"Education for Knowledge, Science, and Culture"
- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur
(Autonomous)

KOLHAPUR (AUTONOMOUS)

B.SC. Part –II (Computer Science Entire) CBCS Syllabus with effect from June, 2019

Semester III

Sr. No.	Paper code	Title of the Paper	Internal Mark	External Mark	Total Mark
1	1300 C	Linear algebra & Numerical methods	20	80	100
2	1301 C	Computer Instrumentation And Organization, Processor	20	80	100
3	1304 C	Introduction to RDBMS using MySQL and Object Oriented Programming Using C++	20	80	100

Semester IV

Sr. No.	Paper code	Title of the Paper	Internal Mark	External Mark	Total Mark
1	1300D	Computational Geometry And Operation Research	20	80	100
2	1301D	Communication Principal & 8051 Microcontroller Interfacing Programming	20	80	100
3	1304 D	Introduction To Data Structures Using C++ & Cyber Security Essentials	20	80	100

Sr. No.	Paper code	Title of the Paper	Internal Mark	External Mark	Total Mark
1	1310	Math lab course III	20	80	100
2	1311	Electronic lab course III & IV	20	80	100
3	1304	Introduction to RDBMS using MySQL	20	80	100

Nature of Question Paper for all (Theory) papers U.G. Courses under Faculty of Science.

Nature of Question Paper Total   80 Marks

Section-I

Q.No.1 Multiple Choice based objective type question   08Marks
(Four options for each question be given)
Q. No. 2 Attempt any two of the following–long Answers (out of three) 16Marks
Q. No. 3 Attempt any four of the following-Short Answers- (out of six) 16Marks

Section-II

Q. No.4 Multiple Choice based objective type question   08Marks
(Four options for each question be given)
Q. No.5 Attempt any two of the following–long Answers (out of three)   16Marks
Q. No. 6 Attempt any four of the following-Short Answers -(out of six)   16Marks

Course Outcome:

1. To make use of computational techniques & algebraic skills essential for the study of systems of linear equations, matrix algebra , vector spaces, eigen values & eigenvectors, orthogonality & diagonalization.
2. To make use of visualization, spatial reasoning, as well as geometric properties & strategies to model, solve problems & view solutions especially in $R2$ & $R3$ as well as conceptually extend these results to higher dimensions.
3. To critically analyze & construct mathematical arguments that relate to the study of introductory linear algebra, explain methods of numerical integration, numerical solutions of ordinary differential equations. Illustrate numerical solutions of non – linear equations.
4. To apply numerical analysis which has enormous application in the field of science and some fields of engineering. Demonstrate the finite precision computation

Unit I:- Linear Equations and Matrices   10

Matrices, Matrix Transformations, Linear systems, Results on system of linear equations and invertible matrices (statements only), Solutions of Systems of Linear Equations, Gaussian Elimination method, Gauss-Jordan method, LU-Factorization method

Unit II:- Real Vector spaces   12

Ring, Integral Domain, Field (only definitions), Vector Spaces, Subspaces Linear Dependence and Independence–Definition & examples, Basis and Dimension, Rank and Nullity of matrix, Inner product space, Definition and examples, Properties of inner product, Ortho normal Basis in R, Gram-Schmidt process.

Unit III:-Eigen values, Eigen vectors and diagonalization   8

Eigen values and Eigen vectors, Diagonalization, Cayley Hamilton theorem(Statement only) and examples.

Unit IV:- Linear Transformations and Matrices   8

Definitions and Examples, The Kernel and Range of a Linear transformation, The Matrix of a Linear Transformation

Note:-All theorems in sections 1.4, 2.6,2.7,3.2,4,3 are without proof.

REFERENCEBOOKS

Elementary Linear Algebra with Applications, Howard Anton, Chris Rorres, John Wiley and sons. 7th Edition (1994).

Linear Algebra, Schaum Series.

A textbook of Matrices, Shanti Narayan, P.K. Mittal, S. Chand.

Section II

(Numerical method)

Unit - I : Solution of Non – linear Equations   09

1.1 Introduction 1.2 Muller's method : Algorithm and examples 1.3 Regula – Falsi method : Algorithm ,graphical representation and examples 1.4 Newton Raphson method : Algorithm ,graphical representation and examples 1.5 Secant method : Algorithm and examples

Unit - II : Numerical Interpolation   09

2.1 Interpolation , Equally and Unequally spaced data 2.2 Definitions of forward difference ( ) ,Backward difference ( ) and Shift operator (E) 2.3 Elementary results on 2.4 Fundamental theorem of difference calculus (with proof) 2.5 Newton – Gregory Forward interpolation formula (with proof) and Examples 2.6 Newton – Gregory Backward interpolation formula (with proof) and Examples 2.7 Lagrange's interpolation formula (with proof) and examples 2.8 Newton's divided difference formula (with proof) and examples

Unit - III : Numerical Intgration   10

3.1 Introduction of numerical integration 3.2 General Quadrature formula (without proof) 3.3 Trapezoidal rule (with proof) and examples 3.4 Simpson's rule (with proof) and examples 3.5 Simpson's rule (with proof) and examples 3.6 Gauss Quadrature Formula (with proof) and examples

Unit - 4 : Solution of first order ordinary differential equation   09

4.1 Introduction of first order ordinary differential equation 4.2 Euler's method and examples 4.3 Euler's modified method and examples 4.4 Runge – Kutta method (second and fourth order) and examples 4.5 Simultaneous first order differential equation by Runge-Kutta method (without proof) and examples

REFERENCE BOOKS :

1. Introductory Methods of Numerical Analysis, S.S. Sastry, 3rd edition, Prentice Hall of India, 1999.

2. Finite differences and Numerical Analysis, H.C. Saxena, S. Chand and Company.

3. Numerical Analysis, Balguruswamy.

4. Calculus of Finite Differences and Numerical Analysis, P. P. Gupta, G. S. Malik and S. Gupta, Krishna Prakashan Media (P) Ltd.

5. Computer oriented Numerical methods, A. B. Auti Tech-max publications

6. Applied Numerical Methods, S.S.Patil, Electrotech Publication, Engineering series, 3rd edition.

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

B.Sc. Part –II (Computer science Entire) CBCS Syllabus with effect from June, 2019 Semester: III

Electronics -Paper- III
ElectronicsGEC-1301 C

COMPUTER INSTRUMENTATION AND OR GANIZATION, PROCESSOR PROGRAMMING
Theory: 60 Hours (75Lectures) credits-4

Course Outcome:

1. To explain principle of operation for various sensors. Describe functional blocks of different types of Digital instruments and data acquisition system.
2. To select appropriate instrument for the measurement of electrical parameter professionally. Design Digital to Analog Converters (DAC) and Analog to Digital Converters (ADC).
3. To understand the basic structure of computer organization.
4. To use instructions for different addressing modes and construct an assembly language programs for given task using assembler.

Section – I

Computer instrumentation

Unit-I Sensors: (12)

Definition of sensors and transducers. Classification of sensors: Active and passive sensors. Specifications of sensor: (Accuracy, range, linearity, sensitivity, resolution, reproducibility). Temperature transducers: Resistance temperature detector (RTD), The roisters, Thermocouple (LM-35 and AD590), optical sensor (LDR), displacement sensor (LVDT), Passive Infrared sensor (PIR), ultrasonic sensor, Hall effect transducer, and Proximity sensors.

Unit-II Signal Conditioning: (08)

Introduction to signal conditioning. Signal conditioning of passive sensors using bridge circuit: Wheat stone's bridge, Three OP-amp instrumentation amplifier, Filters: active and passive filters. Op- Amp based filters: Low Pass Filter, High Pass Filter, Band Pass Filter, Band reject filter.

Unit- III Data Converters: (09)

Digital to Analog Converter (DAC): Resistive divider, R-2R ladder, Parameters: (Linearity, resolution, accuracy), Analog to Digital Converter: Types of ADC: Flash, Successive approximation. Parameters of ADC (Linearity, resolution, conversion time, accuracy)

Unit-IV Digital Instruments and Data Acquisition (08)

Introduction, Digital MultiMate's, Digital Frequency Meter, Digital Tachometer, Digital pH Meter, Digital Phase Meter, Block Diagram of CRO, Generalized Data Acquisition System, Data Logger.

Recommended Books:

1. Sensors & Transducers: Dr. A. D. Shaligram: CTC publications Op-Amps and Linear Integrated Circuits: Ramakant Gaikwad PHI: 4th Ed.
2. Electronic Instrumentation: H. S. Kalsi: TMH: 2nd Edition
3. 3. Modern Electronic Instrumentation and Measurement Techniques: Albert D. Helfrick, William D. Cooper: PHI publications
4. Electronic measurements: K.A.Bakshi, A.V.Bakshiand, U.A.Bakshi, Technical publications.
5. A Course in Electrical and Electronic measurements and Instrumentation: A.K. Sawhney: Dhanpat Rai & Sons Educational & technical publishers

Section II

Computer organization and microprocessor programming

Unit-I Computer Organization (12)

CPU organization: Different registers organization
Memory organization: Characteristics of memory systems, Cache memory, Memory Hierarchy, memory management (Segmentation, Paging),
I/O organization: Need of I/O inter face, IO mapped IO, Memory mapped IO, DMA concept, Serial bus interface (RS 232, USB), Parallel port, PCI bus, PCMCIA bus

Unit-II The Art of Assembly Language Programming (09)

Program development steps-Defining problem, Writing Algorithms, Flow chart Initialization checklist, Choosing instructions, Converting algorithms to assembly language programs. Assembly Language Programming Tools Editors, Assembler, Linker, Debugger Assembler directives and Operators

Unit-III Instruction Set of 8086 microprocessor (09)

Machinelanguageinstructionformat,Addressingmodes,InstructionSetGroupofinstructions: Arithmetic instructions, Logical instructions, Data transfer instructions, Bit manipulations instructions, Program control transfer or branching instructions, Process control instructions.

Unit-IV Assembly programming (08)

Introduction to assembler (NASM), Assembly directives, introduction to Programming (Flow chart, Algorithm, program), Assembly programs of Addition, subtraction, multiplication, division, code conversion, Array processing (Finding largest-smallest number, arranging elements in ascending – descending order).

Recommended Books:

1. Computer System Architecture: Morris Mano, Prentice-Hall of India
2. The Pentium Micro processor: James Antonio's
3. Micro process ors and Interfacing Programming and Hardware: Douglas V.Hall- TATAMc GRAW-HILL
4. The 8088 and 8086 microprocessor: Tribel, WalterA, Singh Pearson Publications New Delhi
5. Microprocessor and Microcontrollers: Latha, C. Murugeshwari Scitech Publications, Chennai.
6. The Intel Microprocessors: BarryB. Brey-Pearson Education A via.

B.Sc. Part–II (Computer science Entire) CBCS Syllabus with effect from June, 2019
Semester: III Computer Science-III
CC-CS-1304C
Introduction to RDBMS using MySQL and Object Oriented Programming Using C++
Theory: 60Hours (75Lectures) credits-4

Course Outcomes:

1. To draw DFD, ERD, create relational database using normalization and to understand MySQL basics, classify DDL, DML, DCL commands and data constraints, implement SQL operators and functions, build C++ program structure, memory management operators, this pointer and reference variable, default argument, function overloading and explain Object Oriented Programming Concepts.
2. To implement programs in C++ using control structures, inline function, explain class, access modifiers and define member functions of a class, static data members and member function, develop the programs using array of object, friend function and friend class.
3. To define a constructor, destructor and explain features of constructor, destructor and types of constructor, explain rules for operator overloading and implement programs using unary and binary operator overloading
4. To explain inheritance and define Base class and derived class and implement programs using types of inheritance, define polymorphism and explain types of polymorphism and implement programs using virtual function and explain concept of pure virtual function and abstract class.

Section-I

Introduction to RDBMS using MySQL

UNIT 1.IntroductiontoDataModelsand Normalization   09

Data Flow Diagram: concept of DFD, Symbols, Levels of DFDs, example. Entity Relationship Diagram: Concept of Entity, Attributes, Symbols, Types of relations, examples. Normalization: Forms of Normalization – 1NF, 2NF, 3NF, BCNF.

UNIT 2.Introductionto MySQL   10

what is MySQL ,features of MySQL, Basic Data types in MySQL, Classification of Commands : DDL-Create, Alter, Drop, Truncate, Comment, Rename, DML-Insert,Update,Delete,Select,DCL-Grant,Revoke,TCL-Commit,Rollback, Save point Data Constraints: Primary Key, Foreign Key, Unique, NOT Null, Check, Default. Select statement with where, group by, order by clause.SQL Operators: Logical, Relational/Comparison, Special - In, Between, Like. SQL functions: Arithmetic, Conversion, Date and time, Aggregate Functions

UNIT3. MySQL Sub-queries and Joins.   10

Introduction to Sub Queries: Sub queries, Nested Sub query. Introduction to Joins: Simple/Inner Two tables Join, Left, Right, Outer join, Self join. Views, Indexes, Sequence.

UNIT4. Introduction to MySQL Stored Procedures   09

Stored Procedures definition and concept. Structure and Syntax of Stored Procedures block. Stored Procedures variables, parameters, modes: IN,OUT, INOUT. Flow Control structures: if, case statements, Loops-Simple loop, while, repeat until Stored Procedures: Creating, Calling, Modifying, Deleting/Dropping procedures Introduction to Cursors, Trigger and its types.

Reference Book

- MySQL The Complete Reference By Vikram Vaswani
- Learning MySQL by O"reilly
- MySQL in Nut Shell by Dyer2ndEdition
- MySQL - Joel Murach 2012 edition

Section-II
Object Oriented Programming Using C++

Unit I: Introduction to C++and Basics of Object Oriented programming Concepts09

Introduction to C++: Structure of C++ program, Input and output Streams, Memory management operators: new and delete, this pointer, Reference variables, Control Structures (looping and branching statements), Functions: inline function, default argument, function overloading.**OOP Concepts:** Data abstraction, Data Encapsulation, Inheritance, Polymorphism, Message Passing.

Unit II Class and Object   10

Class declaration, Access modifiers: public, private, protected, defining member functions (inside the class and outside the class), Static data members and member function, Array of object, friend function and friend class.

Unit III: Constructor, Destructor, Operator Overloading   09

Constructor and Destructor: Definition and features of constructor, Types of constructor, Definition, syntax and use of Destructor **Operator overloading:** Concept, Rules for operator overloading. Unary and Binary Operator overloading

Unit IV: Inheritance and Polymorphism   09

Inheritance: Concept, Definitions of base class and derived class, Types of inheritance (Single, Multiple, Multilevel, Hierarchical and Hybrid inheritance) **Polymorphism:** Definition of polymorphism, Types of polymorphism, virtual function, pure virtual function, Abstract class.

Reference Books

1. K.R.Venugopal, Rajkumar Buyya, MasteringC++,Tata McGraw Hill.2010
Pooranchandra Sarang, Object Oriented Programming with C++,Prentice Hall.2004
Junaid Khateeb,Dr.G.T.Tampi, Computer Programmingin C++,Dreamtech.2010
Rajendra Akerkar, Sudhakar Bhoite.Glimpses of C++ Object Oriented Programming, Mahalaxmi publication.2002
D. Ravichandran, Programming with C++,McGrawHill.2001
Poonam Ponde, Object Oriented Programming with C++,Vision publication.2013

B.Sc.Part–II (Computer science Entire) CBCS Syllabus with effect from June, 2019
Semester IV Mathematics -Paper- IV
MathsGEC-1300D
Computational Geometry & Operation Research
Theory: 60 Hours (75 Lectures) credits -4

Course Outcomes:

1. To demonstrate knowledge of key notions & principles related to computational geometry. Experiment with the central problems in the area & the various approaches to tackling.
2. To identify familiarity with some of the basic algorithmic techniques of the area. Elaborate acquaintance with modern research in the field. To develops operational research from the verbal description of the real world system.
3. To formulate and solve the mathematical models (linear programming problems) for physical situations like production, distribution of goods and economics.
4. To solve the problems of transporting of products from origin to destinations with least transportation cost. Identify the resources required for projects and generate plan and work schedule.

Section-I
(Computational Geometry)

Unit I:- Two dimensional transformations   13

Introduction. Representation of points. Transformations and matrices. Transformation of points. Transformation of straight lines. Midpoint transformation. Transformation of parallel lines. Transformation of intersecting lines. Transformation: rotations, reflections, scaling, shearing. Combined transformations. Transformation of a unit square. Solid body transformations. Transformation and homogeneous co ordinates. Translation. Rotation about an arbitrary point. Reflection through and arbitrary line. Projection–a geometric interpretation of homogeneous co-ordinates. Overall Scaling. Point at infinity.

Unit II:- Three dimensional transformations   12

Introduction. Threedimensional–Scaling,shearing,rotation,reflection,translation. Multiple transformations. Rotation about–an axis parallel to co ordinate axes, an arbitrary axis in space. Reflection through–co ordinate planes, planes parallel to co ordinate planes, arbitrary planes. Affine and perspective transformations. Ortho graphic projections. Axonometric projections. Oblique projections. Single point perspective transformations. Vanishing points.

Unit III:- Plane Curves   9

Introduction. Curve representation. Non–parametric curves. Parametric curves. Parametric representation of a circle and generation of circle. Parametric representation of an ellipse and generation of ellipse. Parametric representation of a parabola and generation of parabolic segment. Parametric representation of a hyperbola and generation of hyperbolic segment.

Unit IV:- Space curves   6
Bezier Curves–Introduction, Definition, Properties (without proof), Curve fitting (up to n=3), Equation of the curve in matrix form (up to n= 3)

REFERENCE BOOKS

1. Mathematical elements for computer graphics, F. Davidand J. Alan Adams (McGraw Hill International Edition)
2. Computer graphics, Schaum series.
3. Computer Graphics handbook, Geometry and Mathematics, M.E.Mortenson, Industrial Press Inc

Section-II

(Operation Research)

Unit-I: Introduction to operation Research   04

Basics of operation research, Different definitions of operation research. Characteristics, scope, limitations of operation research

Unit-II: Linear Programming Problem   12

Basics definitions. Solution of L.P.P by Simplex method and examples. Solution of L.P.P by Big– M method and examples. Definition of Dual Problem. Relationship between solutions of primal and dual problems.

Unit-III: Transportation and Assignment problem   10

Basics of Transportation problem, Basic Definitions, Initial Solution, North–West corner method and examples, Matrix minima method and examples. Vogel's approximation method and examples, MODI method and examples, Maximization in transportation problem and examples, Unbalanced transportation problem and examples, Introduction to Assignment problem, Hungarian method and examples, Maximization in Assignment problems and examples, Unbalanced Assignment problem and examples, Assignment problems with restrictions and examples

Unit-IV: Theory of Games   09

Basics definitions, Saddle point and examples, Algebraic method for 2×2 size game and examples. Arithmetic method for 2×2 size game and examples, Principal of dominance, Dominance method and examples, Sub-game method for $2 \times n$ & $m \times 2$ size game and examples, Graphical method for $2 \times n$ & $m \times 2$ size game and examples.

REFERENCE BOOKS-

Operations Research, S.D.Sharma, Principles of Operations Research, H.M.Wagner,PrenticeHallof India, Operations Research, Gupta and Hira, Operations Research, J K Sharma (second edition).

B.Sc.Part–II (Computer science Entire) CBCS Syllabus with effect from June,2019 Semester: IV
Electronics -Paper- IV
ElectronicsGEC-1301 D
COMMUNICATION PRINCIPLES AND
8051 MICROCONTROLLER INTERFACING, PROGRAMMING
Theory: 60Hours (75Lectures) credits-4

Course Outcomes:

1. To understand different blocks in communication system and how noise affects communication using different parameters. Distinguish between different modulations schemes with their advantages, disadvantages and applications.
2. To differentiate between different pulse modulation and demodulation techniques. Know the different multiple access schemes.
3. To compare personal area network (PAN) technologies such as RFID Zigbee, Bluetooth and Wi-Fi. To draw and describe architecture of 8051 microcontroller. Understand the facilities of 8051 microcontroller.
4. To understand interfacing various peripheral devices to the microcontrollers. Write assembly language program for microcontrollers. Design microcontroller based system for various applications.

Section – I

Communication principles

Unit-I: Introduction to electronic communication (10)

importanceofcommunication,elementsofcommunicationsystem,electromagneticspectrum,types of communication. (serial and parallel), concepts of communication system: signal bandwidth, channelbandwidth,datarate,baudrate,nyquisttheorem,signaltonoiseratio,andchannelcapacity, error handling code- hamming code, Shannon theorem

Unit- II. Modulation and demodulation (10)

basics of modulation and demodulation introduction to modulation techniques: analog modulation (amplitude,frequencyandphase),digitalmodulation,pam,pcm,deltamodulation,modem -concept of ask, fsk, bpsk, qpsk and block diagram of modem using fsk.

Unit-III: Multiplexing and multiple access techniques (09)

study of multiplexing and multiple access techniques: space division multiplexing ,time division multiplexing , frequency division multiplexing , code division multiplexing, spread spectrum techniques:dsss,fhss,introductiontomultipleaccessandcorrespondingaccesstypes:fdma,tdma, cdma

Unit-IV Mobile communication (08)

Introduction to mobile communication, cellular concept, working fgsm, handover, introduction to gprs. Introduction to rfid, zigbee, bluetooth and wi-fi (comparison based on range, data rate, frequency, power).

Recommended Books:

1. Communication Electronics: Principles and Applications. L.E.Frenzel 3rd Edition.
2. Modern Electronic Communication. G.M. Miller 7th Edition.
3. Mobile Communication Jochen Schiller 2nd Edition.
4. Wireless Communications: Principles and Practice. R app aport
5. Wireless Communications and Networks. William Stallings

Section II

8051 Micro controller inter facing, programming

Unit-I: Introduction to micro controller (10)

Comparison of Microcontroller & Microprocessor, Study of 8051 and its Family (89C51, DS5000, 8031, 8032, 8052, 8751, Phillips RD2, 89C51VRD2).Architecture of 8051:InternalDiagram of 8051 and Study of Internal Blocks, Reset and Clock, Registers, Flags and Internal Memory, SFR, I/O Ports.

Unit-II:8051Instructionset (08)

Study of 8051 Instruction Set and Addressing Modes, Data transfer, Arithmetic, Logical, JUMP, Loops & CALL instructions, Bit manipulation Instructions.

Unit-III :Facilitiesin 8051 (10)

Timer and Counter: Timer and Counters, Timer modes, Programming the timers in Mode 1 using assembly and C.Time delay generation. Serial Port:Serialportof8051,RS 232standardandIC MAX–232, Baud rate in 8051, programming for transmitting character through serial port using assembly and C.

Unit-IV.: Real world interfacing (10)

Interfacing ADC, DAC, Stepper Motor, LCD, DC motor (PWM), Respective programming through embedded C. Study of advance micro controllers (ARM& PIC): Features and applications

Reference Books

1. 8051Microcontrollers 2ndEdition-MazidiPearson
2. 8051Microcontroller-Ayala Cengage
3. 8051Microcontroller-DeshmukhTMH

B.Sc.Part–II (Computer science Entire) CBCS Syllabus with effect from June, 2019
Semester: IV Computer science -Paper- IV
CC-CS-1304D
Introduction to Data Structure Using C++
and Cyber Security
Essentials Theory: 60 Hours (75 Lectures) credits -4

Course Outcomes:

1. To define Data Type, Data structure, Data object and explain Abstract Data Type, Linear and nonlinear data structures, explain Algorithm efficiency, array, types of array and sparse matrices.
2. To define Stack and demonstrate operations and static implementation of stack, explain applications of stack. To define queue and demonstrate operations and static implementation of queue and explain types of queues, explain Linked list and types of linked list.
3. To implement Stack and Queue using Linked list, define Tree and explain tree terminologies and tree traversal. To implement programs using searching and sorting techniques.
4. To explain working of computer network and importance of cyber security, understand different security threats and information security management explain access controls methods and wireless network security, understand cyber security laws and importance of security audit.

SECTION-I
Introduction to Data Structure Using C++

Unit I: Introduction to Data structure and Linear Data Structures (Array, Stack, Queue)   8

Definitions: Data types, Data Object, Data structure, Abstract Data Type (concept), Data Structure classification, Algorithm Efficiency: Complexity, Big O notation, Array: Definition, Types of array (one dimensional and multidimensional), sparse matrices.

Unit II : Stack and Queue   10

Stack: Definition of Stack, Operations on Stack, Static Implementation of stack Applications of stack: Recursion, inter conversions between infix, prefix and postfix expressions. Queue: Definition of Queue, Operations on Queue, Static Implementation of Queue. Types of Queue: Linear, Circular and Priority queue, Applications of Queue.

Unit III: Linked List, Trees, Searching and Sorting algorithms   10

Linked List: Concept of Linked List, Operations on Linked List, Implementation of Linear Linked List, Types of Linked List, Implementation of stack and queue using linked list Trees: Definition of tree, Tree terminologies, Types of Tree, Tree Traversal(in order, preorder, post order).

Unit IV: Searching and Sorting   9

Searching: Linear search and binary search Sorting: Bubble Sort, Selection Sort, Insertion sort, Merge Sort

Reference Books
1. Data Structure using C and C++-Rajesh Shukla
2. Data Structure using C and C++ -Tanenbaum
3. Data Structure using C++-E Balagurusamy
4. Data Structure using C++-Yashwant Kanetkar
5. Data Strucure using C++-D.S.Mali

Section–II
Cyber Security Essentials

Unit I : Introduction to Computer Network   6

Computer Network: Definition, Types of Network, Topologies, Network devices, Internet, Search Engines, Web Browsers, OSI Model, TCP IP Model, IP address scheme, switching techniques.

Unit II : Introduction to Cyber security   6

Introduction to Cyber Security: Definition, Importance, Computer ethics, Hacker, Hacking phases, Hacker classes, Mobile Device Security, File Security, Password Security, Browser Security, Email Security, Encryption, Decryption, Digital Signature, Firewall, types of Firewall, spoofing.

Unit III: Introduction to information security and threats   12

Security Threats: Definition, Types of Threats - Virus, Worms, Trojan Horse, Malware, R an software, Identity the fetch, .Web application threats. Torrent and infected websites. Firewall, types of firewall Antivirus-Definition, Types, features, advantages, limitations, difference between Firewall and Antivirus. Definition of attack, Types of Attacks, DoS attack, phishing,

Unit IV: Access Control and cyber security laws   14

Computer Forensics, Steganography, elements of information security and Introduction to Kali Linux **Access Controls:** Overview of Authentication and Authorization, Overview of Intrusion Detection Systems and Intrusion Prevention Systems. **Wireless Network Security-**Components of wireless networks, Security issues in wireless, Wi-Fi Security, Risk of Using Unsecured Wi-Fi, Bluetooth and its security **Cyber Security Laws:** Security Laws, Intellectual Property Rights, Security Audit. What is cyber crime and types of crime.

References:

1. Computer Networks -- Forozoun (TMH)
2. Computer Networks--Olifer (Wiley-India)
3. Computer Network-A S Tannenbum
4. Cyber Security for Beginners: Everything you need to know about it(Cyber security, Cyber war, Hacking) by Harry Colvin (Author)
5. How NOT To Use Your Smartphone by Rodney D Cambridge
6. Online Safety: Scams, SPAM, Viruses and Clouds (Cyber Security Community Book 1) AM. Perry
7. Cyber Security Essentials: James Graham, Richard Howard, Ryon Olson(E-book)
8. Network Security Secrets and Solutions – Stuart McClure, Joe Scambray, George Kurtz.
9. Information Assurance Handbook: Effective Computer Security and Risk Management Strategies – Corey Schou, Steven Hernandez.
10. Applied Network Security Monitoring: Collection, Detection, and Analysis– Chris Sanders, Jason Smith
11. E-Commerce and Security-Kjell Orsborn(E-book).

PRACTICALS-

Math lab course III
Course code- 1310 D

Mathematics-Lab-III: Linear Algebra & Numerical Methods

Practical number	Title of practical
1	Gauss Elimination method
2	Gauss Jordan method
3	LU Factorization method
4	Gram Schmidt process
5	Eigen values and Eigen vectors
6	Diagonalizable Matrix
7	Verification of Cayley Hamilton theorem
8	Inverse of a matrix using Cayley Hamilton Theorem
9	Muller's method
10	RegulaFalsi method and Newton Raphson method
11	Newton Forward and Backward interpolation
12	Lagrange's interpolation & Newton's divided difference formula
13	Trapezoidal, Simpson$^1/_3$ and Simpson$^3/_8$ rule
14	Gauss Quadrature formula
15	Computer programme for 1)Euler's method 2)Euler'smodifiedmethod 3)Runge Kuttamethod (secondandfourthorder)
16	Computer Programme for 1)Trapezoidal rule2)Simpson$^1/_3$rule 3)Simpson$^3/_8$rule

Mathematics-
Lab IV Math's
GEC-1300 D
Linear Algebra & Numerical Methods

Practical number	Title of practical
1	Plane Linear transformation1 Scaling, Shearing, Reflection and Rotation about origin
2	PlaneLineartransformation2 Rotation about arbitrary point, Reflection through arbitrary line Combined transformation matrix
3	Space linear transformation 1 Scaling, Shearing and Rotation about Co–ordinate axis Reflection through Co – ordinate planes , Translation Multiple transformations , Rotation about a line parallel to Co – ordinate axis , Rotation through planes which are parallel to Co – ordinate planes , Reflection through Arbitrary planes (algorithm only)
4	PlaneCurves1 Generation of points on circle and ellipse (Algorithm and Examples)
5	PlaneCurves2 Generation of points on parabola and hyperbola (Algorithm and Examples)
6	Bezier Curve : Generation of curve with $n = 2\ 3$
7	Linear programming Problem1 Simplex method(maximization and minimization problems)
8	Linear programming Problem2 Big–M method (maximization and minimization problems)
9	Initial solution of transportation problem North–West Corner method, Matrix minima method Vogel's approximation method
10	MODI method
11	Transportation problem-minimization
12	Maximization in transportation problem, Unbalanced transportation problem
13	Hungarian method
14	Maximization in assignment problem. Unbalanced assignment problem
15	Game Theory1 Two person zero sum game with saddle point Arithmetic method ,Algebraic method
16	Game Theory2 Dominance method, Sub game method, Graphical method

Electronic lab course III & IV

Course code- 1311 D

S.Y. B.Sc. Computer Science (Entire) Electronics: Practical Course

- TotalExperimentstobeperformed24.
- 20experimentscompulsory:Atleast10Practicalsfromeachof the A and B groups.

Practical Examination–

B) Annual examination: 100 Marksintwosessionof3Hoursasusualpractice.
Session I 45 marks (Practical work 45 marks)
Session II 45marks (Practicalwork45marks)
Journal Work 10 Marks

- 45 Marks can be divided as -

Circuit diagram	08
Connection and Testing	08
Demonstration and working explanation	07
Observations	07
Calculations/Graph/Result/comment	05
Oral	10

LIST OF PRACTICALS:

Group- A

1. Study of temperature sensor LM 35/AD590
2. Instrumentation Amplifier using OP-AMP
3. 3bitFlash ADC
4. R-2RladderDAC
5. Filters(low pass and high pass)
6. Differential amplifier.
7. Measurement displacement of LVDT
8. Study of Pre amplifer using Op-amp.
9. Write an ALP to find sum of series of numbers.
10. Write an ALP to multiply two 16 bit unsigned/signed numbers.
11. Write an ALP to divide two unsigned/signed numbers
12. Write an ALP to perform block transfer data using string instructions/ without using string instructions.

Group- B

1. Data transfer programmingusing8051 microcontroller
2. Arithmetic operations using 8051 micro controller (Use8051Simulator)
3. Logical operations using 8051 micro controller (Use8051Simulator)
4. Time delay generation using timers of 8051micro controller
5. Counter Programming using8051
6. Code Conversion Programming using 8051
7. Interfacing of 7☐SEGMENT DISPLAY/THUMB WHEEL SHITCH with8051
8. Study of parallel port of PC (Port pin access using 'c')

9. Inter facing LCD with 8051
10. Interfacing of Relay/LED/Op to coupler using microcontroller
11. Interfacing Stepper motor with 8051
12. To study wave for m generator (square, triangular and saw tooth using DAC) with microcontroller.

Lab course III Introduction to RDBMS using MySQL
Note: MySQL may be used

1. Write a MySQL command/Statement to Create a database Student details and create a table Studentinsideitwithfields–stud_rollno,stud_name,stud_address,stud_course,stud_ph_noand perform following commands:
2. Display table structure.
3. Alter table to add new column marks.
4. insert10appropriaterecords.
5. Display all record sides ceding order of stud_rollno.
6. Update record of stud_rollno=2changenamefrom,,Supriya"to,,Priya".
7. Display students with lowest and highest marks and count of records using appropriate aggregate functions.
8. Display names of students having letter's" any where in their name.
9. Delete record of stud_name=08.
10. Drop table Student.
11. Create following tables and perform following Queries:
12. Table Sales person with columnss_no,s_name,city,commission.
13. Table Customers with columnsc_no,s_no,c_name,city.
14. Table Orders with columns order_no,c_no,amount,order_dt.
15. Apply following Constraints:
16. Add primary key constraint on s_no in sales person table, c_no on customers table and order_no in orders table.

17. Add foreign key constraint on c_no, s_no column in order table.
18. Add constraint on customer table to check city which should be from the following list(satara, sangli, Kolhapur, pune).
19. Add default value,,0"tocommissionscolumnofsalespersontable.
20. Select records from sales person where city is "Sangli".
21. Select distinct city from salesperson.
22. Display records whose amount is between 4000to 5000.
23. Display records of customer whose city is not "sangli" and "Kolhapur".

24. Write a MySQL program to perform following Join Operations:
25. Create a table dept dtls with following fields (dept_no int(5), dept_name varchar2(20), location varchar2(20)).
26. Create a table emp_dtls(emp_noint(5),emp_namevarchar2(20),jobvarchar2(20), mgr_no int(5), dept_no int(5));

27. Insert 5 relevant records in each table.
28. Perform following queries:
29. Use simple join and display dept_name, location, emp_no, emp_name, job.
30. Use outer left and outer right join to display information of dept_no,dept_name, location, emp_no, emp_name, job.
31. Use self join to display emp_no, emp_name, job, dept_no.
32. Write a procedure to accept two numbers from users and perform arithmetic operations on it.
33. Write a stored procedure to check whether given numbers odd or even.
34. Write a stored procedure to check whether given number is prime or not.
35. Stored Procedure on table: (cust_id, cust_nm,contact,address,city,code,countary).
36. Write a stored procedure named" Select All Customers" that selects all records from the "Customers".
37. Create a stored procedure that selects Customers from a particular City from the "Customers" table.
38. Create a stored procedure that selects Customers from a particular City with a particular Postal Code from the "Customers".
39. Procedures on table:Job1(job_id,job_title,min_salary,maximumsalary)
40. Write a procedure using parameter to accept a number to display number of records from a table. (for e.g. number of records=3, will display first 3 records from table Job1).
41. Write a procedure using parameter to display the maximum salaryfromJob1table.
42. consider tables,product(prod_id, prod_nm,sup_nm,unit_price) and table product_price_history (prod_id, prod_nm,sup_nm,unit_price) write a trigger to store old or previous records in product_price_history which are updated on product table.
43. Write a procedure to select data from table using cursor.

Paper Number: Lab Course-III

Paper Title: Laboratory Course in Computer Science–III

1. Write a C++ program to perform arithmetic operations using in line function
2. Write a C++ program to calculate area of circle, rectangle and triangle using function overloading
3. Write an object oriented program to display details of n number of students.
4. Write an object oriented program to display salary statement of n number of employees using array of object
5. Write an object oriented program to perform in addition using friend function
6. Write an object oriented program to handle saving account system using constructor and destructor
7. Write an object oriented program to reverse a string using unary operator over loading
8. Write an object oriented program to perform addition of two complex numbers using binary operator overloading
9. Make a class named Fruit with a data member to calculate the number of fruits in a basket. Create two other class named Apples and Mangoes to calculate the number of apples and mangoes in the basket. Print the number of fruits of each type and the total number of fruits in the basket.
10. Write an object oriented program to display the result of student using hybrid inheritance.
11. Create class Shape, derive the two classes Rectangle and Circle from Shape class and calculate area of rectangle and circle using virtual function.

Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR
B.Sc.Part–II (Computer science Entire) CBCS Syllabus with effect from June,2019 Semester: III
Skill Enhancement course-I
SECTION-1
WEB TECHNOLOGY
Theory: 30 Hours (38Lectures)credits-2

Course outcomes

1. To understand basic concepts in HTML.
2. To create basic web pages and insert, format text
3. To implement a variety of hyperlinks to connect pages.
4. To develop a basic website.

Unit-I: Introduction to web development and HTML

Web Browser, Web server, Web hosting, Web Pages, DNS, URL, Introduction e-documents - Static,Active & Dynamic. Web programming –client side scripting   HTML Basic Tags-<HTML>, <HEAD>, <TITLE>,<BODY> structure of html, how create to run html Page Comment tag. HTML Formatting Tags-HTML Color Coding. Headings tags,<P>,<I><U>,<FONT>,<HR>
Div and S pan T ags for Grouping, <CENTER>,<MARQUEE> , <SUB>, <SUP>Lists-Unordered Lists. Ordered Lists. Definition list,<Img> tag and its attributes-SRC, align, width, height, hspace, vspace, border,<A> tag andits attributes-href, target, name

Unit-II: Working with tables and forms

<TABLE>Tag,<TR>,<TD>,<TH>anditsattributes.<FORM>Taganditsattributes.
<INPUT>Tag and its attributes. HTML FORM controls –Label, Text Area, buttons, radio Buttons, checkboxes, select Box Control, hidden controls, Frameset and frames

Unit-III: Introduction to CSS

Introduction to Cascading Style Sheet (CSS), CSS Syntax, Comments, Id and Class, Background -Background Color, Background Image -Text - Text Color, Text Alignment, Text Decoration, Text Transformation, Text Indentation - CSS Font - Font Families, Font Style, Font Size -Setting Text Size - Using Pixels and Em - CSS Lists -Different List Item Markers, Unordered List, Ordered List, An Image as The List

Unit-IV-Introduction to PHP

Introduction to PHP, Server side scripting, Role of Web Server software, including files, comments, variables and scope, echo and print,

Lab Course

1. Create a webpage that prints your Biodata to the screen with Title Bio-Data.
2. Create a webpage that prints the numbers1-10tothescreen.Each number being a different color.
3. Create a webpage that prints the message "When was this webpage created? Check page's title for the answer." to the screen, and set the title of the page to the current date.
4. Print a paragraph that is a description of a book, include the title of the book as well as its author. Names and titles should be underlined, adjectives should be italicized and bolded.

5. Print the squares of the numbers1 -20.Each numbers should be on a separate line, next to it the number 2 superscripted, an equal sign and the result. (Example: $10^2 = 100$)
6. Print two lists with any information you want. One list should be an ordered list, the other list should be an unordered list.
7. Prints an h1 level heading followed bay horizontal line whose width is 100%. Below the horizontal line print a paragraph relating to the text in the heading.
8. Print a definition list with5 items.
9. Create some link to various each engines (Google, yahoo etc).
10. Create links to five different pages on five different websites that should all open in anew window.
11. Create a page with a link at the top of it that when clicked will jump all the way to the bottom of the page. At the bottom of the page there should be a link to jump back to the top of the page.
12. Display five different images that has a border of size 2, a width of 100, and a height of 200.. Skip two lines between each image. Each image should have a title.
13. Display an image that when clicked will link to a search engine of your choice (should be opened in a new window).
14. Create login form
15. Create form to display student information

16. Write a program to create HTML table with the following output :

Name	Maths	Science	English	Physics
David	85	87	88	92
Richard	91	81	78	71
John	81	86	88	84
Tony	84	86	87	82
Scott	71	79	82	88

17. Create table with following structure

Day	Today	Tomorrow	Saturday
Condition	Sunny	Mostly sunny	Partly cloudy
Temperature	19°C	17°C	12°C
Wind	E 13 km/h	E 11 km/h	S 16 km/h

18. Create a web Form with following fields

➊ Evergreen Valley College Survey

Personal Information   ➌

➍
Name: [   ]

Email: [   ]

➎   Age: ○ <18   ◉ 18-25   ○ 26-40   ○ 41-65   ○ 65+

Academic Information   ➌

Goals: Check all that apply

➏   ☐ Associate Degree   ☐ Transfer to CSU   ☐ Transfer to UC
☐ Personal Enrichment

Field of   Select all that apply; hold CTRL when clicking to select multiple items
Study:

➐
```
Accounting              ▲
Astronomy               ▤
Business
Chemistry
Computer Information Systems
Health                  ▼
```

Comments: [   ]

➑

Send Data | Reset Form

Create Simple website with 5 pages (Home,About,Gallery,Course,andContact). Gallery and contact page with contact us form is must.
Simple PHP program that displays a welcome message.

Reference books:

1. Web Technologies Black Book-DTEditorialservices,Dreamtech2015edition
2. HTML5-KRIS JAMSA Jones &Bartlett learning 2014 edition
3. HTML & XHTML-O'Reilly Marciano & Kennedy 5thedition
4. HTML, Java script, DHTML & PHPBPB publication Iv an Bayross 4th edition
5. Developing web application Wiley publication Ralph Moseley M.T.Savaliya 2nd edition 2013
6. PHP & MySQL Arut a publication Sagar Sawant Edition 2014

Shri Swami Vivekanand Shikshan Sanstha's
VIVEKANAND COLLEGE (AUTONOMOUS),KOLHAPUR
B.Sc. Part–II (Computer science Entire) CBCS Syllabus with effect from June,2019 Semester: IV
Skill Enhancement course-II
Python Programming
Theory: 30 Hours (38Lectures) credits-2

Course Outcome:

1. To understand why Python is a useful scripting language for developers.
2. To learn how to install Python, start the Python shell and define the structure and components of a Python program
3. To learnt open form basic calculations, print text on the screen and performs impel control flow operations using if statements and for loops.
4. To learn how to use lists, tuples and dictionaries in Python programs and how to reuse code with functions

Unit I: Introduction to Python and Basic Concepts in python

- **Introduction to python:** What is python?, Applications of Python, Why Python?

  Installation of python, First program in Python, Comments and Do strings in Python Variable and data types, Operators in python

- **File Handling:** working with open, read, write, append modes of file

- **Conditional Statements:** Indentation in python, if-else, nested if-else statements

Unit II: Looping Statements, Control statements, String Manipulations

- **Looping Statements:** for loop, while loop, Nested loops

- **Control Statements:** break, continue and pass

  String Manipulations: Accessing strings, Basic operations, String slices, Functions and methods

Unit III : Python collection

- **Python collections :** list, Tuple, set and dictionary

  List: Introduction, Accessing lists, change item value in list, loop through list, methods
  Tuple: Introduction, Accessing tuples, change it em value in tuple, loop through tuple and methods of tuple
  Set: introduction and methods of set
  Dictionary: Introduction, Accessing values in dictionaries, properties, Change value in dictionary, loop through dictionary and methods of dictionary.

Unit IV: Functions, Data visualization in python Functions :

Defining a function, Calling a function, Function arguments, Default parameter value, Anonymous function : Lambda function(why use lambda, syntax and examples of lambda). Data visualization in python: Pandas packages (NumPy and matplotlib libraries)

References:

1. Mark Lutz, Learning Python, 5th Edition, O'reilly .2013
2. Charles Dierbach, Introduction to computer science using python, Wiley.2015
3. Harsh Bhasin, Python for Beginners,New age international publishers.
4. Dr.R.Negeswara Rao, Core python programming.Dreamtech.2018
5. Ajay Ohri, Python for R users, Wiley.2018
6. Laura Cassell and Alan Gauld,Python Projects,Wrox.2018

Lab course:

1. Hello world program in python
2. Python Program to Check Whether a Given Year is a Leap Year
3. Python Program to Check Whether a Number is Positive or Negative
4. Python Program to Take in the Marks of 5 Subjects and Display the Grade
5. Print "1" if a is equal to b, print "2" if a is greater than b, otherwise print "3".Print "Hello" if a is equal to b, and c is equal to d.
6. Python Program to Read a Number n And Print the Series "1+2+.....+n= "
7. Python Program to Check if a Number is a Palindrome
8. Python Program to Count the Number of Digits in a Number
9. Python Program to Find the Sum of Digits in a Number
10. Python Program to Print Odd Numbers Within a Given Range
11. Python Program to Find the Factorial of a Number
12. Python Program to check the number is prime or not
13. Python program to print hello world message using function
14. Python Program to Make a Simple Calculator using function
15. Python program to demonstrate lambda function
16. Write a Python programming to display a bar chart of the popularity of programming Languages. Sample data: Programming languages: Java, Python, PHP, JavaScript, C#, C++ Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7
17. Write a Python program to draw a scatter plot comparing two subject marks of Mathematics and Science. Use marks of 10 students. Test Data: math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34] science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30] marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
18. Write a Python programming to create a pie chart with a title of the popularity of programming Languages. Sample data: Programming languages: Java, Python, PHP, JavaScript, C#, C++ Popularity : 22.2, 17.6, 8.8, 8, 7.7, 6.7

HEAD
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