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DEPARTMENT OF COMPUTER APPLICATIONS

CBCS SYLLABUS

BACHELOR OF COMPUTER APPLICATIONS

PROGRAMME CODE - J

COURSE STRUCTURE

(w.e.f. 2021 – 2022 Batch onwards)

Annexure - 12

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DEPARTMENT OF COMPUTER APPLICATIONS-UG

(w.e.f. 2021 – 2022 Batch onwards)

COURSE STRUCTURE - SEMESTER WISE

Sem	Part	Sub. Code	Title of the Paper	Teaching hrs (per week)	Exam Duration(hrs)	Marks allotted			Credits
						C.I.A	S.E	Total	
V	III	**21J51**	**Core :** Operating System	5	3	25	75	100	4
	III	**21J52**	**Core :** Software Engineering	6	3	25	75	100	4
	III	**21J53**	**Core :** Python Programming	5	3	25	75	100	4
	III	**21J5P**	**Core :** Python Programming Lab	5	3	40	60	100	3
	III		**Elective I**	5	3	25	75	100	5
	IV	**21SEJ5P**	**SBE :**Dot Net Programming Lab	2	3	40	60	100	2
	IV	**214EV5**	Environmental Studies	2	3	25	75	100	2
VI	III	**21J61**	**Core :** Data Communication and Computer Networks	6	3	25	75	100	4
	III	**21J62**	**Core :** Web Technology	5	3	25	75	100	4
	III	**21J6P**	**Core :** Web Technology Lab	5	3	40	60	100	3
	III		**Elective II**	5	3	25	75	100	5
	III	**21JEPR6**	**Elective III (Project)**	5	3	20	80	100	5
	IV	**21SEJ6P**	**SBE :**Android Lab	2	3	40	60	100	2
	IV	**214VE6**	Value Education	2	3	25	75	100	2

Semester - V

Elective I (Choose any one)

1. Computer Graphics **- 21JE5A**
2. Compiler Design **- 21JE5B**

Semester - VI

Elective II (Choose any one)

1. Data Mining **- 21JE6A**
2. Internet of Things **- 21JE6B**

Elective III

Project **- 21JEPR6**

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core - Operating System**	
Semester	**: V**	**Contact Hours: 5**
Sub Code	**: 21J51**	**Credits : 4**

Objective:

To learn the concept to Operating System and its functions, Processes, CPU Scheduling, Process Synchronization, Main Memory, Virtual memory, File System.

Unit- I

Introduction: What Operating Systems Do-Computer System Organization-Computer System Architecture-Operating System Structure-Operating System Operations-Process Management – Memory management – Distributed Systems. **System Structures**: Operating System Services- User Operating System Interface-System Calls-Types of System Calls-System Programs.

Unit- II

Processes: Process Concept-Process scheduling-Operation on process- Inter process communication- Examples of IPC Systems-Communication in Client Server Systems- **Threads**: Overview-MultithreadingModels-ThreadLibraries-ThreadingIssues-OperatingSystemExamples.

Unit- III

CPU Scheduling: Basic concepts- Scheduling criteria-Scheduling algorithms. Thread Scheduling-Multiple Processor Scheduling-**Process Synchronization:** Background – The Critical Section Problem- Semaphores- Monitors. Deadlocks: Deadlock Characterization – Methods of Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance.

Unit- IV

Main Memory: Background-swapping-Contiguous Memory allocation-Paging-Structure of the Page Table-Segmentation-**Virtual Memory Management**: Background-Demand Paging-Copy on Write-Page Replacement-Allocation of Frames.

Unit-V

File System: File concepts -Access methods-**File System Implementation:** File System Structure-Allocation Methods-Free Space Management. **Secondary Storage Structure:** Overview of Mass Storage Structure-Disk structure- Disk Scheduling-Disk Management-Swap Space Management.

Text Book:

Silberschatz Galvin, *Operating System Concepts*, John Wiley & Sons, New Delhi, 9th Edition, 2011.

Chapters:

Unit- I : 1.1 to 1.7, 1.10, 2.1 to 2.5

Unit- II : 3.1 to 3.6, 4.1 – 4.4.

Unit- III : 5.1 to 5.5, 6.1, 6.2, 6.5, 6.7, 7.2 – 7.5

Unit- IV : 8.1 to 8.6, 9.1 -9.5

Unit- V : 10.1, 10.2, 11.1, 11.4, 11.5, 12.1, 12.2, 12.4 – 12.6.

Reference Books:

1. Achyut Godbole S, *Operating Systems*, Tata McGraw HillEducation, India,3rd Edition, 2010.
2. Dhamdhere D M, *Operating systems (A concept- based approach),* Tata McGraw HillEducation, India, 2nd Edition, 2010.
3. Milan MilenKovic, *Operating System-Concepts and Design*, Tata McGraw HillEducation, India, 2nd Edition, 2010.
4. Pramod Chandra Bhatt , *An Introduction to Operating Systems*, Concepts and Practice,PHI Learning Pvt. Ltd., Delhi, 4th Edition, 2014.
5. William Stallings, *Operating Systems: Internals and Design Principles*, PearsonEducation, India, 7th Edition, 2012.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core- Software Engineering**	
Semester	**: V**	**Contact Hours:6**
Sub Code	**: 21J52**	**Credits :4**

Objective:

Toacquireknowledgeaboutretrievalofdatafromvoluminousdatainadesired manner, Understanding Requirements, Design Concepts, Requirements Modeling.

Unit-I

Software and Software Engineering: The Nature of Software – Software Engineering– The Software Process- **Process Models**: A Generic Process Model Process Assessment and Improvement–PrescriptiveProcessModels–SpecializedProcessModels–TheUnifiedProcess – Personal and Team Process Models. **Agile Development:** What is Agility? – Agility and the Cost of Change – What is an Agility process?.

Unit-II

Understanding Requirements: Requirements Engineering – Establishing the Groundwork -Eliciting Requirements - Developing Use Cases. **Requirements Modeling**: Requirements Analysis – Data Modeling Concepts – Class-Based Modeling.

Unit-III

Design Concepts: Design Concepts -The Design Model**. Architectural design**: Architectural Design. **Component-Level Design**: What is a Component?–Designing Class-Based Components – Components-Level Design for Web Apps. **User Interface Design:** User Interface Analysis and Design.

Unit-IV

Review Techniques: Informal Reviews- Formal Technical Reviews-**Software Quality Assurance:** SQA Tasks, Goals and Metrics-Software Reliability – The ISO 9000 Quality Standards - The SQA Plan. **Software Testing Strategies:** A Strategic Approach to Software Testing –Test Strategies for conventional Software- Validation Testing-System Testing – The Art of Debugging. **Software Configuration Management:** Software Configuration Management – The SCM Repository – The SCM Process.

Unit-V

Estimation for Software Projects: Software Project Estimation - Empirical Estimation Models. **Project Scheduling:** Project Scheduling – Defining a Task Set for the Software Project – Defining a Task Network – Scheduling. **Risk Management:** Software Risk – Risk Identification – Risk Projection – Risk Refinement–Risk Mitigation, Monitoring and management-The RMMM Plan.

Text Book:

Roger Pressman S, *Software Engineering: A Practitioner's Approach* Mc Graw Hill Education, New Delhi, 6th Edition, 2010.

Chapters:

Unit I : 1.1, 1.3, 1.4, 2.1 to 2.6, 3.1 to 3.3.

Unit II : 5.1 to 5.4, 6.1, 6.4, 6.5.

Unit III : 8.3, 8.4, 9.4, 10.1, 10.2, 10.4, 11.2.

Unit IV : 15.5, 15.6, 16.3, 16.6 to 16.8, 17.1, 17.3, 17.6 to 17.8, 22.1 to 22.3

Unit V : 26.5 to 26.7, 27.2 to 27.5, 28.1 to 28.7

Reference Books:

1. Aggarwal K K & Yogesh Singh, *Software Engineering, New Age International*,New Delhi, 2nd Edition, 2007.
2. Ian Sommerville, *Software Engineering*, Pearson educationAsia, Hong Kong, 6th Edition, 2009.
3. James Peters F &Witold Pedryez ,*Software Engineering – An Engineering Approach*, John Wiley and Sons, New Delhi, 2nd Edition, 2007.
4. Pankaj Jalote, *An Integrated Approach to Software Engineering Springer Verlag*, India, 3rd Edition,2005.
5. Richard Fairley E,*Software Engineering Concepts*, McGraw Hill Ryerson, New York,2nd Edition, 2004.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core- Python Programming**	
Semester	**: V**	**Contact Hours: 5**
Sub Code	**: 21J53**	**Credits : 4**

Objectives

To introduce the basic features of python programming and impart skills in an Industry standard programming language and to Create advanced programming features in Python to solve industry standard problems.

Unit-I

Introduction to Computer and Python Programming: History of Python – Installing Python in Ubuntu - Executing Python Programs – Commenting in Python – Internal Working of Python – Python Implementations. **Basics of Python programming:** Python Character Set – Token – Python Core Data Type – The print ( ) Function – Assigning Value to a Variable – Multiple Assignments – Writing Simple Program in Python – The input( ) Function – The eval ( ) Function – Formatting Number and Strings – Python Inbuilt Functions.

Unit-II

Operators and Expressions: Introduction – Operators and Expressions – Arithmetic Operators Precedence and Associativity – Changing Precedence and Associativity – Translating Mathematical Formulae into Equivalent Python Expressions – Bitwise Operator – The Compound Assignment Operator. **Decision Statements:** Introduction – Boolean Type – Boolean Operators – Using Numbers with Boolean Operators – Using String with Boolean Operators – Boolean Expressions and Relational Operators – Decision Making Statements – Conditional Expressions.

Unit-III

Loop Control Statements: Introduction – The while Loop – The range ( ) Function – The for Loop – Nested Loops – The break Statement – The continue Statement. **Functions:** Introduction – Syntax and Basics of a Function – Use of a Function – Parameters and Arguments in a Function – The Local and Global Scope of a Variable - The return Statement – Recursive Functions

Unit-IV

Strings: Introduction – The str class – The String Operators – String Operations. **Lists:** Introduction – Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing [Start: end] – List Slicing with Step Size – Python Inbuilt Functions for Lists – The List Operator.

Unit-V

Object-Oriented Programming: Class, Object and Inheritance: Introduction – Defining Classes –The Self-parameter and Adding Methods to a Class – Display Class Attributes and Methods – Special Class Attributes – Accessibility – The_init_Method (Constructor) - Passing an Object as Parameter to a Method - _del_( ) (Destructor Method) – Class Membership Tests – Method Overloading in Python – Operator Overloading – Inheritance – Types of Inheritance – Method Overriding. **Tuples, Sets and Dictionaries:** Introduction to Tuples – Sets.

Text Book:

Ashok Namdev kamthane Amit Ashok Kamthane, *Programming and Problem Solving with PYTHON*,Published McGraw hill Education (India) Private Limited

Chapters:

Unit- I : 1.2, 1.4 to 1.9, 2.2, to 2.12.

Unit- II : 3.1 to 3.8, 4.1 to 4.8.

Unit- III : 5.1 to 5.7, 6.1 to 6.7.

Unit- IV : 7.1, 7.2, 7.7, 7.8.

Unit- V : 8.1, to 8.8, 10.1 to 10.14, 10.21.

Reference Books:

1. Charles Dierbach, "*Introduction to Computer Science using Python*", Wiley, 2015
2. Downey, A. et al., "*How to think like a Computer Scientist: Learning with Python*", John Wiley, 2015
3. Sheetal Taneja & Naveen kumar, *Python Programming a Modular approach – A Modular approach with Graphics, Database, Mobile and Web applications*, Pearson, 2017.
4. Ljubomir Periodic, "*Introduction to Computing Using Python : An Application Development Focus*", John Wiley & Sons,2012
5. Jeeva Jose & P.SojanLal, "*Introduction to Computing and Problem Solving with PYTHON*", Khanna Publishers, New Delhi, 2016

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core- Python Programming Lab**	
Semester	**: V**	**Contact Hours: 5**
Sub Code	**: 21J5P**	**Credits: 3**

List of Programs:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.

2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:

Grade A: Percentage >=80 Grade B: Percentage >=70 and <80

Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60

Grade E: Percentage <40

3. Program, using user-defined function to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.

4. Program to display the first n terms of Fibonacci series.

5. Program to find factorial of the given number.

6. Write a Python program to count the number of even and odd numbers from N numbers.

7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.

8. Python program to reverse a given string and check whether the give string palindrome or not.

9. Write a program to find sum of all items in a dictionary.

10. Write a Python program to construct the following pattern, using a nested loop

1

22

333

4444

55555

666666

7777777

88888888

999999999

11. Print the first 2 and first 3 Characters in a given String using string slicing.

12. Write a program that eliminates duplicates in a list.

13. Implement shallow copy and deep copy of a list.

14. Find the largest of n numbers, using a user defined function largest ().

15. Write a function that capitalizes all vowels in a string.

16. Read a line containing digits and letters. Write a program to give the count of digits and letters.

17. Write a function myReversal() which receives a string as an input and returns the reverse of the string.

18. Use the list comprehension methodology in Python to generate the squares of all odd numbers in a given list

19. Define a class with three methods: readString(), printString(), writeString() The first method should read the contents of a file. The second method should print the contents to the console. The third method should write the contents to a new file.

20. Create a class account which has constructor to input account number, name, balance from user. It must have functionsprint accounts() to display the account details / deposit() to deposit amount /with draw() to withdraw amount

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021– 2022 Batch onwards)

Elective-I

Title of the Paper	**: Computer Graphics**	
Semester	**: V**	**Contact Hours: 5**
Sub Code	**: 21JE5A**	**Credits: 5**

Objectives:

To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.

Unit- I

A Survey of computer graphics: Computer –Aided Design – Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical user Interfaces. **Overview of Graphics system:** Video display devices- Refresh Cathode-Ray Tubes, Raster scan Displays, Random-Scan Displays, Color CRT Monitors, Direct-View Storage Tubes, Flat - Panal Displays, Three-Dimensional Viewing Devices, Stereoscopic and Virtual-Reality Systems- Raster-Scan systems-Random-Scan systems –Graphics Monitors and Workstations-Input Devices-Hard copy devices.

Unit-II

Output Primitives: Points and lines-Line Drawing Algorithms: DDA Algorithm, Bresenham's Line Algorithm, Parallel Line Algorithms-Loading the frame buffer-Circle generating algorithms- Other curves-Pixel Addressing-Filled area primitives: Inside-Outside Tests- Boundary-Fill Algorithm -Flood-Fill Algorithm -Fill-Area Functions-Cell Array-Character Generation.

Unit- III

Attributes of Output Primitives: Line attributes: Line Type, Line Width, Line Color-Color and grayscale levels-Area fill attributes-Character attributes-Bundled attributes-**Antialising:** Antialising Area Boundaries.

Unit- IV

Two- Dimensional Geometric Transformations: Basic Transformations: Translation-Rotation-Scaling-Matrix representations and homogeneous coordinates-Composite transformations: Translations-Rotations-Scaling-General pivot point Rotation-General Scaling Directions-Concatenation Properties. **Structure & Hierarchical Modeling:** Structure Concepts: Basic Structure Functions– Setting Structure Attributes– Editing Structures: Structure Lists and the Element Pointer– Setting the Edit Mode-Inserting Structure Elements-Replacing Structure Elements-Deleting Structure Elements-Labeling Structure Elements. **Basic Modeling Concepts:** Model Representations- Symbol Hierarchies- Modeling Packages.

Unit- V

Two –Dimensional Viewing: The Viewing Pipeline-Window-to-View port Coordinate transformation-Two-Dimensional Viewing functions-Clipping Operations-Point clipping-Line clipping: Cohen-Sutherland Line Clipping, Liang- Barsky Line Clipping, Nicholle-Lee-Nicholl Line Clipping- Line Clipping using Non Rectangular – Clip Windows – Splitting Concave Polygon - Polygon Clipping: Sutherland-Hodgeman Polygon Clipping – Weiler Atherton Polygon Clipping - Other Polygon Clipping Algorithms-Curve Clipping-Text clipping –Exterior Clipping.

Text Book:

Donald Hearn & Pauline Baker M, *Computer Graphics C version*, Pearson Education, India, 2nd Edition, 2017.

Chapters:

Unit - I : 1,2.1-2.6

Unit - II : 3.1,3.2,3.3, 3.5,3.7, 3.10-3.14

Unit - III : 4

Unit - IV : 5.1-5.4 , 7

Unit - V : 6

Reference Books:

1. Malay K. Pakhira, *Computer Graphics, Multimedia and Animation* –, Prentice Hall Of India Pvt. Ltd. , New Delhi – 2008.

2. D. P. Mukherjee, *Fundamentals Of Computer Graphics And Multimedia* Prentice Hall Of India Pvt. Ltd. , New Delhi – 1st Edition 2009.

3. Peter Shirley, *Fundamentals of Computer Graphics*, A.K. Peters Ltd, Wellesley, United States, 3rd Edition, 2009.

4. Dr. Jeffrey McConnell J , *Computer Graphics Theory into Practice* , Jones & Bartlett Publishers, Sudbury , 1st Edition , 2006.

5. Donald D. Hearn, *Computer Graphics with Open GL*, University of Illinois at Urbana-Champaign, India,4th Edition, 2011.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021– 2022 Batch onwards)

Elective-I

Title of the Paper : Compiler Design
Semester : V **Contact Hours: 5**
Sub Code : 21JE5B **Credits: 5**

Objectives:

To acquire knowledge about Compilers , Lexical Analysis , Syntax Analysis, Intermediate Code Generation, Code Generation, Code Optimization.

Unit- I

Introduction To Compilers-Introduction-What are Compilers: Analysis-Synthesis Model-Examples of Software Tools Used for Analysis-Conventional Compiler-Classification of Compilers-Analysis of source program-Phases of a Compiler: Lexical Analysis(Scanning/Scanner)-Syntax Analysis(Parsing/Parser)-Semantic Analysis-Code Optimisation-Code Generation-Symbol Table Management -Error Detection and ReportingCousins of Compiler: Preprocessor-Assemblers-Loaders-Linkers-Grouping of Phases:Front End and Back End-Passes-Reducing the Number of Passes-Compiler Construction Tools-Scanner Generator-Parser Genetator-Syntax-Directed Translation Engines-Automatic Code GeneratorData-Flow Engines Lexical Analysis -Introduction-Definition of Lexical Analysis-Role of Lexical Analyser: Issues in Lexical Analysis-Tokens, Patterns, Lexemes-Attributes for TokensLexical Errors-Panic Mode Error Recovery Strategy-Input Buffering:Buffer Methods-Buffer Pairs-Sentinels-Specification of Tokens-Recognition of Tokens:Finite AUTOMATA-NFA-DFARegular Expression to NFA-Conversion of NFA to DFA-Minimisation of DFA Optimisation of DFA from Regular Expression-LEX Tool-Declarations-Transition Rules-Auxiliary Procedures- Lexical Library.

Unit- II

Syntax Analysis-Introduction-Role of the Parser:Error Handling-Error Recovery Strategies-Writing Grammars-Grammars-Definition-Type of Grammar-Context-free-grammar-A Production(Productions for A)-Derivations using a Grammar-Notations for CFG-Sentential Forms-Parse Tree (Derivation tree)-Yield of Parser Tree. Parsing-Introduction-Types of Parsing:Top down Parsing(Ll(K))-Bottom up Parsing(LR(K))-Shift Reduce Parsing-Operator Precedence Parsing:Detailed Steps for Solving Operator Precedence Parsing Problems-Error Recovery in Operator Precedence Parsing-Handling Errors during Reductions-LR Parsers:SLR Parser-Canonical LR Parser-LALR Parser.

Unit- III

Intermediate Code Generation-Introduction-Generation of Intermediate Code:Representation of intermediate language-Types of three address statement-Implementation of three address Code-styles of syntax directed Translations-Declarations:Declaration in a procedure- Translation scheme for declaration in a procedure-Declaration in nested proceduresAssignment statement: Syntax directed translation scheme Ready using Temporary names- Addressing array elements-Boolean Expression:Numerical representation-Flow of control statements - Case Statements - Backpatching-Procedural calls-Calling the Procedure - Type Conversion

Unit- IV

Code Generation-Issues in the Design of Code Generator : Input to the code Generator Target programs-Memory management -Instruction Selection - Register Allocation -Evaluation Order - The Target machine -Runtime Storage Management: Static allocation -Stack allocation - Basic Blocks and flow Graphs: Basic Block -Transformation on Basic Block - Flow graph - Loops-Next use Information -A Simple Code Generator : Code Generation- Code Generation Algorithm - Register and Address Descriptors-Function Gatereg()-Conditional Statements -DAG Representation of Basic Blocks: DAG for Basic Block - DAG Construction -Applications of DAGS-Peephole Optimisation : Definition Goals-Method

Unit- V

Code Optimisation - Introduction : Criteria for code Improving Transformation Getting Better Performance -An Organisation for an Optimising Compiler - Principal sources of optimisation : function -Preserving Transformations -loop Optimisation -Optimisation of Basic Blocks: Basic Blocks-Basic Block Optimisation -Building Expression DGAs-Introduction to Global Data Flow Analysis: Point and paths-Reaching Definitions-Global Data Flow Analysis

Dataflow Analysis of Structured Programs-Dataflow Equations for Reaching DefinitionsComputation of"gen" and "kill" - Computation of "in" and "out"-Dealing with loops Representation of sets.

Text Book:

Dr.R.Venkatesh, Dr.N.Uma Maheshwari,Ms.S.Jeyanthi, Compiler Design, Published by Yes Dee Publishing Pvt Ltd,India,2015.

Chapters:

Unit- I : 1.1 to 1.7, 2.1 to 2.8.

Unit- II: 3.1 to 3.5, 4.1 to 4.5.

Unit- III: 5.1 to 5.9.

Unit- IV: 6.1 to 6.9.

Unit- V: 7.1 to 7.4.

Reference Books:

1. Alfred V.Aho , Ravi sethi Jeffrey D.Ullman , Compilers Principles , Techniques and Tools Pearson Education, 3rd Edition, 2007.
2. D.Chithra , Principles of Compiler Design , CBS , 2nd Edition , 2011.
3. Alfred V.Aho , Ravi Sethi Jeffrey D.Ullman , Compilers Principles , Techniques and Tools , Darling Kindersley (India) , 1st Edition , 2007.
4. Sandeep Saxena and Rajkumar Singh Rathore , Compiler Design , S.Chand and Co Ltd. , 2nd Edition , 2013.
5. Aho, Ravi Sethi , Ullman , Compilers , Narosa Publishing House , 2nd Edition , 2006

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)
Elective-I

Title of the Paper	**: Skill Based Elective-Dot Net Programming Lab**	
Semester	**: V**	**Contact Hours: 2**
Sub Code	**: 21SEJ5P**	**Credits: 2**

List of Programs:

Window Applications:

1. Mathematical Functions using ComboBox
2. Change Font and color of text using Dialog Controls
3. Pressure and Sugar level using Track Bar
4. Date of birth Calculation using DateTimePicker
5. Accessing a Web page using LinkLabel
6. Add or Remove Items using ListBox
7. ZoomIn and ZoomOut an image using MouseEvents
8. Word pad Manipulation using MenuStrip
9. Filterdata from Employee Database using OLEDB

Console Applications:

10. Determine Grade value using Control Statements
11. Matrix Summation using Arrays
12. Factorial of odd and even numbers using Functions
13. Display Rectangle Shape using Procedures
14. EB Bill calculation using Structures
15. Checking Password using Properties
16. Tribonacci Series using Inheritance
17. Standard Deviation of given elements using Delegates

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B.C.A

(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper : Core-Data Communication and Computer Networks
Semester : VI **Contact Hours: 6**
Sub Code : 21J61 **Credits:4**

Objective:

To acquire knowledge about transmission media, LAN, ISDN, ATM, Transport Layer concept, Network Architectures and OSI Model, Communication Media and Data Transmission

.Unit –I

Introduction: A Brief History – Application – Computer Networks – Categories of Networks – Standards and Standards Organizations. **Network Architectures and OSI Model :** Network Architecture – Open Systems and OSI Model - TCP/IP Architecture – Advantages and Disadvantages of Layer Architectures - Distributed Systems and Client-Server Models.

Unit – II

Communication Media and Data Transmission: Data Representation and Transmission – Fourier Analysis–Analog and Digital Data Transmission – Modulation and Demodulation - Transmission media –Wireless Communications – Data Transmission Basics – Transmission Mode – Interfacing - Multiplexing. **Error Detection and Correction:** Types of Errors – Error Detection – Error Correction.

Unit – III

Data Link Control and Protocol Concepts: Flow Control – Error Control– Asynchronous Protocols – Synchronous Protocols – High-Level Data Link Control (HDLC).

Local Area Networks: LAN Transmission Equipment – Ethernet: IEEE Standard 802.3 - Token Bus: IEEE Standard 802.4 - Token Ring: IEEE Standard 802.5 – Fiber Distributed Data Interface (FDDI) – Distributed Queue Dual Bus - (DQDB): IEEE Standard 802.6 – Ethernet Technologies.

Unit – IV

Integrated Services and Routing Protocols: Integrating Services – ISDN Services –ISDN Topology – ISDN Protocols – Broadband ISDN – Asynchronous Transfer Mode (ATM) –Principal Characteristics of ATM–Frame Relay. **Internetworking:** Principles of Internetworking – Datagram and Virtual Circuit Services - Routing Principles – Internetwork Protocols (IP) – Shortcomings of IPv4 - IP Next Generation.

Unit – V

Network Applications: Client-Server Model – Domain Name System (DNS) – Telnet – File transfer And Remote File Access – Electronic Mail – World Wide Web (WWW). **Networking Security:** Fundamental Concepts – A Model for Network Security– Malicious Software – Security Services and Cryptography–Security Network Using Firewall– Intrusion Detection – Network Security Tools.

Text Book :

Brijendra Singh, *Data Communications and Networks* PHI Learning Private Limited,,NewDelhi, 4thEdition , 2014.

Chapters:

Unit I	: 1.1 - 1.4, 1.8, and 2.1 - 2.5.
Unit II	: 3.1-3.9, 3.11, 4.1- 4.3.
Unit III	: 6.1 - 6.5, 7.2 - 7.7, 7.10.
Unit IV	: 9.1 - 9.8, 12.1 -12.3, 12.5 - 12.7.
Unit V	: 14.1 - 14.6, 16.1, 16.4 -16.9.

Reference Books:

1. Comer, *Computer Networks & Internet with Internet Applications*, PearsonEducation, Pearson Prentice Hall, NewDelhi ,4thEdition, 2004
2. Achyut s Godbole , Atul Kahate , *Data Communications And Networks*, TataMcGrawHill, 2ndEdition ,2013.
3. Simin HaykinsS, *Communication System*, Tata McGraw- Hill, New Delhi,4thEdition, 2006.
4. Tanenbam S, *Computer Network*, PHI Prentice Hall, New Delhi, 4thEdition, 2004.
5. William Stallings, *Data and Computer Communication Network*, Tata McGrawHillDelhi, 6thEdition, 2007.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core- Web Technology**	
Semester	**: V**	**Contact Hours:5**
5SubCode	**: 21J62**	**Credits : 4**

Objectives:

To enable to create their own website in internet, Database: SQL, MySQL, LINQ and Java DB, Cascading Style Sheets.

Unit-I

Introduction to HTML5: Introduction-Editing HTML5-First HTML5 Example-W3C HTML5 Validation Service-Headings-Linking - Images: Alt Attribute- Void Elements – Using Images as Hyperlinks -Special Characters and Horizontal Rules-Lists-Tables-Forms-Internal Linking-Meta Element-New HTML5 Form input Types.

Unit-II

Introduction to Cascading Style Sheets™(CSS): Introduction –Inline Styles-Embedded Style Sheets-Conflicting Styles-Linking External Style Sheets-Positioning Elements: Absolute Positioning, Z-index-Positioning Elements: Relative Positioning, span-Backgrounds-Text Shadows-Rounded Corners-Color-Box Shadows-Linear Gradients; Introducing Vendor Prefixes-Radial Gradients – (Optional: WebKit Only)Text Stroke-Multiple Background Images-(Optional: WebKit Only)Reflections-Image Borders-Animation; Selectors-Transitions and Transformations.

Unit-III

JavaScript: Introduction to Scripting: Introduction-Your First Script: Displaying a Line of Text with JavaScript in a Web Page- JavaScript: Function : Function Definitions- JavaScript: Arrays: Arrays- Declaring and Allocating Arrays- Passing Arrays to Functions- Multidimensional Arrays - JavaScript: Objects: String Objects-Date Object-Boolean and Number Objects-Document Object-Using JSON to Represent Objects.

Unit-IV

Database: SQL, MySQL, LINQ and Java DB : Introduction - Relational Databases - Relational Database Overview: A books Database - SQL - Basic SELECT Query - WHERE Clause - ORDER BY Clause - Merging Data from Multiple Tables: INNER JOIN - INSERT Statement -UPDATE Statement - DELETE Statement - MySQL - Instructions for Setting Up a MySQL User Account - Creating Databases in MySQL.

Unit-V

XML: Introduction - XML Basics-Structuring Data-XML Namespaces-Document Type Definition(DTDs). **PHP**: Introduction-Simple PHP Program-Converting Between Data Types-Arithmetic Operators-Initializing and Manipulating Arrays-String Comparisons-String Processing with Regular Expressions.

Text Book:

Paul Deitel, Harvey Deitel, Abbey Deitel, *Internet & World Wide Web, How to Program*, Pearson Edition, 5th Edition 2012.

Chapters:

Unit - I : 2.1-2.13,3.2

Unit - II : 4.1-4.8,5.2-5.13

Unit – III : 6.1,6.2,9.3,10.2,10.3,10.7,10.10,11.3-11.6,11.8

Unit – IV : 18.1-18.5

Unit - V : 15.1-15.5,19.1-19.7

Reference Books:

1. Dr. Vaka Murali Mohan , S. Pratap Singh , *The Modern Approach to Web Technologies* , Scirech Publication , 1st Edition , 2010
2. Akilandeswari J & Gopalan NP, *TCP/IP to Internet Application Architecture, PHI Publications,* New Delhi,2nd Edition, 2007.
3. Ivan Bayross, *Web Technologies part II*, BPB publications, NewDelhi, 2nd Edition, 2007.
4. Rajkamal,*Web Technologies*, TMH Publications, New Delhi, 1st Edition, 2007.
5. Schafer Steven M , *HTML, XHTML&CSS*, Wiley Publishing, 5th Edition, 2010.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A

(w.e.f. 2021 – 2022 Batch onwards)

Title of the Paper	**: Core- Web Technology Lab**	
Semester	**: V**	**Contact Hours: 5**
SubCode	**:21J6P**	**Credits : 3**

List of Programs:

HTML:

1. List
2. Link
3. Frames
4. Tables
5. Designing a Form

JAVA SCRIPT:

6. Arithmetic Operations
7. Color Palette
8. Online Examination
9. Window Objects
10. Pizza Order

PHP:

11. Program Using String.
12. Program Using String Length Function.
13. Program Using String OOPS Function.
14. Program Using Switch Statement.
15. Program Using Function.
16. Program Using Array.

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B.C.A
(w.e.f. 2021– 2022 Batch onwards)

Elective-II

Title of the Paper	**: Data Mining**	
Semester	**: VI**	**Contact Hours: 5**
Sub Code	**: 21JE6A**	**Credits: 5**

Objectives:

To acquire knowledge about retrieval of data from voluminous data in a desired manner, Association Rules, Decision Trees, Clustering Techniques.

Unit-I

Introduction: Basic Data Mining –Data Mining Versus Knowledge Discovery in Databases – Data Mining Issues – Data Mining Metrics – Social Implications of Data Mining – Data Mining from a Database Perspective. **Related Concepts:** Database / OLTP Systems – Fuzzy Sets and Fuzzy Logic – Information Retrieval – Decision Support Systems – Dimensional Modeling – Data Warehousing – OLAP.

Unit-II

Data Mining Techniques: Introduction – A Statistical Perspective on Data Mining – Similarity Measures – Decision Tress – Neural Networks – Genetic Algorithms**. Classification:** Introduction – Statistical-Based Algorithms –Distance-Based Algorithms –Decision Tree-Based Algorithms.

Unit-III

Clustering: Introduction – Similarity and Decision Measures – Outliers – Hierarchical Algorithms – Partitional Algorithms – Clustering Large Databases – Clustering with Categorical Attributes.

Unit-IV

Association Rules: Introduction – Large Itemsets –Basic Algorithms – Parallel and Distributed Algorithms. **Web Mining:** Introduction – Web Content Mining - Web Structure Mining.

Unit-V

Spatial Mining: Introduction – Spatial Data Overview – Spatial Data Mining Primitives – Generalization and Specialization – Spatial Classification Algorithms – Spatial Clustering Algorithm. **Temporal Mining:** Introduction – Modeling Temporal Events – Time Series.

Text Book:

Margaret H. Dunham, S.Sridhar, *DataMining: Introductory and Advanced Topics*, Published by Pearson Education, 1th Edition, 2004.

Chapters:

Unit I : 1.1 to 1.6, 2.1. to 2.7.

Unit II : 3.1 to 3.6, 4.1 to 4.4.

Unit III : 5.1 to5.7.

Unit IV : 6.1 to 6.4, 7.1 to 7.3.

Unit V : 8.1 to 8.4, 8.6, 8.7, 9.1 to 9.3

Reference Books:

1. Arun K.Pujari,*Data Mining Techniques* , Universities press, 3rd Edition, 2013.
2. S.K. Mourya, Shalu Gupta, *Data Mining and Data warehousing* , Narosa PublishingHouse Private Ltd , 1st Edition , 2013.
3. Jiawei Han & Micheline kamber,*Datamining Concepts & Techniques*,MorgonKaufmann Publishers, San Francisco,USA,2nd Edition,2010.
4. MargaretDunhamH&SridharS,*IntroductoryandAdvancedtopicsinDataMining*, Pearson Education, New Delhi, 2nd Edition,2016.
5. G. K. Gupta, "*Introduction To Data Mining With Case Studies*", EasternEconomy Edition, Prentice Hall Of India, 2nd Edition 2011.

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DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A
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Elective-II

Title of the Paper	**: Internet of Things**	
Semester	**: VI**	**Contact Hours: 5**
Sub Code	**: 21JE6B**	**Credits: 5**

Objectives:

The Internet is evolving to connect people to physical things and also physical things to other physical things all in real time. It's becoming the Internet of Things (IoT).

Unit –I

Introduction of Internet of Things: Introduction – Physical design of IoT – Logical Design of IoT – IoT Enabling Technologies IoT Levels & Deployment Templates. – **Domain Specific IoTs:** Introduction – Home Automation – Cities – Environment - Energy.

Unit – II

IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT. **IoT System Management with NETCONF-YANG:** Need for IOT Systems Management Protocol (SNMP) – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF-YANG.

Unit – III

IoT Platforms Design Methodology: Introduction – IoT Design Methodology. **IoT Systems – Logical Design using Python:** Introduction – Installing Python – Python Data Types & Data Structures – Control Flow – Functions – Modules – Packages – File Handling.

Unit –IV

IoT Physical Devices & Endpoints: What is an IoT devices – Exemplary Device: Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT Devices. **IoT Physical Services & Cloud Offerings:** Introduction to Cloud Storage Models & Communication APIs – Wamp-Auto Bahn for IOT – Xively Cloud for IoT – Python Web Application Framework–Django – Designing a RESTful Web API – Amazon Web Services for IoT.

Unit-V

Data Analytics for IOT: Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch data Analysis – Apache Oozie – Apache Spark – Apache Storm. **Tools for IoT:** Introduction – Chef – Chef Case Studies – Puppet –Puppet Case Study – Multi-tier Deployment.

Text Book:

Arshdeep Bahga, Vijay Madisetti.,*Internet of Things* , Universities Press (India) Private Ltd ,1 st Edition , 2017.

Chapters:

Unit - I : 1.1 to 1.5, 2.1 to 2.5

Unit - II : 3.1 to 3.4, 4.1 – 4.5

Unit - III : 5.1, 5.2, 6.1 – 6.8

Unit - IV : 7.1, 7.2,7.4 – 7.7

Unit - V : 10.1 to 10.6, 11.1 – 11.5

Reference Books:

1. Jamil Y. Khan and Mehmet R. Yuce, *The Internet of Things, Systems and Applications,* Jenny Stanford Publishing , 1 st Edition ,2019.
2. Pethuraj and Anupama C. Raman, *The Internet of Things*, CRC Press,An Auerbach Book, 2017.
3. AdrianMcEwen & HakimCassimally, Designing , *The Internet of Things,* Willey Publication, 1 st Edition, 2014.
4. Pradeeka seneviratne, *Hands – on Internet of Things with Blynk*, Packt Publishing, 2018.
5. Sean Smith, *The Internet of Risky Things:* Trusting the Devices that Surround us, O'Reilly Media, 1 st Edition 2017

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B.C.A
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Elective-III

Title of the Paper	**: Project**	
Semester	**: VI**	**Contact Hours: 5**
Sub Code	**: 21JEPR6**	**Credits: 5**

The students are allowed to develop their project within our campus with the help of the internal staff members.

In the first review the students submit their title of the project and synopsis, and also submit the determination of the modules.

In the second review 50% of the project is completed and demonstrate the project.

In the final review the students prepare the PowerPoint presentation. The oral is must for the completion of the project.

This report will be valuated 80marks for external examiner and 20marks for internal examiner.

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Elective-III

Title of the Paper	**: Skill Based Elective - Android Lab**	
Semester	**: VI**	**Contact Hours: 2**
Sub Code	**: 21SEJ6P**	**Credits: 2**

List of Programs:

1. Develop an application that uses GUI components, Font and Colors.

2. Develop an application that uses Layout Managers and event listeners.

3. Develop a native calculator application.

4. Write an application that draws basic graphical primitives on the screen.

5. Develop an application that makes use of database.

6. Develop an application that makes use of RSS Feed.

7. Implement an application that implements Multi-threading.

8. Develop a native application that uses GPS location information.

9. Implement an application that writes data to the SD card.

10. Implement an application that creates an alert upon receiving a message.

11. Write a mobile application that creates alarm clock.