KISHKINDA UNIVERSITY

ಕಿಷ್ಕಿಂದ ವಿಶ್ವವಿದ್ಯಾಲಯ

(State Private University Established Under Karnataka State Act No. 20 of 2023)

Advancing Knowledge Transforming Lives

Faculty of Science

3rd & 4th Semester Syllabus
Bachelor of Computer Applications
Batch: 2023-26

DEPARTMENT OF BACHELOR OF COMPUTER APPLICATIONS

Distribution of Courses in Undergraduate Program III Semester as per Choice Based Credit System (CBCS) Proposed for UG (BCA) Programs

Second Year; Semester-III									
Objective: Foundation, Understanding, Exploration & Ability to solve well defined problems									
Course Code	**Title of the Course**	**Marks**			**Teaching Hours/ week**			**Credit**	**Duration of exams (Hours)**
		CIE	**SEE**	**Total**	**L**	**T**	**P**		
23BCA31	Python Programming & Applications	50	50	100	4	0	0	4	3
23BCA31P	Python Programming Lab	25	25	50	0	0	4	2	2
23BCA32	Database Management Systems	50	50	100	4	0	0	4	3
23BCA32P	Database Management Systems Lab	25	25	50	0	0	4	2	2
23BCA33	Mathematical Foundation for Computer Applications	50	50	100	4	0	0	4	3
23BCA34	Principles of Artificial Intelligence	50	50	100	3	0	0	3	3
23BCA35	Artificial Intelligence Lab	25	25	50	0	0	2	1	2
23BCA36	Environmental Studies	50	50	100	2	0	0	2	2
23BCA37	Universal Human Values	50	50	100	1	0	0	1	1
Total Marks				**700**	**Semester Credits**			**23**	

DEPARTMENT OF BACHELOR OF COMPUTER APPLICATIONS

Distribution of Courses in Undergraduate Program IV Semester as per Choice Based Credit System (CBCS) Proposed for UG (BCA) Programs

Second Year; Semester - IV									
Objective: Foundation, Understanding, Exploration & Ability to solve well defined problems									
Course code	**Title of the Paper**	**Marks**			**Teaching Hours/week**			**Credit**	**Duration of exams (Hours)**
		CIE	**SEE**	**Total**	**L**	**T**	**P**		
23BCA41	C#.NET	50	50	100	4	0	0	4	3
23BCA41P	.NET Lab	25	25	50	0	0	4	2	2
23BCA42	Advanced Web	50	50	100	4	0	0	4	3
23BCA42P	Advanced Web Lab	25	25	50	0	0	4	2	2
23BCA43	Operations Research	50	50	100	3	0	0	3	3
23BCA44	Computer Networks	50	50	100	3	0	0	3	1
23BCA45	Machine Learning	50	50	100	3	0	0	3	3
23BCA45P	Machine Learning Lab	25	25	50	0	0	2	1	2
23BCA46P	Mini Project	50	50	100	1	0	0	1	1
Total Marks				**750**	**Semester Credits**			**23**	

BCA- Semester: III

Course Title: Python Programming & Application

Course Code:	**23BCA31**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**4:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**50**	Credits	**4**

Module - 1	**10 Hours**
Introduction to Python Programming: Overview of Python; History of Python; Features and applications of Python; Python Versions; Installation of Python Software; Simple Python Program; Command Line Mode; IDLE Python Development Environment **Python Basic Concepts:** Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions	
Module - 2	**10 Hours**
Strings, Exception Handling and Python Functions: Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation; Comparison; Slicing and Joining; Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Types of Errors; Exceptions; Exception Handling using try; except and finally; Types of Functions; Function Definition- Syntax; Function Calling; Passing Parameters/arguments; the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions.	
Module - 3	**10 Hours**
Lists, Tuples and Sets: Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. Dictionaries: Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. Tuples and Sets: Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods.	
Module - 4	**10 Hours**
Python File Operations: Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations. **Object Oriented Programming:** Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading. **Database Programming:** Connecting to a database, Creating Tables, INSERT, UPDATE, DELETE and READ operations, Transaction Control, Disconnecting from a database, Exception Handling in Databases.	

Module - 5	**10 Hours**
Python Built-In Functions: The tkinter Module; Window and Widgets; Layout Management- pack, grid and place. **Python SQLite**: The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables Insert, Select, Update. Delete and Drop Records. **Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and Data Frames, Creating Data Frames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on Data Frames. **Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.	

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

CO1	Understand the overview of Python Programming
CO2	Demonstrate proficiency in handling of loops and creation of functions
CO3	Identify the method to create and manipulate lists, tuples and dictionaries
CO4	Interpret the concepts of Object Oriented Programming as used in Python
CO5	Develop essential skills such as Python Programming, Basics of Python, Python built-in functions, Python SQLite, Data Analysis, Data Visualization

Suggested Learning Resources:

1.Gowrishankar S and Veena A, Introduction to Python Programming

Text Books:

1.Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019
2. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, Apress®, 2015
3. Advance Core Python Programming, MeenuKohli, BPB Publications, 2021.
4. Core PYTHON Applications Programming, Wesley J. Chun, 3rd Edition, Prentice Hall, 2012

Web Links and e-Resources:

https://youtube.com/playlist?list=PLxCzCOWd7aiEb4apyN1Y8mD-QuUTr3SPQ&si=_WkpLIwCpBX01s2M

BCA- Semester: III

Course Title: Python Programming Lab

Course Code:	**23BCA31P**	CIE Marks	**25**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**25**
		Total Marks	**50**
Teaching Hours/Week (L:T:P: S)	**0:0:4:0**	Exam Hours	**2 Hours**
Total Hours of Pedagogy	**40**	Credits	**2**

Course Outcomes (CO's): At the end of the course the student will be able to:

CO1	To acquire programming skills in core Python.
CO2	To be able to introduce core programming basics and program design with functions using Python programming language.
CO3	To be able to introduce core programming design with functions using Python programming language.
CO4	Develop Python Built in Functions using Python programming lab.
CO5	Demonstrate working with database.

Evaluation Scheme for Lab Examination

Assessment Criteria		**Marks**
Program - 1 from Part A	Write-up	**05**
	Execution	**05**
Program -2 from Part B	Write-up	**05**
	Execution	**05**
Viva Voice		**05**
	Total	**25**

Programming For Practice:

PART A

1. Write a Python program to display Multiplication Tables.
2. Write a Python program to create a calculator.
3. Write a Python program to find the sum of n natural number.
4. Write a Python program to find the square root of a number.

PART B

1. Write a Python program to demonstrate use of advanced regular expressions for data validation.
2. Write a Python program to draw Line chart and Bar chart using Matplotlib.
3. Write a Python program to create Data Frame from Excel sheet using Pandas and Perform Operations on Data Frames.
4. Write a Python program to find whether the given string is palindrome.

Programs for execution:

Part A:

1.Write a Python program Check if a number belongs to the Fibonacci Sequence

2. Write a Python program Solve Quadratic Equations

3. Write a Python program Check if a given number is a Prime Number or not

4. Write a Python program Implement a sequential search
5. Write a Python program Explore string functions
6. Write a Python program Implement Selection Sort
7. Write a Python program Implement Stack
8. Write a Python program Read and write into a file

Part-B

1. Write a Python program to demonstrate usage of basic regular expression
2. Write a Python program to demonstrate use of List
3. Write a Python program to demonstrate use of Dictionaries
4. Write a Python program to create SQLite Database and Perform Operations on Tables
5. Write a Python program to demonstrate Exceptions in Python
6. Write a Python program to create a Python Built-in Functions using Tkinter modul
7. Write a Python program to draw Histogram and Pie chart using Matplotlib
8. Write a Python program to create Array using NumPy and Perform Operations on Array

BCA- Semester: III

Course Title: Database Management Systems

Course Code:	**23BCA32**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**4:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**50**	Credits	**4**

Module - 1	**10 Hours**
Introduction to Database Architecture: Introduction to Databases and Database system applications, Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS.	
Module - 2	**10 Hours**
Entity-Relationship Model: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram	
Module - 3	**10 Hours**
Relational Data Model and Relational Algebra: Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views.	
Module - 4	**10 Hours**
Data Normalization: Anomalies in relational database design. Decomposition. Functional dependencies. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form. Introduction to PL/SQL & programming operations in PL/SQL	
Module - 5	**10 Hours**
Transaction Management and Database Security: Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock & Starvation. Advanced Topic: NoSQL.	

Course Outcome (Course Skill Set)

At the end of the course the student will be able to:

CO1	Identify and define database objects, enforce integrity constraints on a database using DBMS.
CO2	Construct an Entity-Relationship (E-R) model from specifications and transform it to a relational model.
CO3	Understanding the relational algebra operations.
CO4	Design databases and apply normalization constraints.
CO5	Explain the transaction processing and concurrency control technique

Text Book:

1. "Fundamentals of Database Systems", Ramez Elamsri, Shamkant B Navathe, Pearson, 7th Edition, 2017.

Reference Book(s):

2. "Database Management Systems", Johannes Gehrke, Raghu Ramakrishnan, McGrawHill, 3rd Edition, 2003.
3. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
4. Introduction to Database System, C J Date, Pearson, 1999.

Database Systems Concepts, Abraham Silberschatz, Henry Korth, S. Sudarshan, 6th Edition, McGraw Hill, 201

Web Links and e-Resources:

BCA- Semester: III

Course Title: Database Management Systems Lab

Course Code:	**23BCA32P**	CIE Marks	**25**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**25**
		Total Marks	**50**
Teaching Hours/Week (L:T:P: S)	**0:0:4:0**	Exam Hours	**2 Hours**
Total Hours of Pedagogy	**40**	Credits	**2**

Course Outcomes (CO's):

At the end of the course the student will be able to:

CO1	Create simple database by using basic commands.
CO2	Analyze the database using Data Definition Language Commands
CO3	Analyze the database using Data Manipulation Language Commands
CO4	To create views & implement locks for a particular table
CO5	Applying PL/SQL for processing database

Evaluation Scheme for Lab Examination

Assessment Criteria		**Marks**
Program - 1 from Part A	Write Up	05
	Execution	05
Program -2 from Part B	Write Up	05
	Execution	05
Viva Voice		05
	Total	**25**

Practical:

1. Perform the queries based on Data Definition Language Commands.
2. Perform the queries based on Data Manipulation Language Commands.
3. Perform the queries based on DCL and TCL commands.
4. Perform the queries based on aggregate functions and group functions.
5. Implement the Nested Queries in SQL.
6. Implement Join operations in SQL.
7. Create views for a particular table.
8. Implement Locks for a particular table.
9. Write PL/SQL procedure for an application using exception handling.
10. Write PL/SQL procedure for an application using cursors.
11. Write a PL/SQL procedure for an application using functions.
12. Write a PL/SQL procedure for an application using package.

BCA- Semester: III

Course Title: Mathematical Foundation for computer Applications

Course Code:	**23BCA33**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**4:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**50**	Credits	**4**

Module - 1	**10 Hours**
Mathematical logic: Introduction-statements Connectives-negation, conjunction, disjunction- statement formulas and truth tables- Conditional and Biconditional statements- tautology and contradiction, negation, consequences of implication-Contrapositive and converse, problems, proving a statement by the method of contradiction by giving counter example. Duality law–predicates and Quantifiers, Arguments.	
Module - 2	**10 Hours**
Complex Numbers: Addition and multiplication of complex numbers, Modulus, amplitude and conjugate of a complex number, real and imaginary parts and the conjugate of a complex number. Geometric representation of the sum, difference, product and quotient of two complex numbers as well as of the modulus, De-Moivre's theorem, roots of unity.	
Module - 3	**10 Hours**
Linear Algebra: Vector spaces, subspaces, linear dependence basis, dimensions, algebra of linear transformations, Algebra of matrices, rank and determinant of matrices, linear equations, Eigenvalues and Eigenvectors, Cayley-Hamilton theorem, Matrix representation of linear transformations, change of basis, canonical forms, diagonal forms, triangular forms.	
Module - 4	**10 Hours**
Statistical Methods: Introduction, Definition and scope of Statistics, Measures of average Median, Mode, geometric and harmonic means, Measure of dispersion and its Coefficients –Range-Quartile Deviation, Standard Deviation -, Mean Deviation , Coefficient of Variance and Standard Deviation, Analysis of Frequency Distributions, Presentation: tabular and graphical data including histogram and ogives. Concepts of statistical population and sample.	
Module - 5	**10 Hours**
Differential Calculus: Functions and limits, Continuity of a function, Differentiability - Simple Differentiation of Algebraic Functions, product rule and quotient rule– Evaluation of First and Second Order Derivatives.	

Course Outcome (Course Skill Set): At the end of the course, the student will be able to:

CO1	Study and solve problems related to connectives, predicates, quantifiers using truth table.
CO2	Study and analyse the problems related to Complex numbers and Modulus Amplitude.
CO3	Develop basic knowledge of matrices and to solve equations using Cramer's rule.
CO4	Verify trigonometric identities, using proper logic and use trigonometric equations.
CO5	Differentiate all polynomials and trigonometric functions and compositions of those functions.

References:

1. M. Shantakumar, Engineering Mathematics – Volume I, Vasundhara Publishers, Mysore.
2. H. K. Das, Engineering Mathematics, S. Chand & Co., N. Delhi.
3. Shanti Narayan, A Textbook of Matrices, S. Chand Publishing N. Delhi
4. S.L Loney, Plane Trigonometry, Part 1 and 2, Arihant Publications, 2016
5. Shanti Narayan, Differential Calculus, S.Chand& Co. 1998.

Web Links and e-Resources:

https://youtube.com/playlist?list=PLHgkOdsvZ17wDnvV6SZ3CwojjzD6g8w0&si=N51JazZWycE5M_Hw

BCA- Semester: III

Course Title: Principles of Artificial Intelligence

Course Code:	**23BCA34**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**40**	Credits	**3**

Pre-requisites:

- Knowledge of a programming language and Mathematics.

Course objectives:

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving.
3. Get to know approaches of inference, perception, Uncertain Knowledge and Reasoning.
4. Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.
5. Experiment with a machine learning model for simulation and analysis.

Module – 1 **8 Hours**

Introduction: Definition of AI, Foundations and History of AI
Intelligent Agents: Agents and environment, Concept of Rationality, The nature of environment, The structure of agents.

Module - 2 **8 Hours**

Problem-solving: Problem-solving agents, Example problems, Searching for Solutions Uninformed Search Strategies: Breadth First search, Depth First Search, Iterative deepening depth first search.

Module – 3 **8 Hours**

Informed Search Strategies: Heuristic functions, Greedy best first search, A*search. Heuristic Functions
Logical Agents: Knowledge–based agents, The Wumpus world, Logic, Propositional logic, Reasoning patterns in Propositional Logic

Module – 4 **8 Hours**

First Order Logic: Representation Revisited, Syntax and Semantics of First Order logic, Using First Order logic.
Inference in First Order Logic: Propositional Versus First Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution

Module – 5 **8 Hours**

Uncertain Knowledge and Reasoning: Quantifying Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference using Full Joint Distributions, Independence, Baye's Rule and its use. Wumpus World Revisited

Course Outcomes:

At the end of the course the student will be able to:

1. Apply knowledge of agent architecture, searching and reasoning techniques for different applications.
2. Analyse Searching and Inferencing Techniques.
3. Develop knowledge base sentences using propositional logic and first order logic.
4. Demonstrating agents, searching and inferencing.
5. Illustrate the application of probability in uncertain reasoning.

Suggested Learning Resources:

SN	Title of the Book	Name of the Author/s	Name of the Publisher	Edition and Year
Textbooks				
1	Artificial Intelligence	Stuart J. Russell and Peter Norvig	Pearson	3rd Edition,2015
Reference Books				
1	Introduction to Artificial Intelligence	Elaine Rich, Kevin Knight	Tata McGraw Hill	3rd Edition 2013
2	Artificial Intelligence Structure and strategies for complex	George F Lugar	Pearson Education	5th Edition 2011

BCA- Semester: III

Course Name: Principles of Artificial Intelligence Lab

Course Code:	**23BCA34P**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**0:0:2:0**	Exam Hours	**2 Hours**
Total Hours of Pedagogy	**20**	Credits	**1**

Course Outcomes:

At the end of the course the student will be able to:

1. Apply knowledge of agent architecture, searching and reasoning techniques for different applications.
2. Analyse Searching and Inferencing Techniques.
3. Develop knowledge base sentences using propositional logic and first order logic.
4. Demonstrating agents, searching and inferencing.
5. Illustrate the application of probability in uncertain reasoning.

List of Experiments:

1. Implement and Demonstrate Depth First Search Algorithm on Water Jug Problem
2. Implement and Demonstrate Best First Search Algorithm on any AI problem
3. Solve 8-Queens Problem with suitable assumptions
4. Program to Implement Tic-Tac-Toe game using Python.
5. Implement the 8-puzzle problem.
6. Implementation of TSP using heuristic approach
7. Implement any Game and demonstrate the Game playing strategies
8. Program to Implement Tower of Hanoi using Python.

Semester: IV

Course Title: C# and Dot Net Framework

Course Code:	**23BCA41**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**4:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**40**	Credits	**3**

Module - 1 **08 Hours**
Introduction to .Net Technology: Definition: .Net, .Net Framework Architecture, Native Code, CLR Architecture, Applications of .Net Definition: Scripts, Types of scripts, Advantages and Disadvantages of Client-side and Server-side Scripts. Overview of Client-side Technologies and Server-side Technologies.
Module - 2 **08 Hours** **Introduction to C#:** Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Control Structures-Methods, Arrays, Strings, Structures, Enumerations. **OOPS with C#:** Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading Delegates, Events, Errors and Exceptions
Module - 3 **08 Hours** **Collections and Generics**: Introducing Collections, Benefits of Collection Classes, Understanding and using commonly used collections, Generics, Advantages of Generics, Working of Generics at Runtime, Constraint on Type Parameters, Generic Methods, Generic Collections, Selecting a Collection Class.
Module - 4 **08 Hours** **ASP .NET:** Overview of ASP.NET framework, Stages in Web Forms Processing, Introduction to Server Controls, HTML Controls, Validation Controls, User control, Data Binding Controls, Configuration, Personalization, Session State, Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box, etc.
Module - 5 **08 Hours** **ADO .NET Connectivity:** Introduction to ADO.NET, ADO vs ADO.NET. Architecture: Data reader, Data adopter, Accessing Data with ADO.NET. Programming Web Applications with Web Forms. ASP .NET applications with ADO.NET

Course Outcomes (COs):

At the end of the course, students will be able to:

CO1	Describe .Net Framework and its various features
CO2	Describe Object Oriented Programming concepts like Inheritance and Polymorphism in C# programming language.
CO3	Build custom collections and generics in C#.
CO4	Interpret and Develop Interfaces for real-time applications.
CO5	Describe ADO.Net concepts with real time applications.

Text Book:

1. "Programming in C#", E. Balagurusamy, 4th Edition, Tata McGraw-Hill, 2017.

Reference Books:

2. "Visual Basic.NET", Shirish Chavan, 3rd Edition, Pearson Education,2009.
3. "ASP.NET and VB.NET Web Programming", Matt J. Crouch,Edition 2012.
4. "Computing with C# and the .NET Framework", Arthur Gittleman, 2nd Edition, Jones &Bartlett Publishers, 2011

Web Links and Resources

https://csharp-video-tutorials.blogspot.com/2012/06/part-1-c-tutorial-introduction.html

BCA- Semester: IV

Course Title: .Net Lab

Course Code:	**23BCA41P**	CIE Marks	**25**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**25**
		Total Marks	**50**
Teaching Hours/Week (L:T:P:S)	**0:0:4:0**	Exam Hours	**2**
Total Hours of Pedagogy	**40 Hours**	Credits	**2**

Course Outcomes (CO's):

At the end of the course the student will be able to:

CO1	Develop a console application using C# .NET
CO2	Demonstrate various operations such as conditional statements
CO3	Demonstrate various operations such as control statements
CO4	Apply the OOPS concepts to construct applications.
CO5	Performing database operations

Evaluation Scheme for Lab Examination

Assessment Criteria		**Marks**
Program - 1 from Part A	Write Up	**05**
	Execution	**05**
Program -2 from Part B	Write Up	**05**
	Execution	**05**
Viva Voice		**05**
	Total	**25**

Lab Programs:

1. Develop a C#.Net console applications to demonstrate conditional statements and loops:
   a) Generate Fibonacci series.
   b) Generate various patterns (triangles, diamond, and other patterns) with numbers.
   c) To check Armstrong number or not
2. Develop a C#.Net console application to demonstrate the OOP Concepts:
   a) Using Class and Object
   b) Inheritance
   c) Polymorphism
3. Demonstrate subroutines and functions in C#.NET
4. Demonstrate Multithreaded Programming in C#.NET
5. Develop an application in C#.NET that demonstrates the windows controls.
6. Develop an application for Restaurant menu using Menu strip in C#.Net.
7. Design an ASP.NET Webpage to demonstrate the Label, Button andTextbox controls.
8. Design an ASP.NET Webpage to work with Cross page and Post back submissions.
9. Design an ASP.NET Webpage to work with Dropdown list and List Box controls.
10. Develop an application to implement Windows media player.
11. Develop a web application in VB.NET for dynamic Login Processing
12. Develop a windows application with database connection.

Note: Student must execute a minimum of 10 programs to complete the lab course.

BCA- Semester: IV

Course Title: Advanced WEB

Course Code:	**23BCA42**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**4:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**50**	Credits	**4**

Module – 1	**10 Hours**
HTML 5: Introduction, Common Infrastructure, Semantics of HTML5, HTML5 links, HTML5 Forms & Script elements, Web Application APIs of HTML5.	
Module – 2	**10 Hours**
PHP: Hypertext Preprocessor: Getting Started with PHP - Basic PHP Syntax, Data Types, Variables, Constants, Operators, Control Structures, Functions, Connecting to MySQL using PHP, Building a Web Page using PHP.	
Module – 3	**10 Hours**
PHP with MySQL: Object oriented PHP, Using MySQL: designing &creating your web database, working with MySQL database, accessing MySQL database from web with PHP, Advanced MySQL administration.	
Module – 4	**10 Hours**
jQuery: Why jQuery, features of jQuery library, Adding jQuery to web pages: Dowloading jQuery & jQuery CDN, jQuery Syntax & jQuery Selectors, jQuery Event Methods & their syntaxes, jQuery Effects: Hide and Show, Fading, Sliding, Animation, stop(), jQuery HTML: get & set content: text(), html(), and val(), jQuery - AJAX: Introduction, load(), get() and post() Methods.	
Module – 5	**10 Hours**
Search Engines: Define Search Engine & how does it work, Keywords & Metadata sculpting, Search Engine development & optimization, SEO Web Design, Effective content writing plan, Achieving high rankings, SEO analysis intervals.	

Course outcome (Course Skill Set)
At the end of the course the student will be able to:

CO1	Understanding the HTML5 Web applications development
CO2	Understanding and explains the PHP
CO3	Can work with PHP with MySQL.
CO4	Understanding the importance of jQuery and its Operations in web development.
CO5	Understanding of Search Engines and Web Content Management.

Suggested Learning Resources & References :

1. Matt west, HTML5 Foundation, john wiley and Sons Publications Ltd, 2nd edition
2. Steve suehring and janet valade, PHP, MySQL, JavaScript & HTML5 All-in-one for Dummies, john wiley & sons Publications.
3. Beginning PHP with MySQL: From novice to professional, 4th edition by W.jason Gilmore,Apress.
4. PHP Complete references.

Web Links and e-Resources:

http://www.luciopanasci.it/Ebooks/JQuery%20Cookbook.pdf

BCA- Semester: IV

Course Title: Advanced WEB Lab

Course Code:	**23BCA42P**	CIE Marks	**25**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**25**
		Total Marks	**50**
Teaching Hours/Week (L:T:P:S)	**0:0:4:0**	Exam Hours	**2**
Total Hours of Pedagogy	**40Hours**	Credits	**2**

Course Outcomes (CO's):

At the end of the course the student will be able to:

CO1	Develop a Web application using HTML5
CO2	Design an online registration page for user using HTML5
CO3	Develop the PHP applications
CO4	Apply the PHP with database MySQL Connections.
CO5	Performing database operations

Evaluation Scheme for Lab Examination

Assessment Criteria		**Marks**
Program - 1 from Part A	Write Up	**05**
	Execution	**05**
Program -2 from Part B	Write Up	**05**
	Execution	**05**
Viva Voice		**05**
	Total	**25**

Lab Programs:

HTML5 Practice programmes:

1. HTML5 Link program
2. HTML5 Form program
3. HTML5 Program for Simple Login page

Part-A-HTML5

1.Draw a square using HTML5 SVG, fill the square with green color and make 6px brown stroke width.

2.Write the following mathematical expression by using HTML5 MathML. d=x2-y2

3.Redirecting current page to another page after 5 seconds using HTML5 meta tag.

4.Demonstrate the following HTML5 Semantic tags – < article >, < aside >, < details >, < f igcaption >, < f igure >, < f ooter >, < header >, < main >, < mark >, < section > for a webpage that gives information about travel experience.

5. Design an online registration page for user using HTML5.

Part-B:PHP with MySQL:

1.Write a PHP program to check whether given number is Armstrong or not.

2.To write a PHP program for age calculation.

3.To write a program for display the date and time.

4.To create a PHP page for login without using SQL connection.

5. To read a from database using PHP

6. To manipulate the database data using PHP.

BCA- Semester: IV

Course Title: Operations Research

Course Code:	**23BCA43**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**40**	Credits	**3**

Course Objectives:

CO1	The course aims at building capabilities in the students for analyzing Concepts of O.R
CO2	The objective of this course is to enable the student to understand problems
CO3	Understanding to use resources such as capitals, materials
CO4	Understanding Maximization of profits of shipping products using various methods
CO5	The main objective of this course are productions, controlling, directing, staffing

Module - 1 **8 Hours**
Definition of the term Operations Research – Nature, Management Application, Modelling, Principles of modelling, features, Different Phases, scope, Advantages and Limitations of O.R. General method for solving O.R models and Role of O.R in decision making. Important definitions – solutions to LPP, feasible solution, basic solutions, Basic feasible solution.
Module - 2 **8 Hours**
Optimum basic feasible solution, unbounded solution. Assumptions in LPP, Limitations of LPP, Applicationsof LPP and advantages of LPP. Standard Linear Programming – Formulation of a Linear Programming Solving L.P.P. by Graphical Method Problem. And Simplex Method.
Module - 3 **8 Hours**
Artificial Variable Technique – two phase method and Big M method, Duality – Meaning definitions of primal problem, General rules for converting any primal problem into its dual. Characteristics of Dual problem, Advantages of Duality.
Module - 4 **8 Hours**
Dual formulation procedure and Problems to obtain the dual of LPP. Fundamental Duality theorems, Primal and Dual correspondence. Transportation Problems – Method of finding initial basic feasible solution to Transportation problem-Northwest Corner, Least Cost Method and Vogel's Method.
Module - 5 **8 Hours**
Method of finding initial basic feasible solution to Assignment Problem using Hungarian Method. Sequencing Problems – Definitions, terminology and notations, Principle assumptions, Processing 'n' jobs through two machines Travelling Salesman (Routing) Problems - Formulations of TSP as an assignment problem.

Course Outcome (Course Skill Set)
At the end of the course, the student will be able to:

CO1	Solving LPP using appropriate techniques and optimization solves, interpret results
CO2	Explain the applications of Operations Research
CO3	Describing the Limitations of Operations Research
CO4	Describing the stages of O.R and LPP, productions, controlling, directing, staffing
CO5	Understand the OR specialist and Manager Relationship

Text Books

1. Introduction to Operations Research, Kanti Swaroop, P.K Guptha and Man Mohan, Sultan Chand & Sons, 2005, latest edition.
2. Operations Research: Theory And Applications by J.K. Sharma, Macmillan India Limited (Publisher), 4th Edition.

References:

1. Wayne L Winston: Operations Research Applications and Algorithms, 4th Edition, Cengage Learning, 2003.
2. Hamdy A Taha: Operations Research: An Introduction, 8th Edition, Pearson Education, 2007.
3. S Kalavathy: Operations Research: Preference of 4th Edition and 1st Edition RMD Engineering College 2005

Web Links and e-Resources:

1.https://youtube.com/playlist?list=PLzj2eBwEXFvcUpN5dwIDh2YXjCnfEOFL1&si=j5-aGjVXCQ9iDPx9

2. https://youtu.be/KIKZyHTDR5Q?si=yLaNQeWM0ZW9V-WQ

BCA- Semester: IV

Course Title: Computer Networks

Course Code:	**23BCA44**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**40**	Credits	**3**

Course Objectives:

CO1	Understanding the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
CO2	Understanding the physical Layer
CO3	Compare the different layers of protocols.
CO4	Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.
CO5	Apply the basics of data communication and various types of computer networks in real world applications.

Module - 1	**8 Hours**
Introduction: Computer Networks and its applications, Network structure, network architecture, Topologies, LAN, WAN, MAN, The OSI reference model, The TCP/IP reference model.	
Module - 2	**8 Hours**
The Physical Layer: Transmission Media – Twisted pair, coaxial cable, optical fiber, radio transmission, microwaves and infrared transmission, Switching – message switching, Multiplexing.	
Module - 3	**8 Hours**
The Data Link Layer: Data Link Layer design issues, Error detection – Single parity checking, Checksum, polynomial codes – CRC, Error correction- Hamming code, Elementary data link protocols, sliding window protocols.	
Module - 4	**8 Hours**
The Network Layer: Network layer design issues, Routing algorithms –Flooding, Distance vector routing, Hierarchical routing, Link state routing, Congestion, control algorithms – Leaky bucket, token bucket algorithm, admission control, Hop by Hop choke packets.	
Module - 5	**8 Hours**
The Transport Layer and Application Layer: Elements of Transport service, Elements of Transport, protocols, Internet transport protocols (TCP & UDP), DNS, Electronic Mailing, and World Wide Web.	

Course Outcome (Course Skill Set)
At the end of the course, the student will be able to:

CO1	**E**xplain the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
CO2	Able to explain the physical Layer
CO3	Compare the different layers of protocols.
CO4	Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.
CO5	Apply the basics of data communication and various types of computer networks in real world applications.

References:

1. Computer Networks, Andrew S. Tanenbaum, 5th Edition, Pearson Education, 2010.
2. Data Communication & Networking, Behrouza A Forouzan, 3rd Edition, Tata McGraw Hills.\
3. Data and Computer Communications, William Stallings, 10th Edition, Pearson Education, 2017.
4. Data Communication and Computer Networks, Brijendra Singh, 3rd Edition, PHI, 2012.
5. Data Communication & Network, Dr. Prasad, Wiley Dreamtech.

Web References:

http://highered.mheducation.com/sites/0072967757/index.htmls

BCA- Semester: IV

Course Title: Machine Learning

Course Code:	**23BCA45**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Theory**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P: S)	**3:0:0:0**	Exam Hours	**3 Hours**
Total Hours of Pedagogy	**40**	Credits	**3**

Course Overview:

This course covers fundamental concepts and methods of computational data analysis, including pattern classification, prediction, visualization, and recent topics in deep learning. The course will give the student the basic ideas and intuition behind modern machine learning methods as well as a bit more formal understanding of how, why, and when they work. The underlying theme in the course is statistical inference as it provides the foundation for most of the methods covered.

Course Objectives:

CO1	To understand pattern classification algorithms to classify multivariate data.
CO2	To understand the implementation of genetic algorithms.
CO3	To gain the knowledge on Bayesian and computational learning.
CO4	To understand the instant based learning.
CO5	To create new machine learning techniques.

SYLLABUS

Module-1

BASICS: Learning Problems, Perspectives and Issues, Concept Learning, Find-S, Version Spaces and Candidate Eliminations, Inductive bias.

8 Hours

Module-2

DECISION TREE & NEURAL NETWORKS: Decision Tree Learning - Introduction, Decision tree representation, appropriate problems, ID3 algorithm.
Neural Network Representation Problems, Perceptions Multilayer Networks and Back Propagation Algorithms,

8 Hours

Module-3

BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem, Concept Learning Maximum, Likelihood Minimum Description Length, Principle Bayes Optimal Classifier, Gibbs Algorithm, Naïve, Bayes Classifier, Bayesian Belief Network, EM Algorithm, Probability Learning.

8 Hours

Module-4

INSTANT BASED LEARNING: K- Nearest Neighbour Learning, Locally weighted Regression Radial, Bases Functions, Case Based Learning. **8 Hours**

Module-5

CLUSTERING: Overview- Types of clustering, Types of clusters, K-Means, Agglomerative Hierarchical, Clustering, Density-Based Clustering, Graph-Based Clustering, Cluster evaluation. **8 Hours**

Course Outcome (Course Skill Set): At the end of the course, the student will be able to:

CO1	Develop and apply classification algorithms to classify multivariate data.
CO2	Apply learning algorithms for finding relationships between data variables.
CO3	Develop and apply reinforcement learning algorithms for learning to control complex systems.
CO4	Scientific reports on computational machine learning methods, results and conclusions.
CO5	Apply clustering algorithms to real time problems.

TEXT BOOK:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill, 2010
2. Bishop, Christopher. *Neural Networks for Pattern Recognition*. New York, NY: Oxford University Press, 1995

REFERENCES:

1. Ethem Alpaydin, (2004) "Introduction to Machine Learning (Adaptive Computation and Machine Learning)", The MIT Press
2. T. astie, R. Tibshirani, J. H. Friedman, "The Elements of Statistical Learning", Springer (2^{nd} ed.), 2009

BCA- Semester: IV

Course Name: MACHINE LEARNING LAB

Course Code:	**23BCA45P**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P:S)	**0:0:2:0**	Exam Hours	**2 Hours**
Total Hours of Pedagogy	**30**	Credits	**1**

Course Objective: The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python.

Course Outcomes: After the completion of the course the student can able to:

CO1	Understand complexity of Machine Learning algorithms and their limitations;
CO2	Understand modern notions in data analysis-oriented computing;
CO3	Apply various supervised and un-supervised algorithms to solve real time complex problems.
CO4	Analyse performance of various machine learning algorithms.
CO5	Apply basic principles of machine learning in solutions that require learning, classification, and prediction.

List of Experiments

1. Implement k-nearest neighbours classification using python.
2. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
3. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.
4. Implement Naïve Bayes theorem to classify the English text
5. Implement an algorithm to demonstrate the significance of genetic algorithm
6. Implement the finite words classification system using Back-propagation algorithm
7. Implement an algorithm to demonstrate the significance of genetic algorithm
8. Implement DBSCAN clustering approach.

BCA- Semester: IV

Course Name: Mini Project

Course Code:	**23BCA46P**	CIE Marks	**50**
Course Type (Theory / Practical / Integrated)	**Practical**	SEE Marks	**50**
		Total Marks	**100**
Teaching Hours/Week (L:T:P:S)	**0:0:2:0**	Exam Hours	**2 Hours**
Total Hours of Pedagogy	**30**	Credits	**1**

Mini-Project Work:
Mini Project is a laboratory-oriented/hands on course that will provide a platform to students to enhance their practical knowledge and skills by the development of small system/applications etc. Based on the abilities of the students and recommendations of the mentor, a single discipline or a multidisciplinary Mini- project can be assigned to an individual student or to a group having not more than 4 students.

CIE procedure for Mini-project:

Sl. No.		CIE Marks
1	Review-1 during first I.A.	25
2	Review-2 during second I.A.	25
	Total CIE marks	50

Scheme for SEE:

i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two faculty members of the Department, one of them being the Guide. The CIE marks awarded for the Mini-project work shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio of 20:20:10. The marks awarded for the project report shall be the same for all the batches mates.

ii) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all the guides of the project. The CIE marks awarded for the Mini-project, shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio 20:20:10. The marks awarded for the project report shall be the same for all the batch mates.

SEE distribution of marks:

Sl. No.		CIE Marks
1	Project Report	20
2	Project presentation skill	20
3	Viva-voce	10
	Total CIE marks	**50**