

## **BSC- COMPUTER SCIENCE- COURSE OUTCOMES**

### **Semester I:**

#### **Problem Solving Using Computers and 'C' Programming (BS12001)**

- Know and understand the foundation of computing, programming and problem- solving using computers.
- Illustrate the ability to analyse a problem and devise an algorithm to solve it.
- Write an algorithm, and flowcharts for arithmetic and logical problems
- Recognize structured programming approach.
- Apply the basic concepts and terminology of programming in general.
- Describe the algorithms using the 'C' language, debug and execute programs.

#### **Database Management System (BS12002)**

- Interpret the fundamental concepts of DBMS (PL/PgSQL)
- Develop an ability to understand database management operations
- Create an E-R Model for given requirements and convert the same into relational model.
- Analyse the raw data and design data dependencies.

#### **Discrete Mathematics (BS12003)**

- Demonstrate the skills of mathematical reasoning: Deduction, Proof and Recursive Thinking.
- Write an argument using logical notation and determine if the argument is or is not valid.
- Prove mathematical theorems using the Principles of Mathematical Induction.
- Construct a solid foundation in some of the new and different branches of Mathematics like Logic, Set Theory and Lattices.
- Distinguish among various counting principles and apply them accordingly.
- Determine properties of relations, identify equivalence and partial order relations, sketch relations.
- Know the wide nature of the subject through various mathematical skills and techniques and apply them in different disciplines.
- Inculcate a positive attitude towards Mathematics and enjoy triumph of solving interesting problems from different areas of the subject.

#### **Calculus and Number Theory (BS12004)**

- Ability to describe various relations in Number theory.
- Ability to explain the notion of continuity as related to functions and to relate an intuitive notion of continuity to the mathematical definition of continuity.

- Ability to compare and contrast the ideas of continuity and differentiability.
- Ability to distinguish between linear, nonlinear, partial and ordinary differential equations.
- Ability to identify areas in mathematics and other fields where Calculus is useful.
- Habit to work effectively with others to complete homework and class assignments.

### **Descriptive Statistics (BS12005)**

- Organize, manage and present data. Analyse statistical data graphically using frequency distributions and cumulative frequency distributions.
- Calculate and apply measures of central tendency for grouped and ungrouped data. Represent mode, median, quartiles graphically.
- Calculate and apply measures of dispersion for grouped and ungrouped data.
- Analyse statistical data using measures of central tendency, dispersion.
- Calculate and apply measures of skewness and kurtosis. Analyse natures of skewness and kurtosis using graphs.
- Apply Likert scale, classification, relationship among different class frequencies (up to two attributes), calculate coefficient of association and interpret.

### **Mathematical Statistics: (BS12006)**

- Understand and apply methods of Counting Principles, Permutation, and Combination to real life situations.
- Understand concepts of experiments, sample space, events to be applied further in the calculation of probabilities.
- Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
- Translate real-world problems into probability models.
- Understand and calculate conditional probabilities of random variables.
- Understand and apply discrete and continuous probability distributions to various real-life problems.

### **Electronics-I- Semiconductor Devices and Basic Electronic Systems (BS12007)**

- Understand the basic knowledge of semiconductor devices and their working through characteristics.
- Differentiate between different types of rectifiers, Understand the concept of filter identify different voltage regulator circuits
- Describe working about BJT and its I-V Characteristics and compare different transistor configuration and amplifier
- Differentiate between E-MOSFET and D-MOSFET

### **Electronics-I Principles of Digital Electronics (BS12008)**

#### **Learner will be able to**

- Understand and represent numbers in powers of base and translate one number system to another and solve binary arithmetic problems

- Identify gates, examine and solve Boolean Algebraic expressions for designing digital circuits using K-Maps
- Analyse, design and construct combinational logic circuits.

### **Practical Course based on (BS12001 and BS12002)**

#### **Problem Solving using Computer and ‘C’ Programming and Database Management System (Subject Code: BSP12009)**

- Understand the program development life cycle.
- Solve simple computational problems using modular design and basic features of the ‘C’ language.
- Solve real world computational problem.
- Understand basic query processing operations. Design E-R Model for given requirements and convert the same into database tables.

#### **Mathematics Practical (BSP12010)**

- Construct a solid foundation in the field of programming handling various mathematical concepts using ‘C’ Programming.
- Write C- Programs more efficiently with the help of various mathematical problems.

#### **Statistics Practical 1 (BS12011)**

- Tabulate and make frequency distribution of the given data.
- Apply various graphical and diagrammatic techniques and interpret.
- compute various measures of central tendency, dispersion, skewness and kurtosis.
- fit the Binomial and Poisson distributions.
- compute the measures of attributes.
- The process of collection of data, its condensation and representation for real life data.
- Study free statistical softwares and use them for data analysis in project.

#### **Electronics Practical (BSP12012)**

- Identify and measure different components, measure ac/dc voltages, frequency and amplitude of a signal, relate to the electronic communication between devices, understand the basics of analog and digital electronics,
- Describe the characteristics of semiconductor devices, illustrate applications in voltage regulated power supplies and amplifiers.
- Construct basic combinational circuits and verify their functionalities.
- Ability to apply knowledge and perform electronics experiments as well as to analyse and interpret data of electronics in computer science.
- Ability to work effectively and responsibly as a team member to perform experiments and presentations.
- Develop skills in scientific writing to make lab reports, activity reports, collecting relevant information.

- Acquire skills in handling scientific instruments, planning and performing Laboratory experiments using modern tools and techniques.
- Ability to communicate effectively in oral and written communication skills

### **Semester II:**

#### **Advanced ‘C’ Programming (BS22001)**

- Construct the code organization with complex data types, structures and preprocessor directives.
- Write programming code for files manipulation.
- Recognize the advanced concepts of programming using the ‘C’ language.

#### **Relational Database Management System (BS22002)**

- Perform database management operations
- Apply the fundamental concepts of RDBMS (PL/PgSQL)
- Analyse the basic issues of transaction processing and concurrency control
- Apply their mind to implement data security.

#### **Graph Theory (BS22003)**

- Know about the new branch of mathematics - Graph Theory and its applications which will help to construct a strong foundation in the subject.
- Define graphs, digraphs and trees, and identify their main properties.
- Classify different types of graphs and identify the areas of their applications.
- Formulate and relate real life situations with different types of graphs and techniques used in Graph Theory.
- Describe and apply some basic algorithms for graphs.
- Demonstrate different traversal methods for trees and graphs.
- Determine the wide nature of the subject through various key concepts in Graph Theory and their real-life applications.

#### **Linear Algebra (BS22004)**

- Ability to apply computational techniques and algebraic skills essential for the study of systems of linear equations.
- Ability to set up equations based on real life situations and solve system of linear equations.
- Ability to describe  $R^2$  and  $R^3$  spaces, as well as conceptually extend these results to higher dimensions.
- Ability to explain the concept/theory in linear algebra.
- Ability to apply computational techniques and algebraic skills essential for the study of eigenvalues and eigenvectors, orthogonality and diagonalization. (Computational and Algebraic Skills).

- Ability to recognize the basic applications of the chosen topics and their importance in the modern science and search engines.
- Provide insight into the applicability of Linear algebra.

### **Methods of Applied Statistics (BS22005)**

- Calculate and interpret the correlation between two variables.
- Represent graphically and calculate the simple linear regression and non-linear regression equations for a set of data. Interpret the results of bivariate regression and correlation analysis, for forecasting.
- Calculate multivariate regression for three variables. Interpret the results of multivariate regression for forecasting.
- Analyse the trend in time series and how to remove it.

### **Continuous Probability Distributions and Testing of Hypothesis (BS22006)**

- Apply the knowledge of standard continuous probability distributions to solve real life problems by calculating probabilities.
- Apply the concepts and definitions related to testing of hypothesis.
- Perform Test of Hypothesis for a population parameter for single sample and two sample cases. Understand the concept of p-values.
- Ability to generate model sample from given distributions.
- Apply concepts of hypothesis testing, parametric and non-parametric tests in research methodology at higher level studies and applications.

### **Enhance Visualization Skills -Electronics-I Instrumentation System (BS22007)**

- Define different OPAMP parameters, comparison of ideal and practical parameters. Identify and discuss OPAMP Applications
- Ability to classify different types of ADC and DAC, conversion of digital to analog and vice-versa
- Explain working principle of sensors and transducers, their classification, Identify and apply the knowledge of sensors in smart instrumentation system

### **Electronics-II (BS22008) Basics of Computer Organization**

- Analyse, design and implement a sequential logic circuit.
- Classify different semiconductor memories, recognize the principal memory technologies from a hierarchical view point with emphasis on cache memory.
- Identify and explain different parts of CPU and I/O devices, Organize them according to their functions.

### **Advanced 'C' Programming and Relational Database Management System (BSP22009)**

- Construct the code organization with complex data types, structures and pre-processor directives.

- Write programming code for files manipulation.
- Recognize the advanced concepts of programming using the 'C' language.

### **Mathematics Practical (BSP22010)**

- Demonstrate skills of programming handling the mathematical concepts using a new mathematical software Maxima and 'C' Programming.
- Develop C- Programs more efficiently with the help of arrays in 'C'.
- Learn new Mathematical Software MAXIMA.
- Applying commands in MAXIMA verify all theoretical concepts learned in class.

### **Statistics Practical 2 (BSP22011)**

- Analyse the relationship between two variables using scatter plot.
- Compute coefficient of correlation, coefficient of regression.
- Apply and Fit various regression models and to find best fit.
- Apply and Fit the Normal distribution.
- Perform Test of Hypothesis for a population parameter for single sample and two sample cases. Understand the concept of p-values
- Analyse the trend in time series and how to remove it.
- Generate model sample from given distributions.
- Explain the importance and functions of different statistical organizations in the development of nation.
- Report writing on application of some statistical technique in the field of computers.

### **Electronics Practical (BSP22012)**

- Arrange, assemble and design a working model using simulation software like PSPICE/Circuit Mod
- Demonstrate the application of OPAMP, ADC and DAC and its applications
- Experiment and understand different sensors
- Apply the design procedures to design basic sequential circuits.
- Explain the working of RAM, ROM, Identify different parts of computer hardware like Motherboard, Hard disk, CDROM
- Develop skills in scientific writing to make lab reports, project reports, collecting relevant information.
- Acquire skills in handling scientific instruments, planning and performing Laboratory experiments using modern tools and techniques.

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