Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (CSE with Specialization in Artificial Intelligence)

Choice Based Credit System (CBCS)-2018-19

SEMESTER-II

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMACS 201		**Mathematics - II**	60	20	20	-	-	3	1	-	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations and Numerical Analysis

COURSE OUTCOMES :

1. Upon completion of the subject, students will be able to:
2. Understand and apply the basics of the calculus of matrices.
3. Solve the fundamental problems of the ordinary differential equations.
4. Apply the advanced techniques to find the solution of the ordinary differential equations.
5. Know the techniques of the numerical analysis.
6. Find the numerical solution of the ODE and PDE.

SYLLABUS

UNIT–I

Calculus of Matrices

Systems of linear equations and their solutions. Matrices, determinants, rank and inverse. Linear transformations. Range space and rank, null space and nullity. Eigenvalues and eigenvectors. Similarity transformations. Diagonalization of Hermitian matrices. Bilinear and quadratic forms.

UNIT–II

Differential Equation

Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations. Operator method. Method of undetermined coefficients and variation of parameters

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UNIT–III
Differential Equation
Power series methods for solutions of ordinary differential equations. Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kind.

UNIT–IV
Numerical Analysis
Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Theoretical Errors in Interpolation; Spline Interpolation; Approximation by Least Square Method.
Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward, Backward and Central Finite Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule, Gaussian Quadrature Rules: Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite, Gauss-Chebychev.

UNIT–V
Probability Theory and Random Process
Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains, Poisson process, Correlation and Regression; Expectation and Variance

TEXT BOOKS:
1. G. Strang, Linear Algebra And Its Applications, 4th Edition, Brooks/Cole, 2006
2. S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.
4. W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.
5. K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
6. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.
7. G. R. Grimmett and D. R. Stirzaker, Probability and Random Processes, Oxford University Press, 2001.
8. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2000.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Edition, Wiley, 1968.
10. K. S. Trivedi, Probability and Statistics with Reliability, Queuing, and Computer Science Applications, Prentice Hall of India, 1998.
11. Papoulis and S. Unnikrishna Pillai, Probabilities, Random Variables and Stochastic Processes, 4th Edition, Tata McGraw-Hill, 2002.
12. S.M. Ross, Stochastic Processes, 2nd Edition, Wiley, 1996.

13. J. Medhi, Stochastic Processes, New Age International, 1994.
14. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

REFERENCES:

1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS204		**Computer Peripherals and Interfaces**	**60**	**20**	**20**	**30**	**20**	**3**	**1**	**2**	**5**

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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COURSE OBJECTIVES:

1. Understanding of a knowledge of memory chips, it's types and troubleshooting methodologies.
2. Understanding the power system and its troubleshooting methods.
3. Understand the different interfaces and ports working and its configuration process.

COURSE OUTCOMES :

After the course completion student will be able to

1. Analyze PC boards, ROM memory and different types of buses.
2. Troubleshoot Device drives and peripherals devices working and its configuration process
3. Analyze the power system and its troubleshooting methods.

UNIT 1

Memory: Memory, memory chips & modules, memory types, advanced memory technologies, troubleshooting memory.

UNIT II

Motherboard: PC family tree, motherboard controllers and system resources, input-output ports, IRQ, I/O bus system: ISA, MCA, ELSA, VESA local bus, PCI, AGP, PCIX; on board I/O devices, ROMBIOS, ROM POST, CMOS setup.

UNIT III

Power Supply: power supply function and operation, power supply quality and specification, power protection and back-up, backup power system; UPS; troubleshooting power supply

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UNIT IV

Interfaces and I/O Ports: Floppy disk drive interface, IDE interface: ATA standards, master-slave configuration, data transfer mode; SCSI interface: SCSI bus, SCSI standards: which is better SCSI or IDE; serial ports, parallel ports, USB, Video apapters, troubleshooting Video adapters.

UNIT V

Device drives and peripherals : Floppy disk drive, hard drive CD ROM drive, DVD ROM drive, record able drives , keyboards, mice printers and moniters, trouble shooting drives and peripherals.

Text Books:

1. Craig Zacker & John Rourtre: PC Hardware- The complete reference, TMH.
2. S.K. Chauhan: PC Upgrading, maintenance and troubleshooting guide.

Practical's List:

1. To study motherboard.
2. Study of microprocessor.
3. To study SMPS and UPS.
4. To study the CD-ROM and DVD-ROM.
5. To study working of keyboard and mouse.
6. To study different ports and slots.
7. To study various types of Cables & Connectors.
8. Study of monitor.
9. To study different types of printers.
10. To assemble a PC.
11. To study Floppy Disk Drive.

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BTCS403		Data Structure & Algorithms	60	20	20	30	20	3	1	2	5

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COURSE OBJECTIVES

1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To teach the concept of protection and management of data.

COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Get a good understanding of applications of Data Structures.
2. Develop application using data structures.
3. Handle operations like searching, insertion, deletion, traversing mechanism etc. on Various data structures.
4. Decide the appropriate data type and data structure for a given problem.
5. Select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.

SYLLABUS

UNIT–I

Introduction, Overview of Data structures, Types of data structures, Primitive and Non Primitive data structures and Operations, Algorithms. Characteristic of Array, One Dimensional Array, Operation with Array, Two Dimensional Arrays, Three or Multi-Dimensional Arrays. Strings, Array of Structures, Drawbacks of linear arrays, Pointer and Arrays, Pointers and Two Dimensional Arrays, Array of Pointers, Pointers and Strings.

UNIT–II

The Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation .

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The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Circular Queue, Priority Queue, & Dequeue, Application of Queues.

UNIT–III

Linked List as an ADT, Linked List Vs. Arrays, Memory Allocation & De-allocation for a Linked List, Linked List operations, Types of Linked List, Implementation of Linked List, Application of Linked List polynomial.

UNIT–IV

Definitions and Concepts, Binary trees, operations on binary trees, Binary tree and tree traversal algorithms, operations on binary trees, List, representation of Tree. Graph Representation, Graph traversal (DFS & BFS).

UNIT–V

Sort Concept, Shell Sort, Radix sort, Insertion Sort, Quick Sort, Merge Sort,Heap Sort, List Search, Linear Index Search, Index Sequential Search Hashed List Search, Hashing Methods , Collision Resolution.

TEXT BOOKS:

1. Ashok N. Kamthane, “Introduction to Data structures”, Pearson Education India.
2. Tremblay &Sorenson, “Introduction to Data- Structure with applications”, Tata Mc- Graw Hill.
3. Bhagat Singh & Thomas Naps, “Introduction to Data structure”, Tata Mc- Graw Hill.
4. Robert Kruse, “Data Structures and Program Design”, PHI.
5. Aaron M. Tenenbaum& Moshe J. Augenstein, “Data Structure using PASCAL”, PHI.

REFERENCES:

1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures Using C, ISRD Group, Second Edition, Tata McGraw-Hill.
3. Data Structure Using C, Balagurusamy.
4. C & Data Structures, Prof. P.S. Deshpande, Prof. O.G. Kakde, Dreamtech press.
5. Data Structures, Adapted by: GAV PAI, Schaum’s Outlines.

LIST OF EXPERIMENTS:

1. To develop a program to find an average of an array using AVG function.
2. To implement a program that can insert, delete and edit an element in array.
3. To develop an algorithm that implements push and pop stack operations and implement the same using array.
4. To perform an algorithm that can insert and delete elements in queue and implement the same using array.
5. To implement an algorithm for insert and delete operations of circular queue and implement the same using array.
6. To develop an algorithm for binary tree operations and implement the same.
7. To design an algorithm for sequential search, implement and test it.
8. To develop an algorithm for binary search and perform the same.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS404		Computer System Organization	60	20	20	0	0	3	1	0	4

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COURSE OBJECTIVES

1. Understand the architecture of a modern computer with its various processing units.
2. To impart knowledge on processor speed and processing of programs.
3. The performance measurement of the computer system.
4. To introduce hardware utilization methodology.
5. To impart knowledge in inter process communication.

COURSE OUTCOMES

Upon completion of the subject, students will be able to:

1. Students can understand the architecture of modern computer.
2. They can analyze the Performance of a computer using performance equation.
3. Understanding of different instruction types.
4. They can understand how computer stores positive and negative numbers.

SYLLABUS

UNIT–I

Computer Basics and CPU: Von Newman model, various subsystems, CPU, Memory,I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, decode and execution, data movement and manipulation, Instruction formats and addressing modes of basic computer. 8085 microprocessor organization

UNIT–II

Control Unit Organization: Hardwired control unit, Micro and nano programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming, Arithmetic and Logic Unit: ArithmeticProcessor, Addition, subtraction, multiplication and division, Floating point and decimalarithmetic and arithmetic units, design of arithmetic unit.

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UNIT–III

Input Output Organization: Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, 8085 I/O structure, 8085 instruction set and basic programming. Data transfer – Serial / parallel, synchronous/asynchronous, simplex/half duplex and full duplex.

UNIT–IV

Memory organization: Memory Maps, Memory Hierarchy, Cache Memory - Organization and mappings. Associative memory, Virtual memory, Memory Management Hardware.

UNIT–V

Multiprocessors: Pipeline and Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication.

TEXT BOOKS:

REFERENCES:

1. Morris Mano: Computer System Architecture, PHI.
2. Tanenbaum: Structured Computer Organization, Pearson Education
3. J P Hayes, Computer Architecture and Organisations, Mc- Graw Hills, New Delhi
4. Gaonkar: Microprocessor Architecture, Programming, Applications with 8085; Penram Int.
5. William Stallings: Computer Organization and Architecture, PHI
6. ISRD group; Computer Organization; TMH
7. Carter; Computer Architecture (Schaum); TMH
8. 8. Carl Hamacher: Computer Organization, TMH

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BTCS305		Object Oriented Programming	60	20	20	0	0	3	1	0	4

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COURSE OBJECTIVES

1. To explain abstract data types, classes and different types of objects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting the classes.
4. To demonstrate the overloading of functions and operators to grant them a different meaning.
5. To formulate programs using the concepts of object oriented programming languages.

COURSE OUTCOMES

Upon the completion of the course, students will be able to:

1. Identify and describe the components of object-oriented technology and justify their relevance.
2. Classify and model the relationships/associations that exist between classes and objects.
3. Perform experiments on inheritance by implementing code reusability and polymorphism by overloading the functions as well as operators.
4. Develop programs for real world scenarios using the object oriented approach.

SYLLABUS

UNIT–I

Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Static and dynamic objects, global and local objects, Metaclass, Modeling the real world objects.

UNIT–II

Relationships between classes, Association of objects, Types of Association, Recursive Association, Multiplicities, Navigability, Namedassociation, Aggregation of objects. Types of Aggregation, Delegation, Modeling Association and Aggregation.

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UNIT–III

Inheritance and Polymorphism, Types of polymorphism, Static and dynamic polymorphism, Operator and Method overloading, Inherited methods, Redefined methods, the protected interface, Abstract methods and classes, Public and protected properties, Private operations, Disinheritance, Multiple inheritance.

UNIT–IV

Container Classes, Container types, typical functions and iterator methods, Heterogeneous containers, Persistent objects, stream, and files, Object oriented programming languages.

UNIT–V

Study of C++/Java as Object-oriented programming language.

TEXT BOOKS:

REFERENCES:

1. David Parsons; Object oriented programming with C++; BPB publication.
2. Object oriented programming in C++ by Robert Lafore: Galgotia.
3. Balagurusamy; Object oriented programming with C++; TMH.
4. Java Complete Reference: Herbert Schildt, Mc Graw Hill.
5. Hubbard; Programming in C++ (Schaum); TMH.
6. Mastering C++ by Venugopal, TMH.

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BTCS 208		**Programming Skills with 'C++'**	**-**	**-**	**-**	**30**	**20**	**-**	**-**	**2**	**1**

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COURSE OBJECTIVES

1.To explain abstract data types, classes and different types of objects.
2.To distinguish among types of relationships between classes and express the associations diagrammatically.
3.To analyze the public, protected and private modes of inheriting the classes.
4.To demonstrate the overloading of functions and operators to grant them a different meaning.
5.To formulate programs using the concepts of object oriented programming languages.

COURSE OUTCOMES :

1. Students should be able to explain the object oriented concepts.
2. Students should be able to write programs using object-based programming techniques including classes, objects and inheritance.
3. Able to use of various system libraries.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solves pecified problems.
6. Be able to use the Java SDK environment to create, debug and run simple Java programs.
7. Introduce event driven Graphical User Interface (GUI) programming

List of Experiments:

1. Program To Demonstrate Default Arguments.
2. Program To Demonstrate Call By Value.
3. Program To Demonstrate Call By Reference.
4. Program To Demonstrate Call By Address.
5. Program To Demonstrate Classes And Objects.

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6. Program To Demonstrate Static Member Function.
7. Program To Demonstrate Constant Member Function.
8. Program To Demonstrate Object As Argument
9. Program To Demonstrate Function Returning An Object.
10. Program To Add Two Distances In Feet And Inch Using Friend Function.
11. Program To Demonstrate A Function Friend Of Two Classes.
12. Program To Demonstrate Friend Class.
13. Program To Demonstrate Different Constructors And Destructor.
14. Program To Demonstrate Constructor With Default Argument.
15. Program To Demonstrate Function Overloading.
16. Program To Demonstrate Function Overriding.
17. Program To Demonstrate Unary Operator Overloading.
18. Program To Demonstrate Binary Operator Overloading.
19. Program To Demonstrate Multiplication Of Postive Numbers Using Single Inheritance.
20. Program To Demonstrate Employee Details Using Multiple Inheritance.
21. Program To Demonstrate Calculation Of Area Of Shapes Using Virtual Function.
22. Program To Demonstrate Student Mark List Using Virtual Base Class.
23. Program To Demonstrate Function Template.
24. Program To Demonstrate Class Template.
25. Program To Demonstrate Sequential File Access.
26. Program To Demonstrate Random File Access.

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HUCS 101		**Communication Skills**	**60**	**20**	**20**	**-**	**20**	**2**	**-**	**2**	**3**

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

COURSE OBJECTIVES:

1. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.
2. To train them to use language effectively to face interviews, group discussions, public speaking.

COURSE OUTCOMES :

1. The student will be able to learn better pronunciation through stress on word accent, intonation, and rhythm.
2. The student will be able to initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

Syllabus:

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to Phoneticsthe Sounds of English- Vowels, Diphthongs & Consonants.
2. Reading Comprehension
3. Situational Dialogues / Role Play.
4. Oral Presentations-
5. Extempore.
6. 'Just A Minute' Sessions (JAM).
7. Describing Objects / Situations / People.
8. Debate
9. Telephoning Skills.
10. Group Discussions.

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References:

i) Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
ii) English Pronouncing Dictionary Daniel Jones Current Edition with CD.
iii) Spoken English- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
iv) Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
v) A Practical Course in English Pronunciation, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
vi) A text book of English Phonetics for Indian Students by T.Balasubramanian (Macmillan)

Suggested Software:

i) Aristoclass
ii) Hiclass
iii) K-VAN solutions
iv) Globarina
v) Console OCL-908W
vi) Histudio MHi Tech

Minimum Requirement:

The English Language Lab shall have two parts:
i) The Computer aided Language Lab for 60 students with 60 systems, one teacher /instructor console, LAN facility and English language software for self- study by learners.
ii) The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo ‑audio & video system and camcorder etc.

System Requirement (Hardware component):
Computer network with Lan with minimum 60 multimedia systems with the following specifications:
i) P ‑ IV Processor
a) Speed ‑ 2.8 GHZ
b) RAM ‑ 512 MB Minimum
c) Hard Disk ‑ 80 GB
ii) Headphones of High quality

Distribution of marks

i) The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
ii) For the Language lab sessions, there shall be a continuous evaluation during the year for 20 sessional marks and 30 year-end Examination marks.
iii) Of the 20 marks, 10 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.