1. Russel S, Norvig P, Artificial Intelligence: A Modern Approach, 3rd edition, Pearson Education, 2010.
2. Rich E, Knight K, Nair S B, Artificial Intelligence, 3rd edition, Tata McGraw-Hill, 2009.
3. Luger G F, Artificial Intelligence, 6th edition, Pearson Education, 2009.
4. Carter M, Minds and Computers: An Introduction to the Philosophy of Artificial Intelligence, Edinburgh University Press, 2007.
5. Coppin B, Artificial Intelligence Illuminated, Jones & Bartlett, 2004.
6. Ertel W, Introduction to Artificial Intelligence, Springer, 2011.

## Course Outcomes

By the end of this course students will be able to:

- Demonstrate basic understanding of artificial intelligence and its fundamentals.
- Identify 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 robotics.

CEEST
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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## BASICS OF CIVIL ENGINEERING

No. of Credits: 2 Instruction Hours/ Week: 2

### Course Objectives:

The course is designed to

- Provide basic knowledge on different elements of civil engineering
- Gain knowledge in various materials used for construction.
- Understand various aspects of surveying

### UNIT I

Building Planning and Architecture: Planning and Design of buildings such as residentialhouses, offices, schools, hospitals, theaters, banks and postal offices.
Introduction to Architecture: Importance, Basic building techniques such as Lintel, Cantilever, Arches, Buttress.

### UNIT II

Soils, Foundations, and Building Materials: Selection of Site, Objective of a foundation, Site inspection, Soils, Loads on foundations, Essential requirements of a good foundation, Types of foundation, Failure of foundations, and Remedial measures.
Construction Materials: Bricks, Stones, Cement, Cement concrete, Steel section, Properties ofbuilding materials.

### UNIT III

Surveying: Objective of Surveying, Types of Surveying, Classification of Surveying, Principles of Surveying, Measurement of distance, Measurement of angles, Leveling, Determination of areas, Contouring, Total station.
Basic principles and applications of - Remote sensing, Global Positioning System (GPS) and Geographical Information System (GIS).

### UNIT IV

Roads: Introduction, Road transport characteristics, Benefits of a good system of roads, Classification of roads.
Bridges: Necessity of bridges, Site investigation, Components of a bridge, Classification of bridges.

### UNIT V

Water Resources: Quality and Quantity, Water quality standards for drinking and construction
Dams and Canals: Classification of Dams, Components of a Reservoir, Classification of Irrigation Canal, Canal alignment.

## Text Books:

1. Anurag Kandya, Elements of Civil Engineering, 3rd Edition, Charotar Publishing House Pvt. Ltd, 2015.
2. S.S. Bhavikatti , Basic Civil Engineering, Vikas Publishing House Pvt. Limited, 2004
3. Palanichamy M S, Basic Civil Engineering, 3rd Edition, Tata McGraw-Hill, 2000

## Reference Books:

1. Gopi S, Basic Civil Engineering, Pearson Education, 2010

## Course Outcomes

By the end of this course students will be able to:

- Find the suitability of various building materials at a particular location in the building construction.
- Analyze the status of water quality standards for drinking and construction

CSPCT
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## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) - CBCS Regulations-2018**

## CRYPTOGRAPHY

No. of Credits: 2 Instruction Hours/ Week: 2

### Course Objectives:

The course is designed

- Gain knowledge about the mathematics of the cryptographic algorithms
- Get an insight into the working of different existing cryptographic algorithms
- Learn how to use cryptographic algorithms in security

### UNIT I

Introduction to Cryptography and Data Security: Concept of cryptology, Symmetric cryptography, Substitution cipher, Cryptanalysis, Modular arithmetic, Shift cipher, Affine cipher, Concept of stream cipher, Random number generators, One-time pad, Practical streamciphers.

### UNIT II

Introduction to DES, Overview of DES, Internal structure of DES and its limitations, AES algorithm, Introduction to Galois fields, Internal structure of AES, Decryption.
Overview of Block Ciphers: ECB, CBC, OFB, CFB, CTR, and GCM.

### UNIT III

Public-Key Cryptography and associated Number Theory: Symmetric vs. Asymmetric cryptography, Authenticity of public keys, Public key algorithms, Key lengths and security levels, Euclidean algorithm, Extended Euclidean algorithm, Euler's Phi function, Fermat's Little theorem, Euler's theorem.
The RSA Cryptosystem: Encryption and Decryption, Key generation and Proof of correctness.
Public-Key Cryptosystems Based on the Discrete Logarithm Problem: Diffie-Hellman key exchange, The discrete logarithm problem, Security of the Diffie-Hellman key exchange, Overview of Elliptic Curve Cryptosystems.

### UNIT IV

Digital Signatures: The basic principle, The RSA signature scheme, Computational aspects, Security
Hash Functions: Motivation, Security requirements of Hash Functions, Overview of Hash algorithms, The Secure Hash Algorithm (SHA-1).

### UNIT V

Message Authentication Codes (MACs): Principles, HMAC, CBC-MAC, GMAC.
Key Establishment: Introduction, Key freshness and key derivation, The $n^2$ key distribution problem, Key establishment using Symmetric Key Techniques: with a key distribution center, Kerberos; Key establishment using Asymmetric Key Techniques: Man-in-the-Middle Attack,Certificates, Public-Key Infrastructures (PKI) and CAs.

## Text Books:

1. Paar C, Pelzl J, Understanding Cryptography, Springer, 2010.

## Reference Books:

1. Mao W, Modern Cryptography - Theory and Practice, Pearson Education, 2004.
2. Stinson D R, Cryptography: Theory and Practice, 3rd edition, Chapman and Hall CRC, 2006.
3. Schneier B, Applied Cryptography, 2nd edition, Wiley, 2006.
4. Goldreich O, Foundations of Cryptography - A Primer, now Publishers, 2005.
5. Pachghare V K, Cryptography and Information Security, PHI, 2009.
6. Pfleeger C P, Pfleeger S L, Security in Computing, 4th edition, Pearson Education, 2009.

## Course Outcomes

By the end of this course students will be able to:

- Understand the basic concepts of symmetric cryptosystem, public key cryptosystem and digital signature scheme
- Reason about the security of cryptographic constructions
- Break the cryptosystems that are not secure

**CSPCP 607**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) – CBCS Regulations-2018**

## COMPUTER NETWORKS LABORATORY

No. of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the course, "ComputerNetworks".

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**CSPCP 608**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) – CBCS Regulations-2018**

## LANGUAGE PROCESSORS LABORATORY

No. of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the course, "LanguageProcessors".

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**CSPCP 609**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) – CBCS Regulations-2018**

## ARTIFICIAL INTELLIGENCE LABORATORY

No. of Credits: 1 Instruction Hours/Week: 2

At least 10 assignments are to be given covering the topics of the course "ArtificialIntelligence"

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**CSCVP 609**

# SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VI Semester B.Tech (CSE) – CBCS Regulations-2018**

## COMPREHENSIVE VIVA-VOCE

No. of Credits: Nil

The Comprehensive Viva-Voce shall assess the overall knowledge acquired by the studentover I to VI semesters of study in both theory and laboratory work.

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

# WEB AND MOBILE TECHNOLOGIES (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand the Web designing using HTML, XML, DHTML and Javascript
- Provide knowledge about Web servers, Database connectivity and PHP.
- Introduce the Android technology and its application.

### UNIT I

Core Java Programming: Introduction to Java programming; Object-oriented programming with Java Classes and Objects, Constructors; Overloading Methods and Constructors, Argument Passing, Inheritance; Data Abstraction, Interfaces, Exception handling with try, catch, finally, throws, throw constructs; The Object class; Working with types: Wrapper classes; Packages; Applets; Event Handling; Basics of AWT and Swing; Threads; The I/O Package; Basic concepts of networking;

### UNIT II

HTML - List, Tables, Images, Forms, Frames, Cascading Style sheets. XML - Document type definition, XML Schemas, Document Object Model.

Java Script - Control statements, Functions, Arrays, Objects, Events, Dynamic HTML with Java Script, Ajax.

### UNIT III

Web servers – IIS (XAMPP, LAMPP) and Tomcat Servers. Java Web Technologies-Servlets, Java Server Pages, Java Server Faces, Building a Web Application in IDE, JSF Components, Session Tracking, Cookies.

Database Connectivity with MySQL - JDBC, Servlets, JSP.

### UNIT IV

PHP - Basics, String Processing and Regular Expressions, Form Processing and Business Logic, Using Cookies, Dynamic Content, Operator Precedence Chart.

Getting started with Android Programming - What is Android, Obtaining the required tools, Creating your First Android Application. Anatomy of an Android Application.

### UNIT V

Activities, Fragments and Intents - Understanding Activities, Linking Activities Using Intents, Fragments, Calling Built-in Applications using Intents, Displaying Notifications.

Android User Interface - Understanding the Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Listening for UI Notifications.

## Text Books:


1. Herbert Schildt, Java - The Complete Reference, 8th Edition, Mcgraw Hill Education, 2011.
2. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet & World Wide Web How to Program", 5th edition, Deitel Series, 2012.
3. W. Jason Gilmore, "Beginning PHP and MySQL: From Novice to Professional", 4th Edition, Apress Publications, 2010.
4. Wei-Meng Lee, Beginning Android 4 Application Development, Wiley India, 2012.


## Reference Books:


1. Jim Keogh, J2EE - The complete Reference, 1st Edition, McGraw Hill Education, 2017.
2. Robert W. Sebesta, "Programming the World Wide Web", 4th edition, Pearson, 2008.
3. James Keogh, J2ME: The Complete Reference, TMH, 2017.
4. David William Barron, "The World of Scripting Languages", Wiley Publications, 2000.
5. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wiley India, 2009.
6. Hans Bergsten, Java Server Pages, 3rd Edition, O'Reilly, 2003.
7. Michael Juntao Yuan, Enterprise J2ME: Developing Mobile Java Applications, Pearson Education, 2004.
8. James C. Sheusi, Android Application Development for Java Programmers, Cengage Learning.
9. Jerome DiMargio, Android: A Programmer's Guide, TMH.


## Course Outcomes

By the end of this course students will be able to:

- Design and develop dynamic and interactive web sites.
- Develop real world applications using client side and server side scripting languages
- Design Android User Interface for mobile applications.

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

# COMPUTER GRAPHICS (Elective)

No.of Credits: 3 Instruction Hours/Week:3

### Course Objectives:

The course is designed to

- Understand the basics of various inputs and output computer graphics hardware devices.
- Exploration of fundamental concepts in 2D and 3D computer graphics.
- Learn 2D raster graphics techniques, 3D modelling, geometric transformations, 3D viewing and rendering.

### UNIT I

Introduction- Image processing as picture analysis, Advantages of Interactive Graphics, Representative uses of computer graphics, Classification of applications, Development of hardware and software for computer graphics, Conceptual framework for Interactive Graphics.

Scan Converting Lines – Basic Incremental algorithm, Midpoint Line algorithm and additional issues; Scan Converting Circles, Scan Converting Ellipses, Solid Filling– Rectangles, Polygons and Ellipse arcs; Pattern filling, Thick primitives, Cohen-Sutherland line clipping algorithm, Parametric line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm, Generating characters and Antialiasing.

### UNIT II

Display Systems - Raster-scan and Random scan.

Geometrical transformations – 2D transformations, Homogeneous coordinates, Matrix representation of 2D transformations, Composition of 2D transformations, Window to view-port transformation, Matrix representation of 3D transformations, Composition of 3D transformations and Transformation as a change in coordinate system.

Representing Curves and surfaces – Polygon meshes, Parametric cubic curves, Parametric bicubic surfaces andQuadric surfaces.

Fractals – Lines and Surfaces.

### UNIT III

Viewing in 3D - Projections, Specifying an arbitrary 3D view, Examples of 3D viewing, Mathematics of planar geometric projections, Implementing planar geometric projections, Coordinate systems.

Solid Modeling – Representing solids, Regularized Boolean set operations, Primitive instancing, Sweep representations, Boundary representations, Spatial-Partitioning Representations, Constructive solid geometry, Comparison of representations, User interfaces for solid modeling.

### UNIT IV

Achromatic and Colored Light – Achromatic light, Chromatic color, Color models for raster graphics, Reproducing color, Using color in computer graphics.

Visible Surface Determination – Functions of two variables, Techniques for efficient visible surface algorithms, z-Buffer algorithm, Scan-line algorithms, Visible surface ray tracing.

**UNIT V**

Illumination Models - Ambient light, Diffuse reflection, Atmospheric attenuation.
Shading4 Models – Constant shading, Interpolated shading, Polygon mesh shading, Gouraud shading, Phong shading, Problems with interpolated shading.
Surface Detail – Surface-detail polygons, Texture mapping, Bump mapping.
Animation – Conventional and Computer-Assisted animation, Animation languages, Methods of controlling animation, Basic rules of animation, Problems peculiar to animation.

## Text Books:

1. Hughes J F, Van Dam A, Foley J D, et al., Computer Graphics*:* Principles and Practice, 3rd edition, Addison-Wesley, 2013.

## Reference Books:

1. Foley J D, Van Dam A, Feiner S K, John F H, Computer Graphics: Principles & Practice in C, 2nd edition, Pearson Education, 1995.
2. Ragiv Chopra, Computer Graphics, S. Chand& Company, 2012.

## Course Outcomes

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

- Understand the various computer graphics hardware and display technologies.
- Implement various 2D and 3D objects transformation techniques.
- Apply 2D and 3D viewing technologies into the real world applications

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) - CBCS Regulations- 2018**

# SOFT COMPUTING (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand basic ANN architectures, algorithms and their limitations
- Understand the concepts of feed forward and feedback ANN.
- Discuss the Fuzzy logic concepts, Fuzzy principles and relations
- Familiarize Genetic Algorithm and its applications to Soft Computing.
- Design and develop ML techniques with assistance of MATLAB

### UNIT I

Introduction of soft computing - Soft computing vs. Hard computing- Various types of soft computing techniques- Applications of soft computing-Neuron- Nerve structure and synapse- Artificial Neuron and its model- Activation functions- Neural network architecture- Single layer and Multilayer feed forward networks- McCullochPitts neuron model- Perceptron model- MLP- Back propagation learning methods- Effect of learning rule coefficient.

### UNIT II

Counter propagation network - Architecture - Functioning & Characteristics of counter-propagation network - Hopfield/ Recurrent network – Configuration - Stability constraints associative memory- and characteristics- Limitations and applications- Hopfield vs Boltzman machine - Adaptive Resonance Theory – Architecture – Classifications -Implementation and training-Associative Memory.

### UNIT III

Different faces of imprecision - Inexactness, Ambiguity, Undecidability, Fuzziness and certainty, Fuzzy sets and Crisp sets. Intersections of Fuzzy sets, Union of Fuzzy sets, the complement of Fuzzy sets - Fuzzy reasoning. Linguistic variables, Fuzzy propositions, Fuzzy compositional rules of inference - Methods of decompositions and Defuzzification.

### UNIT IV

Basic concept of Genetic algorithm and detail algorithmic steps - Adjustment of free parameters- Solution of typical control problems using Genetic algorithm - Concept on some other search techniques like tabu search and ant colony search techniques for solving optimization problems.

### UNIT V

GA application to optimization problems - Case studies: Identification and control of linear and nonlinear dynamic systems using MATLAB - Neural Network toolbox. Stability analysis of Neural Network interconnection systems - Implementation of fuzzy logic controller using MATLAB fuzzy logic toolbox - Stability analysis of fuzzy control systems.

## Text Books:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, Wiley India, 3rd edition, 2012.
2. Zimmermann H. J. "Fuzzy set theory and its Applications" Springer international edition, 2011.
3. David E. Goldberg, “Genetic Algorithms in Search, Optimization, and Machine Learning”, Pearson Education, 2009.
4. Laurene V. Fausett, “Fundamentals of Neural Networks: Architectures, Algorithms, And Applications”, Pearson Education, 1st edition, 1993.
5. W. T. Miller, R. S. Sutton and P. J. Webros, “Neural Networks for Control”, MIT Press, 1996.

## Reference Books:

1. S. Rajasekaran, and G. A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis, and Applications, Prentice Hall of India, 2007.

## Course Outcomes

By the end of this course students will be able to:

- Comprehend the fuzzy logic and the concept of fuzziness involved in various systems.
- Understand the role of soft computing techniques in solving real world applications
- Build optimal classifiers using genetic algorithms
- Implement fuzzy logic controller using MATLAB fuzzy logic toolbox

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

# CLOUD COMPUTING (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand fundamental concepts of cloud computing and its services.
- Demonstrate an understanding of Service models, deployment models and Virtualization
- Understand the programming and implementation issues of Cloud

### UNIT I

Introduction: Definition, Historical developments, Computing platforms and technologies.
Principles of Parallel and Distributed Computing: Parallel versus distributed computing, Elements of parallel computing, Elements of distributed computing, Technologies for distributed computing.

### UNIT II

Virtualization: Characteristics, Virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples.
Cloud Computing Architecture: Cloud reference model, Types of clouds, Economics of clouds, Open challenges.
Aneka: Cloud Application Platform: Framework overview, Anatomy of the Aneka container, Building Aneka clouds, Cloud programming and management.

### UNIT III

Concurrent Computing- Thread Programming: Programming applications with threads, Multithreading with Aneka, Programming applications with Aneka threads.
High Throughput Computing- Task Programming: Task computing, Task-based application models, Aneka task-based programming.

### UNIT IV

Data Intensive Computing - Map-Reduce Programming: Introduction, Technologies for data-intensive computing, Aneka MapReduce programming.
Cloud Platforms in Industry: Amazon web services, Google AppEngine, Microsoft Azure.

### UNIT V

Cloud Applications: Scientific applications in - Healthcare, Biology, Geo-science; Business applications in - CRM and ERP, Productivity, Social networking, Media applications, Multiplayer online gaming.
Advanced Topics in Cloud Computing: Energy efficiency in clouds, Market based management of clouds, Federated clouds / InterCloud, Third party cloud services.

### Text Books:

1. Buyya R, Vecchiola C, Selvi S T, Mastering Cloud Computing, McGraw HillEducation (India), 2013.

## Reference Books:


1. Dan C. Marinescu, Cloud Computing - Theory and Practice, Morgan Kaufmann (an imprint of Elsevier), 2013.
2. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing - Principles and Paradigms, Wiley India, 2011.
3. Kai Hwang, Geoffrey C Fox, Jack J Dongarra, Distributed and Cloud Computing - From Parallel Processing to the Internet of Things, Morgan Kaufmann (an imprint of Elsevier), 2012.
4. Rittinghouse J W, Ransome J F, Cloud Computing - Implementation, Management, and Security, CRC Press, 2010.
5. Velte A T, Velte T J, Cloud Computing - A Practical Approach, McGraw Hill, 2011.
6. Shroff G, Enterprise Cloud Computing - Technology, Architecture, Applications, Cambridge University Press, 2010.
7. Antonopoulos N, Gillam L, Cloud Computing - Principles, Systems and Applications, Springer, 2010.
8. Furht B, Escalante A, Handbook of Cloud Computing, Springer, 2010.
9. Sosinsky B, Cloud Computing Bible, Wiley, 2011.


## Course Outcomes

By the end of this course students will be able to:

- Identify the architecture, service models and deployment models of Cloud.
- Analyze authentication, confidentiality and privacy issues in Cloud computing environment.
- Determine technological implications for selecting cloud computing platforms
- Design and develop applications for Cloud environment.

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

# DATA MINING (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand the principles of Data Warehousing and Data Mining
- Know the Architecture of a Data Mining system
- Learn pre-processing techniques and data mining functionalities
- Compare and contrast classification and clustering algorithms

### UNIT I

Data Mining: Introduction to Data Mining, Knowledge discovery from data, Kinds of data can be mined; Kinds of patterns can be mined

Types of Data: Relational Database, Data Warehouse, Transactional Database, Advanced Database Systems

Data Mining Functionalities: Mining Frequent Patterns, Association and Correlation, Classification and Prediction, Cluster Analysis, Outlier Analysis, Evaluation Analysis.

### UNIT II

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 III

Mining Frequent Patterns, Associations, and Correlations; Market Basket Analysis, Frequents Item sets, Closed Item sets, and Association rules, Mining Various Kinds of Association Rules, Efficient and Scalable Frequent Itemset Mining Methods, The Apriori Algorithm: Finding Frequent Itemsets Using Candidate Generation, Generating Association Rules from Frequent Itemsets , Improving the Efficiency of Apriori , Mining Closed Frequent Itemsets.

### UNIT IV

Cluster Analysis: What is Cluster analysis ,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

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, Classifier Accuracy Measures: True Positive Rate, False Positive Rate, Precision, Recall, F-Measure.

## Text Books:

1. Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publishers, Elsevier, 2006.

## Reference Books:

1. Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Introduction to Data Mining, Pearson Education, 2016.
2. Hongbo Du, Data mining Techniques and Applications: An Introduction, 1st Edition, Cengage India Publishing, 2013.
3. Arun K Pujari, Data Mining Techniques, 3rd Edition, Universities Press, 2013.
4. T.V Suresh Kumar, B Eswara Reddy, Jagadish S Kallimani, Data Mining: Principles and Applications, First edition, Elsevier, 2012.
5. Vikram Pudi, P Radha Krishna, Data Mining, Oxford University Press, 2009.
6. Sam Anahory and Dennis Murray, Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems, First Edition, Pearson Education India, 2002.
7. K.P.Soman, Shyam Diwakar,V.Ajay, Insight Into Data Mining: Theory and Practice, Prentice Hall India, 2006.

## Course Outcomes

By the end of this course students will be able to

- Comprehend the various architectures and its application with data mining
- Design and develop data mining algorithms to analyze raw real world data
- Apply preprocessing techniques for data cleansing
- Analyze multi-dimensional modeling techniques and Classification & Clustering algorithms

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

# SOFTWARE PROJECT MANAGEMENT (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand basic concept of project management, project management life cycle and model-based software architectures.
- Discuss various software management disciplines.

### UNIT I

Conventional Software Management: The Waterfall model, Conventional software management performance; Evolution of Software Economics: Software Economics, Pragmatic software cost estimation; Improving Software Economics: Reducing Software product size, Improving software processes, Improving team effectiveness, Improving automation, Achieving required quality, Peer inspections; The old way and the new: The principles of conventional software engineering, Principles of modern software management, Transitioning to an iterative process.

### UNIT II

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; Work flows of the process: Software process workflows, Iteration workflows.

### UNIT III

Checkpoints of the Process: Major mile stones, Minor milestones, Periodic status assessments; Iterative process planning: Work breakdown structures, Planning guidelines, Cost and schedule estimating process, Iteration 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 IV

Project control and process instrumentation: The seven core metrics, Management indicators, Quality indicators, Life cycle expectations pragmatic software metrics, Metrics automation; Tailoring the process: Process discriminants; Example: Small scale project Vs Large scale - Modern project profiles, Next generation software economics, Modern process transitions.

### UNIT V

The state of practice in software management, The COCOMO cost estimation model, Change metrics, CCPDS-R Case study.

## Text Books:

1. Walker Royce, Software Project Management, Pearson Education.
2. Bob Hughes & Mike Cotterell, Software Project Management, Fourth Edition,Tata Mc-Graw Hill.

## Reference Books:

1. Andrew Stellman & Jennifer Greene, Applied Software Project Management, O‟Reilly, 2006.
2. Jennifer Greene & Andrew Stellman, Head First PMP, O‟Reilly, 2007.
3. Richard H. Thayer & Edward Yourdon, Software Engineering Project Management, Second Edition, Wiley India, 2004.
4. Jim Highsmith, Agile Project Management, Pearson education, 2004.
5. Scott Berkun, The art of Project management, O‟Reilly, 2005.
6. Pankaj Jalote, Software Project Management in Practice, Pearson Education, 2002.

## Course Outcomes

By the end of this course students will be able to:

- Describe the importance of project management from the perspectives of improving software economics.
- Describe software management process framework.

**CSPEP 703**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## PROGRAM ELECTIVE - I LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 8 assignments are to be given covering the topics of the course chosen under 'Program Elective – I'.

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**CSPEP 704**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## PROGRAM ELECTIVE - II LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 8 assignments are to be given covering the topics of the course chosen under 'Program Elective – II'.

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**CSPWP 705**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## PROJECT WORK PHASE-1

No.of Credits: 3 Instruction Hours/Week: 6

Students, not exceeding four per batch, shall pursue either research-oriented or application-oriented Project Work. The steps to be followed in executing the Part-I of the Project Work are given below:

| Research-Oriented Project Work | Application-Oriented Project Work |
|---|---|
| 1. Motivation | 1. Motivation |
| 2. Literature Survey | 2. Problem Definition |
| 3. Problem Definition | 3. Feasibility Study |
| 4. Model Formulation (System Model) | 4. Software Requirements Analysis |

At the end of the semester, a Preliminary Report shall be prepared and submitted for evaluation.

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**CSINP 706**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## INTERNSHIP / MINI PROJECT

No.of Credits: 3 Instruction Hours/ Week: 6

Industry Internship (not less than 4 weeks) shall be carried out at the end of IV or VI semesters and the performance is reflected in the VII Semester.

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**CSSEP 707**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

SEMINAR - II

No.of Credits: Nil Instruction Hours/Week: 2

Every student shall give a minimum of 2 seminars of at least 15 minutes duration each on technical topics, using power point slides.

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MEPCT 801

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VIII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

## INDUSTRIAL MANAGEMENT

No.of Credits: 3 Instruction Hours/ Week: 3

### UNIT I

Definition of Management, Management Functions, Management and Administration, Nature of Management, Universality of Management Principles of Management, Organization Approaches, Organization Structures and Process of Organizing.
Nature and Scope of Financial management, Capital Budgeting, Cost of Capital and Working Capital Management.

### UNIT II

Facilities Planning – Definition, Significance, Objectives and Process. Location models, Plant Location Problem and Basic Layout Types
Material Handling – Definition, Principles, System Design and, Equipment
Process Design – Identifying, Selecting and Sequencing the Required Processes

### UNIT III

Aggregate Production Planning, material Requirements Planning and Project Planning and Scheduling

### UNIT IV

Job Sequencing and Operations Scheduling, New Direction in Batch and Discrete-parts Production Systems and Plant Maintenance
Purchasing – Objectives, Responsibilities, Policies, Practices, Procedures, Organization for Purchasing and Relationship of Purchasing with Other Departments

### UNIT V

Marketing Management – Nature and Functions of Marketing, Distribution Channels and Marketing Research.
Human Resources Development – Dynamic Personnel Management, Staffing Policies and Process, and Wage and Salary Policies and Administration.

### Text Books:


1. R D Agarwal, Organization and Management, Tata McGraw – Hill, 2000 (Chapters 1, 7, 8, 24, 26, 31, 36, 37 and 41 to 46).
2. James A Tompkins and John A White, Facilities Planning, John Wiley & Sons 1954 (Sections 1.1, 1.2, 1.3, 1.4, 3.3, 6.1, 6.2, 6.4, 6.6, 7.1, 7.2, 15.2, 15.4)
3. Elsaye A Elsayed and Thomas O Boucher, Analysis and Control of Production Systems, Prentice-Hall, 1985 (Chapters 4 to 8).
4. O.P Khanna, Industrial Engineering and Management , Dhanpat Rai Publication, Reprint 2003.

COPCT 802

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VIII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

## MANAGERIAL ECONOMICS

No.of Credits: 2 Instruction Hours/ Week: 2

### UNIT I

Introduction - Nature and Scope of Managerial Economics, Economic Theory and Managerial Economics, Managerial Economist**:** Role and Responsibilities**.**
Demand Analysis and Forecasting **–** Demand Determinants, Demand Distinctions, Demand Forecasting**:** General Considerations, Methods of Demand Forecasting**.**

### UNIT II

Cost Analysis – Cost Concepts, Classifications and Determinants; Cost-Output Relationship, Economies and Diseconomies of Scale, Cost Control and Cost Reduction.
Production and Supply Analysis – Production Functions, Supply Analysis.

### UNIT III

Price and Output Decisions Under Different Market Structures – Perfect Competition, Monopoly and Monopsony; Price Discrimination, Monopolistic Competition, Oligopoly and Oligopsony.

### UNIT IV

Pricing Policies and Practices – Pricing Policies, Pricing Methods, Specific Pricing Policies, Price Discounts and Differentials; Product-line Coverage and Pricing; Price Forecasting.

### UNIT V

Profit Management – Nature of Profit, Measuring Accounting Profit,Profit Policies, Profit Planning and Forecasting.
Capital Management - Capital Budgeting, Cost of Capital, Appraising Project Profitability, Risk, Probability and Investment Decisions.

### Text Books:

1. Varshney R L and Maheshwari K L, Managerial Economics, 19th Edition, Sultan Chand and Sons, 2009.
2. Michael R. Baye, Managerial Economics and Business Strategy , Tata McGraw-Hill, 2008.

### Reference Books:

1. Froeb L M, and McCann B T, Managerial Economics*:* A Problem Solving Approach, Cengage Learning, 2008.
2. Dean J, Managerial Economics, PHI, 2010.

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VIII SEMESTER B.Tech (CSE) - CBCS Regulations-2018**

# BIG DATA ANALYTICS (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Discuss the challenges traditional data mining algorithms face when analyzing Big Data.
- Introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
- Comprehend machine learning and deep learning algorithms for data analytics.
- Understand how big data analytics can leverage into a key component

### UNIT I

Introduction to Big Data - What is Analytics?, What is Big Data?, Characteristics of Big Data, Domain Specific Examples of Big Data Viz. Web, Financial, Healthcare, IoT, Environment, Logistics & Transportation, Industry, Retail; Analytics Flow for Big Data, Big Data Stack, Mapping Analytics Flow to Big Data Stack, Case Studies: Genome Data Analysis and Weather Data Analysis, Analytics Patterns.

### UNIT II

Overview of Setting up Big Data Stack, Big Data Patterns - Analytics Architecture Components & Design Styles, MapReduce Patterns.
NoSQL - Key-Value Databases, Document Databases, Column Family Databases, Graph Databases.

### UNIT III

Data Acquisition - Data Acquisition Considerations, Publish-Subscribe Messaging Frameworks, Big Data Collection Systems, Messaging Queues, Custom Connectors.
Big Data Storage - HDFS: Architecture and Usage Examples.
Batch Analysis - Hadoop and MapReduce, Hadoop-MapReduce Examples, Pig, Case Study: Batch Analysis of News Articles, Apache Oozie, Apache Spark, Apache Solr.

### UNIT IV

Real-time Analysis - Stream Processing, Storm Case Studies, In-Memory Processing, Spark Case Studies.
Interactive Querying - Spark SQL, Hive, Amazon Redshift, Google BigQuery.
Serving Databases & Web Frameworks - Relational (SQL) Databases, Non-Relational (NoSQL) Databases, Python Web Application Framework-Django, Case Study: Django application for viewing weather data.

### UNIT V

Analytics Algorithms - Frameworks, Clustering, Case Study: Song Recommendation System, Classification & Regression, Case Studies: Classifying Handwritten Digits and Genome Data Analysis (Implementation), Recommendation Systems.
Data Visualization - Frameworks & Libraries, Overview of Visualization Examples.

## Text Books:

1. Arshdeep Bhaga, Vijay Madisetti, Big Data Science and Analytics: A Hands-On Approach, 1st Edition, VPT Publishers, 2019.
2. Michael Minelli, Michele Chambers, Ambiga Dhiraj, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses, Wiley, 2013.

## Reference Books:

1. EMC Education Services, "Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", Wiley, 2016.
2. Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.
3. Rajkumar Buyya, Rodrigo N. Calheiros and Amir Vahid Dastjerdi (Editors), "Big Data Principles and Paradigms", Morgan Kaufmann (An imprint of Elsevier), 2016.
4. Colleen McCue, "Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis", Elsevier, 2007.
5. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
6. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
7. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Wiley and SAS Business Series, 2012.
8. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGraw Hill, 2011.

## Course Outcomes

By the end of this course students will be able to

- Understand big data challenges in different domains viz. social media, transportation, finance, medicine and apply the concepts of big data analytics for the said domains.
- Apply several newer algorithms for Clustering, Classifying and finding associations in Big Data
- Design and develop Hadoop and Map Reduce Framework
- Handle several Data Intensive tasks using the Map Reduce Paradigm

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

### VIII SEMESTER B.Tech (CSE) - CBCS Regulations-2018

### CYBER SECURITY (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

**Course Objectives:**

The course is designed to

- Analyze and evaluate the cyber security needs of an organization.
- Design and develop security architecture for an organization.
- Develop cyber security strategies and policies.
- Determine and analyze software vulnerabilities and develop necessary security solutions.

**UNIT I**

Building a Secure Organization, Preventing System Intrusions, Guarding Against Network Intrusions, Internet Security, The Botnet Problem, Intranet Security, Local Area Network Security.

**UNIT II**

Wireless Network Security, Cellular Network Security, RFID Security, Protecting Mission-Critical Systems, Security Management Systems, Information Technology Security Management, Identity Management.

**UNIT III**

Intrusion Prevention and Detection Systems, Computer Forensics, Network Forensics, Firewalls, Penetration Testing, Vulnerability Assessment.

**UNIT IV**

NET Privacy, Personal Privacy Policies, Virtual Private Networks, Identity Theft, VoIP Security, SAN Security, SAN Devices Security.

**UNIT V**

Risk Management, Physical Security Essentials, Biometrics, Information Warfare, Security Through Diversity, Reputation Management, Content Filtering, Data Loss Protection.

**Text Books:**

1. Vacca J R, Computer and Information Security Handbook, 2nd edition, Elsevier / Morgan Kaufmann, 2013.
2. Belapure S, Godbole N, Cyber Security, Wiley, 2011.

**Reference Books:**

1. Gogolin G, Digital Forensics Explained, CRC / Auerbach, 2013.
2. Godbole N, Information Systems Security, Wiley, 2015.
3. Wu C H, Irwin J D, Introduction to Computer Networks and Cyber Security, CRC Press, 2013.

4. Singer P W, Friedman A, Cyber Security and Cyber War: What Everyone Needs to Know, Oxford University Press, 2014.
5. Boddington R, Practical Digital Forensics, Packt, 2016.
6. Drake J J, Lanier Z, et al., Android Hacker's Handbook, Wiley, 2014.
7. Graham J, Howard R, Olson R, Cyber Security Essentials, CRC Press, 2010.
8. Hadnagy C, Wilson P, Social Engineering: The Art of Human Hacking, Wiley, 2010

## Course Outcomes

By the end of this course students will be able to:

- Effectively use cyber security and computer forensics software/tools
- Measure the performance and troubleshoot cyber security systems.
- Protect the network from both internal and external attacks
- Provide new security solutions and and implement the same confidently.

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

### VIII SEMESTER B.Tech (CSE) - CBCS Regulations-2018

## IMAGE PROCESSING (Elective)

No.of Credits: 3 Instruction Hours/ Week: 3

### Course Objectives:

The course is designed to

- Understand the fundamentals of Digital imaging and Image Processing techniques.
- Discuss the concepts of image compression and segmentation.
- Evaluate the performance of image processing algorithms and systems.

### UNIT I

Introduction: Fundamentals of Image Processing, Applications of Image Processing, Human Visual Perception, Introduction to Image Formation, Sampling and Quantization, Binary Image, Three-Dimensional Imaging, Image file formats. Color and Color Imagery: Perception of Colors.

### UNIT II

Image Transformation: Fourier Transforms, Discrete Cosine Transform, Walsh-adamard Transform, Karhaunen-Loeve Transform or PCA. Discrete Wavelet Transform: Wavelet Transform, Extension to 2D Signals, Lifting Implementation of the Discrete Wave Transforms.

### UNIT III

Image Enhancement and Restoration : Introduction, Distinction between image enhancement and restoration, Histrogram-based Contrast Enhancement, Frequency Domain Methods of Image Enhancement, Noise Modeling, Image Restoration, Image Reconstruction, Image Segmentation.

### UNIT IV

Recognition of Image Patterns : Introduction, Decision Theoretic Pattern Classification, Baesian Decision Theory, Nonparametric Classification, Linear Discriminant Analysis, Unsupervised Classification Strategies-clustering, K-means clustering algorithm, Syntactic Pattern Classification, Syntactic Inference, Symbolic Projection method. Texture and Shape Analysis.

### UNIT V

Fuzzy Set Theory in Image Processing : Introduction, Use of Fuzzy Image, Preliminaries and Background, Image as a Fuzzy Set, Fuzzy Methods of Contrast Enhancement, Image Segmentation using Fuzzy Methods, Fuzzy Approaches to Pixel Classification, Fuzzy c-Means Algorithm, Fusion of Fuzzy logic with neural network. Image mining and Content-Based Retrieval.

**Text Books:**

1. Maria Petrou and Costas Petrou , “Image Processing the Fundamentals”, John-Wiley and Sons Publishers, 2nd edition, 2010.
2. Rafael C. Gonzalez , Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", 2nd edition, Gatesmark Publishing, 2009.
3. Tinku Acharya and Ajoy K. Ray, “Image Processing Principles and Applications”, John Wiley & Sons publishers, 2005.

**Reference Books:**

1. Rafael Gonzalez and Richard E. Woods Digital Image Processing, 4th edition, Pearson, 2017.
2. Anil K Jain, Fundamentals of Digital Images Processing, First edition, Pearson, 2015.

**Course Outcomes**

By the end of this course students will be able to:

- Understand Image representation and modeling.
- Design and apply image enhancement and restoration techniques
- Develop image processing techniques for assisting digital forensics

**CSPEP 806**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VIII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## PROGRAM ELECTIVE - III LABORATORY

No.of Credits: 1 Instruction Hours/Week: 2

At least 8 assignments are to be given covering the topics of the course chosen under Program Elective - III.

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**CSPWP 807**

## SRI VENKATESWARA UNIVERSITY :: TIRUPATI

**VIII SEMESTER B.Tech (CSE) – CBCS Regulations-2018**

## PROJECT WORK PHASE-2

No.of Credits: 9 Instruction Hours/ Week: 18

In the current semester, the Project work started in the previous semester shall be continued.The steps of the Project work part –II shall be as follows:

| Research-Oriented Project Work | Application-Oriented Project Work |
|---|---|
| 5. System Design/ Algorithm Development | 5. Software Design |
| 6. Proof of Correctness | 6. Test Case Design |
| 7. Performance Analysis | 7. Coding |
| 8. Performance Measurement | 8. Testing |
| 9. Results and Conclusions | 9. Conclusions |

At the end of the current semester, a Comprehensive Report of the Project Work shall beprepared and submitted for evaluation.