Choice Based Credit System
Scheme of Examination
Fifth Semester - Bachelor of Science (Computer Science)

Subject- Computer Science
Code: BSCC-501B

UNIT –I

Basic Concepts of Data File system, its advantages and disadvantages. Concepts of DBM: Data, Information, Database, Components of DBMS, Architecture of a database system- physical, conceptual and user level, Data Independence- Logical and Physical, DBMS terminology, Data Dictionary, Database Models: Network, Hierarchical and Relational Model, Features and Comparison of the three models, Concepts of Multitier Architecture in databases. RDBMS: Definition, Components, Terminology, Difference with DBMS, ER- Model, ER-Diagram, ER-concepts, types of relationships. Codd's 12 rules, Normalization: Introduction, Concepts associated with normalization, key terminology: primary, candidate, foreign, alternate keys steps involved in normalization 1st, 2nd, 3rd, BCNF. Relational Algebra: Formal Definition, Fundamental Operations select, project, union, set, difference, Cartesian product & rename.

UNIT-II

Introduction to SQL: Components of SQL, DDL, DML, Query Language, DCL, TCL, SCL etc. Invoking sql*plus. The oracle data types tow dimensional matrix creation. Insertion, updation, deletion operations, the many faces of select command, creating tables using query, inserting data using query, modifying the structure of tables, renaming tables, dropping tables, dropping columns, logical operators, range searching, pattern matching, use of Alias, Oracle Functions. Accessing data from multiple tables. Set Operation: Union, Intersect, Minus. Data Constraints: I/O constraints, Business rule constraints. Grouping data from tables. Joins:Equi-Join Self- Join, Sub-Queries. Views, Sequences, Synonyms, use of savepoint, rollback & commit commands, creating user accounts, granting permissions, revoking permission.

UNIT-III

Introduction to Visual BASIC, VB Environment- User Interface screen, Forms, Project Explorer, Properties, Code Window, VB Menu options, Tool Bar, adding components to tool bar. VB Controls: Text Box, Label, Frames, Option Buttons, Check Box, Line, Command Button, Image, Picture Box, Data Types, Variable declarations, Constants, Scope of Variables, VB file, Naming Conventions, Default property for each Control. Operators- logical, relational, mathematical operators. Statements- Simple, using while & until in Do-Loop Structure.

UNIT-IV

Using MsgBox an Input Box Statement and Functions, Input Validation, Writing Events-adding & calling forms in a project, calling Event Procedures, Debugging VB Projects, using common Dialog Box, Writing Procedures- subroutines & functions and its calling methods, using multiple forms, using standard code modules. Using An about Box and Splash Screen, Using Sub Main for Startup, using List Boxes and combo Boxes, Creating and using Menu, Using String Function, Control Arrays, Case Structure. Arrays- Single and multi dimensional arrays, User Defined Data Types .

UNIT-V

Handling Data Files – Sequential file Organization, Trapping Program Errors, Sequential Data Files. Accessing Database files- Data Bound Control (DAO & ADO) objects, Navigating Database in Code, Updating database file, Preventing Errors. Advanced Data Handling- Using Grids, Validation, Setting a recordset, repositioning the records, finding & of using SQL as Record Source and changing at runtime . Date Report Designer – Creating Data Environment and linking Data Report.

REFERENCE:-

- Introduction to Database to Data System – C.J. Date
- Introduction in Database Management System- by Bipin Desai
- Introduction to Database Mgt. System by ISRD group (TMH)
- SQL, PL/SQL The Programming Language of Oracle-by Ivan Bayross (BPB)
- Carnell- VB6- From the Ground up –TMH
- Deitel- VB 2005- Hw to program – Reason
- Stephons – VB 2008 Programmer's Reference- Wiley
- Zoke – VB8- Cengage

Choice Based Credit System

Scheme of Examination

Fifth Semester - Bachelor of Science (Computer Science)

PHYSICS

Paper: Quantum Mechanics and Spectroscopy

Code: BSCC-502B

UNIT-I

Quantum Mechanics-1: Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

UNIT-II

Quantum Mechanics-2: Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator. Orbital angular momentum, azimuthal quantum numbers and space quantization. Radial solutions and principle quantum number. Hydrogen atom.

UNIT-III

Atomic Spectroscopy: Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, Vector model L-S and J-J coupling. Doublet structure of alkali spectra. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

UNIT-IV

Molecular Spectroscopy:Spectra: Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Rotational Raman spectra and Vibrational Raman spectra. Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. FrankCondon principle, singlet and triplet states. Fluorescence and phosphorescence.

UNIT-V

Nuclear Physics: Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter, Scintillation counter, Cloud chamber. Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra – velocity and energy of alpha par ticles. Geiger-Nuttal law. Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus, Bohr's postulate of compound nuclear reaction, Semi empirical mass formula, Shell model, Liquid drop model, Nuclear fission and fusion (concepts).

References:

1 Quantum Mechanics: V. Devanathan, Narosa Publishing House, New Delhi, 2005.
2 Quantum Mechanics: B. H. Bransden, Pearson Education, Singapore, 2005.
3 Quantum Mechanics: Concepts and Applications, Nouredine Zettili, Jacksonville State University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009.
4 Introductory Quantum Mechanics & Spectroscopy: K.M. Jain, South Asian Publications.
5 Physics of Atoms & molecules: B.H. Bransden & C.J. Joachaim, Pearson Education, Singapore, 2003
6 Fundamentals of Molecular Spectroscopy: C.M. Banwell & M. McCash, McGraw Hill (U.K. edition)

Choice Based Credit System
Scheme of Examination
Fifth Semester - Bachelor of Science (Computer Science)
Subject- MATHEMATICS (MATRIX)

Code: BSCC-503C

UNIT – I

Rank of a matrix, Eigen values, Eigen vectors, Characteristic equation of a matrix, Cayley Hamilton theorem and its use in finding inverse of matrix,

UNIT- II

Application of matrix to a system of linear (both homogenous and non - homogenous) equations,

UNIT- III

Theorems on consistency and inconsistency of a system of linear equations, Solving the linear equations with three unknowns.

UNIT – IV

Relation between the roots and coefficients of a general polynomial equation in one variable, Transformation of equations, Descarte's rule of signs,

UNIT – V

De Moivre's theorem and its applications, Direct and inverse circular and hyperbolic functions, Expansion of trignometrical function

Text Books :-

1. S.L. Loney – Plane Trigonometry Part II
2. K.B. Datta – Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd. New Delhi 2000
3. Chandrika Prasad – A Text Book on Algebra and Theory of Equations, Pothishala Pvt.Ltd. Allahabad

Reference Books :-

1. P. B. Bhattacharya, S. K. Jain and S.R. Nagpaul, First Courses in Linear Algebra, Wiley Eastern, New Delhi. 1983
2. R.S. Verma and K.S. Shukla, Text Book on Trigonometry Pothishala Pvt. Ltd.

Choice Based Credit System
Scheme Of Examination
Fifth Semester - Bachelor Of Science (Computer Science)
System Administration And Maintenance- II
CODE: BSCC-505A

UNIT I

INTRODUCTION System software and machine architecture, The Simplified Instructional Computer (SIC) Machine architecture, Data and instruction formats addressing modes instruction sets I/O and programming.

UNIT II

ASSEMBLERS: Basic assembler functions - A simple SIC assembler, Assembler algorithm and data structures, Machine dependent assembler features Instruction formats and addressing modes, Program relocation -Machine independent assembler features, Literals, Symbol, defining statements Expressions,One passassemblers and Multi pass assemblers, Implementation example, MASM assembler.

UNIT III

LOADERS AND LINKERS:- Basic loader functions, Design of an Absolute Loader, A Simple Bootstrap Loader, Machine dependentloader features, Relocation, Program Linking, Algorithm and Data Structures for Linking Loader, Machine, Independent loader features, Automatic Library Search, Loader Options - Loader design options- Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

UNIT IV

MACRO PROCESSORS:- Basic macro processor functions, Macro Definition and Expansion, Macro Processor Algorithm and data structures, Machine-independent macro processor features - Concatenation of Macro Parameters –Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters-Macro within Macro, Implementation example, MASM Macro Processor, ANSI C Macro language.

UNIT V

SYSTEM SOFTWARE TOOLS: Text editors - Overview of the Editing Process User Interface Editor Structure. Interactive debugging systems, Debugging functions and capabilities, Relationship with other parts of the system– User-Interface Criteria.

TEXT BOOK

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2000.

REFERENCES

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan “Systems Programming”, Tata McGraw-Hill Edition, 1972.

Choice Based Credit System
Scheme Of Examination
Fifth Semester - Bachelor Of Science (Computer Science)
Software Testing Concepts-II
Code: BSCC-505B

UNIT I

INTRODUCTION

Testing as an Engineering Activity – Role of Process in Software Quality – Testing asa Process– BasicDefinitions Software Testing Principles The Tester's Role in a Software Development Org anization –Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples –Developer/Tester Support for Developing a Defect Repository.

UNIT II

TEST CASE DESIGN

Introduction to Testing Design Strategies– The Smarter Tester – Test Case Design Strategies – Using BlackBox Approach to Test Case Design Random Testing –
Requirements based testing positive and negative testing -— Boundary Value Analysis– decision tables- Equivalence Class Partitioning state-based testing– cause- effect graphing – error guessing - compatibility testing – user documentation testing–
domain testing Using White–Box Approach to Test design – Test Adequacy Criteria – static testing vs.structural testing – code functional testing -
Coverage and Control Flow Graphs – Covering Code Logic –Paths – Their Role in White– box Based Test Design –code complexity testing – Evaluating Test AdequacyCriteria.

UNIT III

LEVELS OF TESTING

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The TestHarness – Running the Unit tests and Recording results
Integration tests – Designing Integration Tests –Integration Test Planning – scenario testing – defect bash elimination –SystemTesting – types of system testing - Acceptance testing – performance testing - RegressionTesting – internationalization testing – ad-hoctesting - Alpha – Beta Tests – testing OO systems – usability and accessibility testing

UNIT IV

TEST MANAGEMENT

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items –
testmanagement test process Reporting Test Results The role of three groups in Test Planning an d Policy Development – Introducing the test
specialist Skills needed by a test specialist Building a Testing Group.

UNIT V

CONTROLLING AND MONITORING

Software test automation – skills needed for automation – scope of automation – design and architecture forautomation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developinga review program – Components of Review Plans– Reporting Review Results. – evaluating software quality –defect prevention – testing maturity model

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

REFERENCES:

1. Boris Beizer, "Software Testing Techniques", Second Edition,Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.