Jagannath International Management School

Vasant Kunj, New Delhi-110070

(Affiliated to Guru Gobind Singh Indraprastha University, New Delhi)
Recognized u/s 2(f) by UGC & Accredited with 'A' Grade by NAAC
Participant of UNGC & UNPRME, New York
ISO 9001:2015 Quality Certified

Bachelor of Computer Applications

Programme Outcome & Course Outcome

1. Aim:

The programme covers rudimentary to advance concepts in Computer Science and its applications in various domains. An exceptionally broad range of topics covering current trends and technologies in the field of information technology and computer science are included in the syllabus. The hands on sessions in Computer labs using various Programming languages and tools are also given to have a deep conceptual understanding of the topics to widen the horizon of students' self- experience.

Students, who choose BCA Programme, develop the ability to think critically, logically, analytically and to use and apply current technical concepts and practices in the core development of solutions in the multiple domains.

The knowledge and skills gained with a degree in Computer Application prepare graduates for a wide range of jobs in education, research, government sector, business sector and industry. In broader perspective the mission of teaching BCA is to produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize solutions for various Enterprises.

2. Programme Objectives:

It is envisioned that the graduates passing out BCA degree, will achieve the following objectives and will be able to

Programme Objectives (POs)	Description
PO1	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5	Understand the front end and backend of software applications.
PO6	Gain expertise in at least one emerging technology.

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PO7	Acquire knowledge about computer architecture and organization, networks, network devices and their configuration, protocols, security concepts at various level etc.
PO8	Apply techniques of software validation and reliability analysis to the development of computer programs.
PO9	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO10	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO11	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.

3. Programme Learning Outcomes:

The completion of the BCA Programme shall enable a student to:

i) To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis

ii) Identify applications of Computer Science in other fields in the real world to enhance the career prospects

iii) Realize the requirement of lifelong learning through continued education and research.

iv) Use the concepts of best practices and standards to develop user interactive and abstract application

v) Understand the professional, ethical, legal, security, social issues and responsibilities.

The detailed list of programme learning outcomes is as follows:

PLO	Attribute	Description
PLO1	Communication Skills	The student should be able to communicate the technical information both orally and in writing professionally.
PLO2	Use of Software Tools	Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3	Technical Skills	Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve

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		real world problems within their work domain
PLO4	Domain Awareness	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and it Applications in Business context.
PLO5	Technical Support	Must be able to provide technical support for various software applications.
PLO6	Analysis and investigation of Complex Computing Problems	Ability to analyze research and investigate complex computing problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.
PLO7	Design / Development of Solutions	Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.
PLO8	Imbibe Cyber Ethics	Awareness on ethics, values, sustainability and creativity aspects of technical solutions.

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Programme Outcome & Course Outcome

PROGRAM OUTCOME & COURSE OUTCOME

MAPPING

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Programme Outcome & Course Outcome

FIRST SEMESTER

Course Code: BCA 101 **L T C**
Course Name: Discrete Mathematics **3 1 4**

LEARNING OBJECTIVES:

The objective of this course is to provide the learners with the following:

1. Knowledge about sets, relations and functions.
2. Make them familiar with basics of lattices and graphs.
3. Understanding of the concept of propositional logic.
4. Acquiring the insight of combinatorics and recurrence relations

PRE-REQUISITES: Basic Concepts of Mathematics

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the basics conceptual math and relations.	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply partial order and recurrence relation and their operations.	BTL3	PO1, PO2
CO3	Compare and design, sorting and hashing techniques.	BTL4	PO1, PO2, PO3, PO4,PO5
CO4	Appraise and determine the correct logic and solutions for any given real world problem.	BTL5	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA103 **L T C**
Course Name: Programming Using 'C' Language **3 1 4**

LEARNING OBJECTIVES:

This course will provide the learners the following:-

1. Understanding of the syntax and the semantics of C programming language
2. Building of their logics for solving a given problem.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop programming skills by learning the fundamentals of structured programming using C Language.	BTL2	PO1, PO2, PO3
CO2	Design and develop programs using arrays, storage classes, functions and to understand memory management through pointers	BTL3	PO1, PO2, PO3
CO3	Critically analyze real world problems using structures, unions and develop applications for handling text and binary files.	BTL5	PO1, PO2, PO3, PO4, PO5
CO4	Explore the use of command line arguments, string manipulation and standard libraries.	BTL5	PO1, PO2, PO4,

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Programme Outcome & Course Outcome

Course Code: BCA 105 **L T C**
Course Name: Fundamentals of Computers and IT **3 1 4**

LEARNING OBJECTIVES:

The objectives of this course is to provide the learners:

1. Awareness of evolution of Computers, various types of computers its characteristics, usage, and limitations.
2. Identification of different categories of computers, their peripherals and memory.
3. Knowledge about operating system, their types, MS-Office various software.
4. Understanding of computer network fundamentals and various communication networks.
5. Overview of emerging technologies in IT i.e. AI and Machine Learning, IOT, Data Analytics etc.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Describe computer with its characteristics, its usage, limitations and benefits, Computer Memories and its type, Software and its type	BTL2	PO1, PO2, PO3
CO2	Acquire knowledge about Number Systems, various computer languages and operating system DOS	BTL2	PO1, PO2, PO3
CO3	Attain skills in Application Software used for word processing, spreadsheet and presentation	BTL4	PO1
CO4	Understand network fundamentals and various communication network, Advance trends in IT	BTL3	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA 107 **L T C**
Course Name: Web Technologies **3 1 4**

LEARNING OBJECTIVES:
The objective of this course is to provide the learners the following:

1. Knowledge about the semantic structure of HTML, Javascript, CSS, XML and bootstrap.
2. Ability to compose forms and tables using HTML, Javascript, CSS and Bootstrap.
3. Expertise to design static web pages
4. Skills to create dynamic user interface and perform Client-Side validations using JavaScript

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop static web pages through HTML, JavaScript, CSS and Bootstrap.	BTL6	PO4, PO5
CO2	Implement different constructs and programming techniques provided by JavaScript.	BTL3	PO4, PO8
CO3	Adapt HTML, Javascript, CSS and Bootstrap syntax and semantics to build web pages.	BTL1, BTL2	PO4
CO4	Develop Client-Side Scripts using JavaScript to display the contents dynamically	BTL3, BTL6	PO4,PO5

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Programme Outcome & Course Outcome

Course Code: BCA 109 **L T C**
Course Name: Technical Communication **3 1 4**

LEARNING OBJECTIVES:
This course will provide the learners the following:
1. Understanding of the correct use of English Language.
2. The student will improve in oral as well as written communication skills.

PRE-REQUISITES: Nil

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	The student will become familiar with the basics of communication and its importance in the organizational world.	BTL1	PO9, PO11
CO2	To improve the business writing skills also will become well aware how to write effective resume to enter the global world.	BTL2 & 3	PO9, PO11
CO3	To improve the listening skills by knowing well how to negotiate and give effective presentations.	BTL5	PO9, PO11
CO4	To make use of effective business language and give a professional look to oneself.	BTL6	PO9, PO11

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Programme Outcome & Course Outcome

Course Code: BCA 171 **L T/P C**

Course Name: Practical -1 'C' Prog. Lab **0 4 2**

LEARNING OBJECTIVES:
This course will provide the learners the following:-
1. Understanding of the syntax and the semantics of C programming language
2. Building of their logics for solving a given problem.

PRE-REQUISITES: None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop programming skills by learning the fundamentals of structured programming using C Language.	BTL3	PO1, PO2, PO3
CO2	Design and develop programs using arrays, storage classes, functions and to understand memory management through pointers	BTL4	PO1, PO2, PO3
CO3	Critically analyze real world problems using structures, unions and develop applications for handling text and binary files.	BTL5	PO1, PO2, PO3,PO4, PO5
CO4	Explore the use of command line arguments, string manipulation and standard libraries.	BTL5	PO1, PO2, PO4,

List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO #**
Core Practicals (Implement minimum 8 out of 10 practical)		
1.	Write a program to convert temperature from Celsius to Fahrenheit by taking input from the user.	CO1
2.	Write a program to find the greatest number among 3 numbers given by the user.	CO1

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3.	Write a program to check if a given number is a prime number or not.	CO1
4.	Write a program to display the following pattern upto N rows, taking the value of N from the user: 1 2 3 4 5 6 7 8 9 10	CO1
5.	Write a program to input marks of 50 students using an array and display the average marks of the class.	CO2
6.	Write a program to search for a number entered by the user in a given array and display the array in ascending order.	CO2
7.	Write a program to check if a string is palindrome or not.	CO2
8.	Write a program to add, subtract, multiply and divide two numbers using pointers.	CO2
9.	Write a program to create a structure for employees containing the following data members: Employee ID, Employee Name, Age, Address, Department and Salary. Input data for 10 employees and display the details of the employee from the employee ID given by the user.	CO3
10.	Write a program to create two files with names EvenFile and OddFile. Input 20 numbers from the user and save even numbers in EvenFile and odd numbers in OddFile.	CO3
Application Based Practicals (Implement minimum 5 out of 10 practical)		
11.	Write a menu driven program to construct a calculator for following arithmetic operations: addition, subtraction, multiplication, division, average and percentage.	CO1
12.	Write a menu driven program to perform the following operations: (i) Print armstrong numbers upto N, (ii) Display prime numbers between 1 to N, (iii) Reverse of an integer	CO1
13.	Write a program to convert a hexadecimal number into a binary number.	CO1
14.	Write a program to calculate factorial of a number and display fibonacci series upto N terms using recursive functions.	CO2

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15.	Write a program to perform matrix addition, (ii) matrix multiplication, and (iii) Matrix transpose) on 2D arrays.	CO2
16.	Write a program to make use of arrays with structures in the following ways: (i) Use array as a structure data member (ii) Create array of structure variables	CO3
17.	Write a program to compare the contents of two files by taking names of the files through command line arguments.	CO3, CO4
18.	WAP to perform I/O and make use of file positioning functions on Binary files. (using fseek, ftell, rewind functions)	CO4
19.	Write a menu driven program to implement the following string operations: (i) Calculate length of a string (ii) Concatenate at the end of a given (iii) Copy one string to another (iv) Compare contents of two strings (v) Copy nth character string to another	CO4
20.	Write a program to read time in string format and extract hours, minutes and second also check time validity	CO4

Note:
1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

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Programme Outcome & Course Outcome

Course Code: BCA 173 **L T/P C**

Course Name: Practical – II IT Lab **0 4 2**

PRE-REQUISITES: Nil

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Work with basic DOS Commands and Windows Explorer.	BT3	PO1, PO2
CO2	Create Word Documents using advanced features of MS Word.	BT3	PO1,PO2
CO3	Create Worksheet using advanced features of MS Excel.	BT3	PO1,PO2
CO4	Create interactive Presentation using advanced features of MS Power-point.	BT3	PO1, PO2

List of Practicals

S. No.	Detailed Statement	Mapping to CO #
	Core Practicals (Implement minimum 10 out of 15 practical)	
1.	To explore the System settings - Personalisation, System, Devices, Apps, Network & Internet.	CO1
2.	To practice basic DOS commands like cd, md, dir, erase, cls, copy, date etc.	CO1
3.	To explore Windows Explorer functionalities like create, rename, move, delete folder and files etc.	CO1
4.	To practice the use of basic formatting features - Format Painter, Indentation, Line spacing, background color, find, replace, dictate commands.	CO2
5.	To practice the use of Bullets, numbering, multilevel lists and use of Table Feature- Insert table with rows and columns, draw tables, excel	CO2

	spreadsheet and quick tables etc.	
6.	To practice the use of Insert Features – add picture, Chart, SmartArt, WordArt, Equation, Symbols, Header and Footer, Page Numbering etc. and the use of Design Features – Watermark, Page color, Page Border, Themes implementation etc.	CO2
7.	To practice the use of Layout Features – Margins, Orientation, Size, Columns, Indent, Spacing etc.	CO2
8.	To practice the use of Mail Merge Feature to generate Envelops and Labels.	CO2
9.	To practice the use of Excel basic formatting features – Wrap Text, Insert and Delete (Cells, Sheet, Row or Column), Format – Cell Height, Cell Width, Hide, Un Hide Cell, Protection, Freeze and Unfreeze panes, Macros etc.	CO3
10.	To practice the use of Insert Features- Pivot Table, Pivot Chart, Picture, Chart and its formatting and Design and the use of Page Layout Features- Margins, Orientation, Page Break , Background, Height and Width of Cells.	CO3
11.	To practice the use of Formula Features – user defined function, predefined functions – Logical, Date, Time, Maths and the use of Data Manipulation Features – Sort, Filter, Advanced Filters, Whatif analysis.	CO3
12.	To practice the creation of Blank presentation and Selecting Themes and the use of the basic design features – Adding New Slides, Reuse slides, Slides layout etc.	CO4
13.	To practice the use of Insert Features – add pictures, screenshots, shapes, wordart, audio, video, date-time etc. and use of Design Features- Changing the theme of presentation, format background and design ideas.	CO4
14.	To practice the use of Transition features to be applied on Slides content, setting sound, duration etc. and the use of Animation Features to be applied on presentation of Slide, set animation timings and rehearse etc.	CO4

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15.	To practice the use of Slide Show Features – Custom Slide Show, Rehearse Timing etc.	CO4
Application Based Practicals (Implement minimum 5 out of 8 practical)		
16.	Create a Folder by your name in your system, store all the work done in this semester inside that folder.	CO1
17.	Create your Resume using basic formatting features like : table, bullets, wordart etc	CO2
18.	Design an Invitation to Birthday Party using mail merge features send the invitation to 10 friends.	CO2
19.	Write an Article for Magazine with 3 columns and hyperlink.	CO2
20.	Create your own marksheet using basic formatting features.	CO3
21.	Create a list of marks of 10 students create charts and pivot table.	CO3
22.	Prepare a Sales summary and use features like sort, filter etc. to manipulate the data.	CO3
23.	Create a Power Point Presentation on any topic of your choice using animation and transition features.	CO4

Note:
1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

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Programme Outcome & Course Outcome

Course Code: BCA 175 **L T/P C**
Course Name: Practical-III Web Tech Lab **0 4 2**

PRE-REQUISITES: None.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop static web pages through HTML, CSS, JavaScript, bootstrap and XML.	BTL3	PO4, PO5
CO2	Implement different constructs and programming techniques provided by JavaScript.	BTL1,BTL3	PO4, PO8
CO3	Adapt HTML, CSS, javascript, bootstrap and XML syntax and semantics to build web pages.	BTL1,BTL5	PO4
CO4	Develop Client-Side Scripts using JavaScript to display the contents dynamically	BTL3	PO4,PO5

List of Practicals

S. No.	Detailed Statement	Mapping to CO #
	Core Practicals	
1.	Make following five different web pages: i. Formatting Styles and Headings: Include Bold, italics, Underline, Strike, Subscript, superscript and all six type of headings ii. Font Styles and Image tag iii. Marquee: Move text, image and hyperlink iv. Other tags: br, hr, pre, p Include following specifications: ● In all these web pages only mention about use, attributes apply them. ● Insert a background image on home page ● Make all the topics as hyperlinks and go to some other page for description ● Insert a marquee showing HTML Tutorial as moving text. ● Use different font style for different topics ● On every page, make a hyperlink for going back to home page and internal link also.	CO1, CO3
2.	Create an unordered list nested inside ordered list and apply the following :	CO1, CO3

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<table>
<tr><td></td><td>

Insert an image of Main item on top right corner of web page.
Display heading as a marquee.
Use different font styles and colors for different ordered list items.
Insert horizontal line after each ordered item.

</td><td></td></tr>
<tr><td>3.</td><td>Design a table with row span and column span and make use of attributes colspan, rowspan, width, height, cellpadding, cellspacing etc.</td><td>CO1, CO3</td></tr>
<tr><td>4.</td><td>Design following frame:
<table>
<tr><td rowspan="4">MAIN MENU
<u>Topic 1</u>
<u>Topic 2</u>
<u>Topic 3</u></td><td>Explanation
- - - - - - - - - - -
- - - - - - - - - - -
<u>View Example</u></td></tr>
<tr><td>Example</td></tr>
</table>
</td><td>CO1, CO3</td></tr>
<tr><td>5.</td><td>Make an image map showing the usage of shape, coords, href attributes in map definition. Link each hotspot to their respective details. All the web pages should be designed with proper background color, images, font styles and headings.</td><td>CO1, CO3</td></tr>
<tr><td>6.</td><td>Design Student registration form for admission in college.</td><td>CO1, CO3</td></tr>
<tr><td>7.</td><td>Create a webpage and show the usage of inline and internal style sheet and external style sheet?</td><td>CO1, CO3</td></tr>
<tr><td>8.</td><td>Create a webpage containing a background image and apply all the background styling attributes?</td><td>CO1, CO3</td></tr>
<tr><td>9.</td><td>Create a web page showing the usage of font styling attributes</td><td>CO1, CO3</td></tr>
<tr><td>10.</td><td>Create a web page and apply all Text styling attributes use Id and class</td><td>CO1, CO3</td></tr>
</table>

	selector.	
11.	Create a webpage and implement all list styling attributes.	CO1, CO3
12.	Create a Webpage with three equal columns.	CO1, CO3
13.	Create a webpage containing bootstrap table.	CO1, CO3
14.	Create a webpage containing various types of images.	CO1, CO3
15.	Create a webpage containing various types of buttons	CO1, CO3
16.	Create a webpage containing various, typography classes.	CO1, CO3
17.	Create a webpage containing to display the heading using. Jumbotron.	CO1, CO3
18.	Write a program to show the usage of inbuilt functions and dialog boxes.	CO2
19.	Write a program to show the usage of alert box and confirm box	CO2
20.	Write a program to implement event handling using onclick, onmouseover and onmouseout events.	CO2
21.	Write a program to show the usage of all the date, math and string object functions	CO2
22.	WAP to display the bookstore details in XML with CSS and internal DTD.	CO1, CO3
23.	WAP to format the Teacher details in XML with CSS using external DTD	CO1, CO3
Application Based Practical		
24.	Design the registration form for a web site and when the user clicks on submit button the login form should be appeared on the screen (use external javascript file).	CO4
25.	Design a website and apply all the features of HTML, css, javascript and bootstrap to make the website attractive.	CO4

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26.	Write a JavaScript function that creates a table, accept row, column numbers from the user, and input row-column number as content (e.g. Row-0 Column-0) of a cell.	CO2
27.	Zebra-striped Tables: Setting different background colors for alternate rows is a popular technique to improve the readability of tables that has large amount of data. This is commonly known as zebra-striping a table. Make use of pseudo classes to create zebra stripped Table.	CO2
28.	Create a Questionnaire related to any topic of your choice by using Form Elements.	CO4

Note:
1. In total 15 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

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Bachelor of Computer Applications

Programme Outcome & Course Outcome

Course Code: BCA 181+ L T C

Course Name: Bridge Course in Mathematics **2 0 0**

Aim: To build mathematical aptitude of the students for understanding the basic concepts of core courses of mathematics of the programme.

LEARNING OBJECTIVES:

The objectives of this course is to provide the learners

- The knowledge about the matrices, determinants and limits.
- Familiarity with basic concepts of differential and integral calculus.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the various approaches dealing the data using theory of matrices	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply the concepts of determinants	BTL3	PO1, PO2
CO3	Understand the concept of calculus such as limit, continuity and differentiability.	BTL4	PO1, PO2, PO3, PO4,PO5
CO4	Appraise and determine the correct logic and solutions for any given real world problem using application of integration& integral calculus.	BTL5	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA 102 **L T C**
Course Name: Applied Mathematics **3 1 4**

LEARNING OBJECTIVES:

The objectives of this course are to provide the learners with the following:

1. The Knowledge of mathematical probability
2. Understanding of various numerical techniques
3. Familiarity with the Linear Programming and it's applications

PRE-REQUISITES: Basic Concepts of Mathematics

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the various approaches dealing the data using theory of Probability	BTL2	PO1, PO2, PO3, PO4
CO2	Understand various numerical techniques and apply them to solve real life problems	BTL3	PO1, PO2
CO3	Analyse and evaluate the accuracy of common Numerical Methods	BTL4,5	PO1, PO2, PO3, PO4,PO5
CO4	Develop a mathematical model for real life situation and solving it Using Linear programming technique	BTL5	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA 104 **L T C**
Course Name: Web Based Programming **3 1 4**

LEARNING OBJECTIVES:

The objectives of this course are to provide the learners expertise in the following:-

1. Understanding of the syntax and semantics of PHP language
2. Ability to design and develop web applications using PHP as a server side language.
3. Performing CRUD operations in the database

PRE-REQUISITES:

1. Basic knowledge of HTML, CSS and Javascript.
2. Skills to Design static Webpage.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.	BTL3, BTL4	PO1, PO2, PO3, PO7
CO2	Have a good understanding of Web Application Terminologies	BTL1, BTL2	PO1, PO2, PO3, PO7, PO10
CO3	Learn how to link and publish web sites	BTL1, BTL2	PO1, PO2, PO3, PO4

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Programme Outcome & Course Outcome

Course Code: BCA 106 **L T C**

Course Name: Data Structure and Algorithm Using C **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be provided expertise in

1. Understanding of the basic concepts of data structures and their operations like, insertion, deletion, searching and sorting
2. Design algorithms and pseudo codes of various linear and non-linear data structures

PRE-REQUISITES:

1. C Programming Skills
2. Discrete Mathematics

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Familiarize the basics of data structures and algorithms.	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply linear and nonlinear data structures and their operations.	BTL3	PO1, PO2, PO3, PO4, PO5
CO3	Compare and implement searching, sorting and hashing techniques.	BTL5	PO1, PO2, PO3, PO4,PO5
CO4	Appraise and determine the correct data structure for any given real world problem.	BTL5	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA 108 **L T C**

Course Name: Database Management System **3 1 4**

LEARNING OBJECTIVES:

The paper aims to introduce the concept of Back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database. The objective of this course is to provide the learners expertise in the following:

1. Understanding of the requirement of database management System for storing data and its advantages over file management system.
2. Designing the database conceptually, physically and finally implementing the creation of database for any application.
3. Learning of queries in SQL for creating database and performing various operations for manipulating data in the database.
4. Knowledge of database utilities i.e. backup, recovery, transaction processing.

PREREQUISITE: Basic knowledge of data storage and file management system

COURSE OUTCOMES (COS):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the DBMS concepts with detailed architecture, characteristics.Describe different database languages and environment and learn various data models, along with the related terminologies	BTL1	PO1, PO2, PO3, PO7
CO2	Explore Structure Query Language, a brief on NOSQL, Query By Example.Also understand the overview of SQL, and try to implement DDL, DML and DCL along with operators, use of joins, nested query, use of views and Indexes Discuss Integrity Constraints	BTL3	PO1, PO2, PO3, PO7
CO3	Describe Relational Data Model, explain Codd's Rules, Relational Algebra, Set theory operations and the concept of functional dependencies and normalization	BTL4	PO1, PO2, PO3, PO4
CO4	Acquire Knowledge about Transaction Processing, concurrency problems, and its controlling techniques, Database backup and recovery and security.	BTL2	PO2, PO3, PO4, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 110 **L T C**
Course Name: Environmental Studies **2**
0 2

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. Development of critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
2. Acquisition of values and attitudes towards understanding complex environmental economic- social challenges, and active participation in solving current environmental problems and preventing the future ones.
3. Encouraging adoption of sustainability as a practice in life, society, and industry.

PRE-REQUISITES: Basic awareness about the natural environment.

COURSE OUTCOMES (COs): After completion of this course, the learners will be able to:

CO#	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Gain in-depth knowledge on natural processes and resources that sustain life and govern economy.	BTL1,2	PO10
CO2	Understand the consequences of human actions on the web of life, global economy, and quality of human life.	BTL3	PO10
CO3	Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.	BTL3	PO10
CO4	Acquire values and attitudes towards understanding complex environmental economic-social challenges, and active participation in solving current environmental problems and preventing the future ones.	BTL4	PO10

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Programme Outcome & Course Outcome

CO5	Adopt sustainability as a practice in life, society, and industry.	BTL5	PO10

Course Code: BCA 134 **L T/P C**
Course Name: Front End Design Tools VB.NET **0 4 2**

PRE-REQUISITES: Prior knowledge of programming language is beneficial but not mandatory.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Design Console application using basic programming concepts.	BT3	PO3, PO5
CO2	Design Windows application using control.	BT3	PO3,PO5
CO3	Understand and use of different Data Structures, Exception Handling	BT2	PO3,PO5
CO4	Learn basic concepts of OOPS. Design classes and interfaces.	BT2	PO3, PO5

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Programme Outcome & Course Outcome

Course Code: BCA 136 L T C

Course Name: Statistical Analysis using Excel 0 4 2

LEARNING OBJECTIVES:

In this course, the learners will be able to apply the concepts pertaining to the following:-

1. The understanding of the basic concepts of statistics
2. Using Excel for applying the Statistical concepts in day to day operations

PRE-REQUISITES:

1. The student must be adequate knowledge of working in MS Excel
2. The student must be well versed in the basic concepts of Statistics

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the basic concepts of statistics and its application in the real life scenarios	BTL2	PO1, PO2, PO3
CO2	Understand the means and mechanisms for applying the various skills used in the process of generating various statistical concepts by using MS Excel software	BTL3	PO1, PO2, PO3, PO5, PO8
CO3	Developing the skills needed for understand the various features of MS Excel software which assist the user in the process of deriving statistical measures	BTL3	PO1, PO2, PO3, PO4, PO5, PO7
CO4	Understand the skill needed to draw various forms of graphical representation based on statistical data	BTL4	PO2, PO3, PO4, PO6
CO5	Understand the various features of MS Excel involved in the process of compilation and summarizing of Statistical data and the skills needed to interpret the statistical data	BTL5	PO2, PO3, PO4, PO5, PO6, PO7, PO8
CO6	Understand the skills needed to ensure the process of integrating data from multiple in MS Excel	BTL6	PO2, PO3, PO5, PO6, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 138 **L T/P C**
Course Name: Designing Lab Photoshop **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:

1. Knowledge of Tools in Photoshop.
2. Exporting images & pdf.
3. Uses of gif & digital enhancement in images.

PRE-REQUISITES:

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Explain the basics of graphics designing & Adobe suite	BTL1	PO6, PO11, PO14, PO20
CO2	Exploring the Raster designing tools in Adobe Photoshop.	BTL3 BTL5	PO1, PO2, PO3, PO4, PO5, PO8, PO11-PO20
CO3	Exploring the Vector designing tools in Adobe Photoshop.	BTL3 BTL5	PO6, PO7, PO9, PO13, PO11-PO20

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Programme Outcome & Course Outcome

Course Code: BCA 172 **L T/P**
Course Name: Practical-IV WBP Lab **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:
1. Understand the syntax and semantics of PHP language
2. Design and develop web applications using PHP as a server side language
3. Perform database connectivity using MYSQL as database server.

PRE-REQUISITES:

1. Knowledge of HTML, CSS, Javascript, bootstrap and XML.
2. Able to Design Static Website.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.	BTL3	PO1, PO2, PO3,PO7
CO2	Have a good understanding of Web Application Terminologies	BTL1, BTL2	PO1, PO2, PO3,PO7, PO10
CO3	Learn how to link and publish web sites	BTL1, BTL2	PO1, PO2, PO3,PO4

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Programme Outcome & Course Outcome

Course Code: BCA 174 **L T/P C**
Course Name: Practical-V DS Lab **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:
1. Implement various types of data structures using C
2. Implement different operations on linear and non-linear data structures

PRE-REQUISITES:
C Programming Skills

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Implement basic operations on static linear data structures.	BTL3	PO1, PO2,PO3, PO4
CO2	Implement various operations on dynamic linear data structures.	BTL6	PO1, PO2,PO3, PO4,PO5
CO3	Implement basic operations on non-linear data structures	BTL3	PO1, PO2,PO3, PO4, PO5
CO4	Implement searching techniques on linear and non-linear data structures.	BTL4	PO1, PO2,PO3, PO4
CO5	Implement sorting techniques on one dimensional array.	BTL4	PO1, PO2,PO3, PO4

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Programme Outcome & Course Outcome

Course Code: BCA 176 **L T/P C**
Course Name: Practical-VI DBMS Lab **0 4 2**

LEARNING OBJECTIVES:

The course is to provide the basics of SQL. To understand RDBMS and construct queries using SQL to design a database and manipulate data in it.

PRE-REQUISITES: NIL

COURSE OUTCOMES:
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand the structure and design of relational databases.	BT2	PO3
CO2	Write DDL statements in SQL to create, Modify and remove database objects	BTL1, BTL3, BTL4	PO3, PO5
CO3	Use constraints for the database	BTL1, BTL2, BTL3	PO3,PO5
CO4	Write DML statements in SQL to insert, Modify and remove data from database	BTL4	PO3,PO5
CO5	Write SQL statements to retrieve data based on the conditions provided by the user	BTL1, BTL2, BTL3	PO3,PO5
CO6	Use index and Views in database	BTL2	PO3,PO5
CO7	Use structured query language (SQL) to an	BTL5, BTL6	PO4

	intermediate/advanced level		

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Programme Outcome & Course Outcome

Course Code: BCA 201 **L T C**
Course Name: Computer Networks **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. To study different types of media, multiplexing, switched networks, the Internet, TCP/IP suite, fiber-optic communications and the state-of-art networking applications.
2. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
3. Identify and discuss the underlying concepts of IPv4 & IPv6 protocols, along with their characteristics and functionality.
4. Details of IP operations in the Internet and associated routing principles
5. Analyzing various layering protocols in computer networks.

PRE-REQUISITES:

1. Fundamentals of Computers and IT

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Utilize the fundamentals of data communication and networking to identify the topologies and connecting devices of networks.	BTL1 BTL2	PO1, PO2, PO3, PO7,PO8
CO2	Understand and describe the layered protocol model (OSI and TCP/IP model)	BTL2	PO1, PO2, PO3, PO7
CO3	Analyze the elements and protocols for peer – peer and communication between layers.	BTL3 BTL4	PO1, PO2, PO3, PO4, PO6, PO7
CO4	Evaluate and implement routing algorithms and Router basic configuration.	BTL3 BTL5	PO1, PO2, PO3, PO4, PO7, PO8
CO5	Evaluate the protocols and Principles in computer networking	BTL5 BTL6	PO1, PO2, PO3, PO4, PO5, PO6, PO7

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Programme Outcome & Course Outcome

Course Code: BCA 203 **L T C**
Course Name: Computer Organization and Architecture **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. To study the various logic gates and design principles of different digital electronic circuits
2. To design different combinational and sequential circuits.
3. Identify the functional units of the processor and the factors affecting the performance of a computer
4. To learn about the Input –Output organization of a typical computer

PRE-REQUISITES:
Fundamentals of Computer

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Able to understand the fundamentals of digital principles and able to design digital circuits by simplifying the Boolean functions	BTL2 BTL3 BTL5	PO1, PO7, PO11
CO2	Implement the combinational and sequential circuits for the given specifications	BTL3 BTL6 BTL1	PO1, PO4, PO7, PO11
CO3	Able to trace the execution sequence of an instruction through the processor	BTL1 BTL2	PO1, PO7, PO11
CO4	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.	BTL2 BTL4	PO1, PO4, PO7, PO11

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Programme Outcome & Course Outcome

CO5	Demonstrate the ability to classify the addressing modes, instructions set	BTL2 BTL5	PO1, PO4, PO7, PO11

Course Code: BCA 205 **L T C**
Course Name: Object Oriented Programming with C++ **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. Gain knowledge and develop a broad understanding of bottom up approach
2. Construct object oriented solutions for real world scenarios

PRE-REQUISITES:

1. Knowledge of C programming
2. Basic Programming Skills

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO#
CO1	Understand the basic principles of Object-Oriented Programming	BTL2	PO2, PO3
CO2	Apply OOPs principles using C++ constructs	BTL3	PO3

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CO3	Develop expertise in classification hierarchies and polymorphism using C++	BTL3	PO3, PO4
CO4	Comprehend the working of files and generic programming	BTL5	PO3, PO4

Course Code: BCA 207 **L T/P C**
Course Name: Human Values and Ethics **2 0 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To distinguish between values and skills, and understand the significance of values in personal and professional life
2. To understand harmony at all the levels of human living, and live accordingly.
3. To understand the role of a human being in ensuring harmony in society and nature.
4. To apply the understanding of harmony in existence in their profession and lead an ethical life

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PRE-REQUISITES:
None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Identify and evaluate personal ethical values and their implications in various social situations	BTL1	PO10
CO2	Recognize the multiple ethical interests at stake in a real-world situation	BTL2	PO10
CO3	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research	BTL3	PO10
CO4	Instill Moral and Social Values and Loyalty and appreciate the rights of others	BTL4	PO10
CO5	Comprehend the concept of harmony at all the levels of society and readiness to contribute towards harmony at all levels.	BTL5	PO10

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Programme Outcome & Course Outcome

Course Code: BCA 211 **L T/P C**
Course Name: Basics of Python Programming **4 1 5**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following: -
1. To understand Python programming fundamentals
2. To define the structure and components of a Python program.
3. To apply fundamental problem-solving techniques using Python
4. To design and program applications using Python.

PRE-REQUISITES:
1. **Computer Fundamentals**

COURSE OUTCOMES(COs):
After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Demonstrate knowledge of basic programming constructs in python.	BTL2	PO1, PO2, PO3,PO7
CO2	Illustrates string handling methods and user-defined functions in python	BTL3	PO1, PO2, PO3,PO7, PO10
CO3	Applying data structures primitives like List, Dictionary and tuples.	BTL2	PO1, PO2, PO3,PO4
CO4	Identify the commonly used operations involved in file handling	BTL3	PO1, PO2, PO3, PO4, PO7
CO5	To understand how python can be used for application development	BTL2	PO1, PO2, PO3, PO4, PO11

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Programme Outcome & Course Outcome

Course Code: BCA 213 **L T/P C**
Course Name: Cyber Security **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Students will be able to understand and learn the concept, layers of Cyber Security.
2. Students will be able to learn about cybercrime and types of attack.
3. Students will be able to learn about how many tools and methods available of cybercrime.
4. To study about cybercrime real life examples and cases.
5. Students will be able to understand and learn about Ethical Hacking.
6. Students will be able to understand and learn about Cyber Forensics.

PRE-REQUISITES:

1. Fundamentals of Information Technology

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Define the basic concept of Cyber Security, Cybercrime and Cybercriminals. Identify and understand about Cyber Threats.	BTL1 BTL2	PO1,PO2,PO3, PO7
CO2	Describe briefly types of criminal attack and classification of Cybercrimes. Describe Steganography.	BTL2	PO1,PO3, PO7
CO3	Identify and apply the Cybercrime Tools and Methods. Identify and apply the underlying concepts of Symmetric-key and Asymmetric-key Cryptography along with Digital Signature.	BTL1, BTL2, BTL3	PO1,PO3,PO6, PO8
CO4	Implement security for HTTP applications, Emails. Apply Firewall in your system.	BTL4	PO1,PO3,PO5, PO7

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CO5	Implement, evaluate Keyloggers. Implement and evaluate different cyber security algorithms with the help of program.	BTL3, BTL5	PO1, PO4, PO6, PO7, PO8
CO6	Design and create security mechanisms to protect computer systems.	BTL6	PO1, PO4, PO6, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 221 **L T C**
Course Name: Principles of Management & Organizational Behaviour **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To get the knowledge about the important management concepts and their applications.
2. To help the students to develop cognizance of the importance of management principles.
3. To have an insight of various functional departments in an organization.
4. To help the organization in understanding Organizational culture.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop basic knowledge about management, management process, managerial roles, skills and functions and management theories.	BTL2,1	PO1, PO2
CO2	To give knowledge about planning and decision making process. To describe about staffing and directing.	BTL2,4	PO2, PO1
CO3	To learn about the motivation theories and Leadership styles. To discuss about the Organizational behaviour and its application.	BTL4,6	PO3
CO4	To give basic knowledge people management, their personality and perception. To describe about the Organisational culture and its effects.	BTL5,2	PO3

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Programme Outcome & Course Outcome

Course Code: BCA 233 **L T/P C**
Course Name: Designing Lab CorelDraw **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following: -
1. Introduction to graphics designing.
2. Knowledge & hands-on on CorelDraw.

PRE-REQUISITES:
None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Explain the basics of graphics designing & CorelDraw suite.	BTL1	PO1, PO6
CO2	Exploring the vector & 3D tools in CorelDraw.	BTL3 BTL5	PO1, PO6
CO3	Exploring the custom shapes & basics of printing in CorelDraw.	BTL3 BTL5	PO1, PO6
CO4	Exploring the workspaces & objects in CorelDraw.	BTL3 BTL5	PO1, PO6

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Programme Outcome & Course Outcome

Course Code: BCA 235 **L T/P C**
Course Name: ASP.NET **0 4 2**

LEARNING OBJECTIVES:
The objective of this course is to provide the learners:
1. Basic knowledge of ASP.NET Framework
2. Understand the basic and advanced ASP.NET Web Controls
3. Gain expertise in developing ASP.NET Web Applications

PRE-REQUISITES:
Prior knowledge of HTML, JavaScript and CSS concepts would help in better grasping of the subject

COURSE OUTCOMES (COs):
After the completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping of PO#
CO1	Understand the designing and development of Web Application Components	BT2	PO2
CO2	Develop dynamic web pages using Web Server controls	BT4	PO4, PO5
CO3	Design and create web applications with Validation controls	BT3	PO6, PO7, PO8
CO4	Understand and Apply database connectivity to Web Applications	BT5	PO3

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Programme Outcome & Course Outcome

Course Code: BCA 237 **L T/P C**

Course Name: AR VR Development with Unity **0 4 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to

1. Augmented and virtual reality development
2. Games and application development using Unity engine

PRE-REQUISITES:

Basic Programming Skills

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Familiarize the basics of augmented, virtual and mixed reality.	BTL2	PO1, PO2, PO3, PO4
CO2	Understand and apply the game development basics.	BTL3	PO1, PO2, PO3, PO4, PO5
CO3	Compare and implement the various XR development techniques.	BTL5	PO1, PO2, PO3, PO4,PO5
CO4	Appraise the XR development using Unity Engine.	BTL5	PO1, PO2, PO3, PO4, PO5

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Programme Outcome & Course Outcome

Course Code: BCA-239 **L T/P C**
Course Name: Cyber Ethics **2 0 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following: -

1. Students will be introduced to the widespread development of cyber ethics.
2. Students will learn about impacting issues, laws, and developments that will help shape their future within the business community through technology
3. To facilitate students to grow and develop professionally and morally through readings, class participation, and course activities.

PRE-REQUISITES:
None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Define cyber ethics and recognize cyber ethic issues	BTL1	PO10
CO2	Identify how security issues in cyberspace raise ethical concerns.	BTL3 BTL5	PO10

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CO3	Recognize various types of cybercrime and its impact	BTL3 BTL5	PO10
CO4	Discuss ethical issues associated with the use of social networks and social media	BTL3 BTL5	PO10
CO5	Survey recent whistle-blowing cases focusing on associated ethical issues		PO10

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Programme Outcome & Course Outcome

Course Code: BCA 271 **L T/P C**
Course Name: Practical – VII C++ Lab **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to:

1. Develop concepts related to Object Oriented Programming
2. Construct object oriented solutions in real world scenarios

PRE-REQUISITES:

1. Knowledge of C programming
2. Basics of Programming

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Implement basic concepts of Object Oriented Programming	BTL 3	PO3
CO2	Implement the concept of Classes and Objects	BTL 3	PO2
CO3	Analyse and apply various polymorphism techniques to solve real life problems	BTL 4	PO2, PO4
CO4	Implement Generic Classes, Exception Handling and various file operations	BTL 4	PO4

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Programme Outcome & Course Outcome

Course Code: BCA 202 **L T C**
Course Name: Java Programming **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. Learn how to implement Object Oriented concepts through Java.
2. Identify and apply the Java thread model to program Java applications.
3. Develop GUI applications using Java swings

PRE-REQUISITES:
1. Programming fundamental
2. Object-Oriented concepts

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Illustrate the Object-Oriented paradigm and Java language constructs	BT2	PO3
CO2	To inculcate concepts of inheritance to create new classes from existing ones and design the Classes needed given a problem specification.	BT3	PO3
CO3	To familiarize the concepts of packages and interfaces.	BT3	PO4
CO4	To facilitate students in handling exceptions and defining their own exceptions.	BT4	PO4
CO5	To manage input output using console and files	BT4	PO4
CO6	To apply the Java Thread model to develop multithreading applications.	BT5	PO4
CO7	To understand and apply the concepts of GUI programming using swings.	BT6	PO5, PO6

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Programme Outcome & Course Outcome

Course Code: BCA 204 **L T C**
Course Name: Software Engineering **3 1 4**

LEARNING OBJECTIVES:
The paper aims to understand the importance, limitations and challenges of processes involved in software development. In this course, the learners will be able to develop expertise related to the following:

1. To gain knowledge of various software models.
2. To gain knowledge of various software design activities.
3. To learn cost estimation, software testing, Maintenance and debugging.

PRE-REQUISITES:
NONE

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	To evaluate languages to code front end and back end of a software	BTL2	PO5
CO2	Instantiating into the process of designing, coding and testing a software module.	BTL2	PO4
CO3	Organizing a software product along with its complete documentation.	BTL6	PO1

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CO4	Implementing Software Development Cycle to develop a software module.	BTL5	PO4
CO5	To analyze the use of techniques, skills and modern engineering tools necessary for software development.	BTL2	PO6
CO6	Organizing a complete software module	BTL3	PO8

Course Code: BCA 206 **L T C**
Course Name: Introduction to Management and Entrepreneurship Development **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. Development of critical thinking and to inspire students to developed an entrepreneurial mind-set.
2. Acquisition of values and attitudes towards understanding complex business problems
3. Promoting active participation in solving current business problems and preventing the future ones.
4. Encouraging students to understand the fundamentals of management

PRE-REQUISITES:
Basic awareness about the Entrepreneurship Development

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

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CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Gain in-depth knowledge on Entrepreneurial development in today's global scenario	BTL2	PO2, PO10, PO11
CO2	Understand the concept of entrepreneurs and to help the students to develop an entrepreneurial mind-set	BTL3	PO9, PO10, PO11
CO3	Develop critical thinking for shaping strategies and help them to become an successful entrepreneur	BTL3	PO3, PO5, PO11
CO4	Acquire values and attitudes towards understanding complex business problems, and active participation in solving current business problems.	BTL4	PO3, PO10, PO11
CO5	Understand the concept of the fundamentals of management	BTL5	PO2, PO5, PO10, PO11

Course Code: BCA 212 **L T C**
Course Name: Introduction to Data Science **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Apply mathematical principles to the analysis of data.
2. Analyze data sets in the context of real world problems.
3. Develop and implement data analysis strategies base on theoretical principles, ethical considerations, and knowledge of the underlying data

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Programme Outcome & Course Outcome

PRE-REQUISITES:
None

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Basics of Data Science and Data Collection strategies	BTL2	PO1, PO2, PO3,PO7
CO2	Illustrating statistical analysis of data.	BTL3	PO1, PO2, PO3, PO7.
CO3	Working with the data structures of python like series and Data Frames	BTL3	PO1, PO2, PO3,PO4
CO4	Statistical analysis of data with the help of python	BTL3	PO1, PO2, PO3

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Programme Outcome & Course Outcome

Course Code: BCA 214 **L T C**
Course Name: Introduction to Artificial Intelligence **4 1 5**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. To learn the basics of designing intelligent agents that can solve general purpose problems.
2. To represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

PRE-REQUISITES:
Basic Programming Skills

COURSE OUTCOMES(COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	To understand elements constituting problems and learn to solve it by various uninformed and informed (heuristics based)	BTL1,BTL2, BTL3,	PO1, PO2,PO4
CO2	To understand formal methods for representing the knowledge and the process of inference to derive new representations of the knowledge.	BTL2, BTL3	PO1, PO2, PO4,
CO3	Analyze and apply the notion of uncertainty and some of probabilistic reasoning methods to deduce inferences under uncertainty	BTL3, BTL4	PO1, PO2, PO4,
CO4	Apply some mechanisms to create and improve AI system.	BTL3, BTL5	PO4, PO6, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 216 **L T C**
Course Name: Network Security **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Students will be able to learn about basic security issues and concepts of Network Security.
2. Students will be able to understand the Describe briefly the use of Cryptography and Steganography.
3. To develop graduates that can identify, analyze, and remediate network security breaches.
4. To learn about Firewall and his principles.
5. Students will be able to understand the concept of Kerberos and use of this.
6. To Design and Implement different network security algorithm by using Program.
7. Students will be able to understand the computer network and secure network communication issues along with their remedies.
8. Students will be able to learn and evaluate the different algorithm by using Program.

PRE-REQUISITES:

1. Computer Network
2. C, C++ (Programming Knowledge of C/C++)

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Define and explain the issues and basic concepts of Network Security. To understand how to draw a network model.	BTL1, BTL2, BTL4	PO7
CO2	To Explain, understand and summarize the concepts, types and features of Firewall.	BTL2	PO1, PO7
CO3	Explain and implement working of authentication, authorization, Packet security, IP Security, Firewall by using some suitable examples.	BTL3, BTL2	PO3, PO4, PO7
CO4	Classify and organize the architecture of network security management.	BTL2, BTL4	PO7
CO5	Evaluate different Network Security algorithms with the help of program.	BTL5	PO3, PO4, PO7
CO6	Design and create a network security architecture for an organization.	BTL6	PO4, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 218 **L P C**
Course Name: Web Development with Python and Django **4 1 5**

LEARNING OBJECTIVES:

The students will be able to develop expertise related to the following:

1. Understand the model view controller (MVC) and Model View template (MVT) pattern and how it is implemented in Django
2. Create Django templates for easy-to-modify views
3. Map views to URLs
4. Take advantage of the built-in Admin interface
5. Provide HTML form processing
6. Integrate automated tests with your code

PRE-REQUISITES:

1. All students should have a working knowledge of HTML 5, and CSS.
2. All students should have a working knowledge of Python

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Install and Configure Python and Django in a development and production environment	BTL1, BTL2, BTL3	PO4,PO5, PO6, PO8
CO2	Understands the security implications of Django using templates and develop secure websites with Django	BTL2, BTL3, BTL4, BTL6	PO4, PO5, PO8
CO3	Utilize Django Models to build an interface with powerful relational databases	BTL3, BTL6	PO5,PO7,PO8
CO4	Design and develop forms (both ad-hoc and from Models and Data Models) and automate the validation	BTL3, BTL4,	PO6,PO8

	and verification of data in those forms	BTL5, BTL6	

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Programme Outcome & Course Outcome

Course Code: BCA 222 **L T C**
Course Name: Digital Marketing **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Understand the basics of Digital Marketing.
2. Comprehend the importance of Digital Marketing Platforms.
3. Gain knowledge about the usefulness of Social Media Marketing (SMM) and Search Engine Optimization (SEO)

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understanding the digital marketing concepts and its usefulness in business.	BTL2	PO2, PO4
CO2	Planning steps for digital marketing strategy and successfully executing it.	BTL3	PO2, PO4
CO3	Understand the importance of Social Media Platforms and Social Media Marketing for online communication.	BTL2	PO2, PO4, PO6
CO4	Applying Search Engine Optimization techniques (SEO) and Search Engine Marketing (SEM) to maximize reach and enhance engagement of users.	BTL3	PO2, PO4, PO6
CO5	Analyzing web using analytics tools and gaining insights to various tools for Social Media Marketing.	BTL4	PO2, PO4, PO6

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Programme Outcome & Course Outcome

Course Code: BCA 224 **L T C**
Course Name: Principles of Accounting **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. To get the knowledge about the important concepts & characteristics of accounting.
2. To study the application of accounting in the general business environment.

PRE-REQUISITES:
None.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Basic accounting knowledge, accounting equations, accounting concepts & convention.	BTL1	PO3
CO2	Rules of debit & credit, journal, ledger, trial balance.	BTL2 BTL3	PO3
CO3	Final A/c's (Trading A/c, Profit & Loss A/c, Balance Sheet) without adjustment & with adjustment.	BTL3 BTL4	PO4
CO4	Sub division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return Journal, Sales Journal, Sales Return Journal.	BTL4	PO4
CO5	Inventory valuation, Inventory System, Methods of valuation of Inventories (FIFO, LIFO & Weighted Average Method).	BTL5	PO4
CO6	Depreciation concept & causes, Method of recording depreciation & Method of providing depreciation.	BTL5 BTL6	PO5,PO6

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Programme Outcome & Course Outcome

Course Code: BCA 232 **L T C**
Course Name: Personality Development Skills **2 0 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop the following:

1. To boost student's confidence through oral and written skills.
2. To help students develop leadership skills and teamwork.
3. To prepare students for work related challenges.

PRE-REQUISITES:
None.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Learn Social Etiquettes and social conversation.	BTL1, BTL2, BTL3	PO9, PO11
CO2	Learn Leadership, Decision making and Team-building skills	BTL2, BTL3, BTL4	PO9, PO11
CO3	Improve confidence building skills	BTL2, BTL3, BTL4	PO9, PO11
CO4	Able to manage Stress and Time Management	BTL2, BTL3, BTL4	PO9, PO11

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Course Code: BCA 272 **L T/P C**
Course Name: Practical – VIII Java Lab **0 4 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop applications related to:

1. Basic understanding of Object-Oriented Programming Concepts and create classes.
2. Learn Inheritance, exception handling, threads.
3. Understand and implement multithreading programming.
4. Learn building GUI applications using various controls in Swings.

PRE-REQUISITES: Prior knowledge of programming language is mandatory.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Illustrate the Object-Oriented paradigm and Java language constructs	BT2	PO3
CO2	To inculcate concepts of inheritance to create new classes from existing ones and design the classes needed given a problem specification.	BT3	PO3
CO3	To apply various functions of String class	BT3	PO4
CO4	To facilitate students in handling exceptions and defining their own exceptions.	BT4	PO4
CO5	To manage input output using console and files	BT4	PO4
CO6	To apply the Java Thread model to develop multithreading applications.	BT5	PO4
CO7	To understand and apply the concepts of GUI programming using swings.	BT6	PO5,PO6

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Bachelor of Computer Applications

Programme Outcome & Course Outcome

Course Code: BCA 274 **L T C**
Course Name: Practical-IX SE Lab **0 4 2**

LEARNING OBJECTIVES:

Students will be capable to acquire the generic software development skill through various stages of software life cycle. Students will also be able to ensure the quality of software through software development with various protocol based environment. After completion of course student will be able to prepare SRS, analysis the requirement, design the requirements and generate test cases to test the project. Students will also be able to handle software development models through rational method. Rational Rose Enterprise Edition software is used to serve the objectives.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	To apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.	BT2	PO3
CO2	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.	BT3	PO3
CO3	Analyzing and developing a software product along with its complete documentation.	BT3	PO4
CO4	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software in one or more significant application domains.	BT4	PO4
CO5	Demonstrate an ability to use the techniques and tools necessary for engineering practice	BT4	PO4

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Programme Outcome & Course Outcome

Course Code BCA 301
Course Name: Operating System & Linux Programming

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:-

1. Working and functionalities of operating system
2. Understand the concept of process scheduling, ,memory management, deadlock and file system
3. Understand basic commands of Linux and shell scripts.

PRE-REQUISITES:

1. Basic understanding of hardware and software of computer organization.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	MappingtoPO #
CO1	Understand the basic concept of Operating System with the help of Unix and Linux Architecture.	BTL2	PO1, PO4
CO2	Understand the concept of Processes, Process Scheduling, Process Synchronization and applying process commands in Linux environment.	BTL3	PO1, PO2,PO4,PO5
CO3	Understand the concept of memory management and deadlock.	BTL2	PO1, PO2,PO4,PO5
CO4	Understand the concept of file Systems, Types and Access Methods by using Linux commands.	BTL3	PO1, PO2,PO4

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Programme Outcome & Course Outcome

Course Code: BCA 303 **L T C**
Course Name: Computer Graphics **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. Concept of Computer graphics, types of display devices and their techniques.
2. Methods of drawing of graphic objects on the display devices.
3. Concepts of viewport, mapping of real world objects to display device, clipping
4. Knowledge of projection concepts and their types

PRE-REQUISITES:
1. Programming in C/C++

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Develop basic knowledge of computer generated graphics, their applications, display devices and drawing of graphic objects on display devices.	BTL2	PO1, PO6
CO2	To develop knowledge of various graphics 2D transformation operation, their mathematical calculations.	BTL4	PO4, PO8
CO3	To learn about the surfaces and curves, properties of curves and shading of surfaces	BTL2	PO4

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Programme Outcome & Course Outcome

CO4	To give basic knowledge of 3D projection and identifying hidden surfaces to be removed.	BTL2	PO1

Course Code: BCA 305 **L T C**
Course Name: Cloud Computing **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:
1. Understand current cloud computing technologies, including technologies for different cloud services.
2. Analyze the components of cloud computing
3. Perform Large data processing in the cloud

PRE-REQUISITES:
1. Basics of Computer Network
2. Knowledge of Operating System and Databases.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

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Programme Outcome & Course Outcome

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Overview of Cloud Computing	BTL1	PO1, PO2, PO3, PO7
CO2	Understanding Cloud Computing Architecture	BTL2	PO1, PO2, PO3, PO4, PO7,
CO3	Working with Parallel and Distributed Computing	BTL3	PO1, PO2, PO3, PO4, PO5
CO4	Understanding the Concept of Virtualization	BTL4	PO1, PO2, PO3, PO6, PO7

Course Code: BCA 307 **L T/P C**
Course Name: Minor Project **0 8 4**

PROJECT REPORT
All the students are required to submit a report based on the project work done by them during the sixth semester.

SYNOPSIS (SUMMARY/ABSTRACT) :
All students must submit a summary/abstract separately with the project report. Summary,

preferably, should be of about 3-4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following:

- Name / Title of the Project
- Statement about the Problem
- Why is the particular topic chosen?
- Objective and scope of the Project
- Methodology (including a summary of the project)
- Hardware & Software to be used
- Testing Technologies used
- What contribution would the project make?

TOPIC OF THE PROJECT- This should be explicitly mentioned at the beginning of the Synopsis. Since the topic itself gives a peep into the project to be taken up, candidate is advised to be prudent on naming the project. This being the overall impression on the future work, the topic should corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objective should be clearly specified. What the project ends up to and in what way this is going to help the end user has to be mentioned.

PROCESS DISCRIPTION: The process of the whole software system proposed, to be developed, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing and developing the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

CONCLUSION: The write-up must end with the concluding remarks- briefly describing innovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stand out from the rest.

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Programme Outcome & Course Outcome

Course Code: BCA 311 **L T C**
Course Name: Data Visualization & Analytics **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Students will develop relevant programming abilities.
2. Students will demonstrate proficiency with statistical analysis of data.
3. Conduct exploratory data analysis using visualization.
4. Craft visual presentations of data for effective communication.

PRE-REQUISITES:

1. Basics of Python Programming (BCA-206)

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Illustrating the features of Multithreading in python.	BTL2	PO1, PO2, PO3, PO5
CO2	Analyzing data using suitable python library.	BTL2	PO1, PO2, PO3,PO7, PO10
CO3	Visualizing data using Matplotib, Seaborn library.	BTL3	PO1, PO2, PO3,PO4
CO4	Develop python applications with database connectivity operations.	BTL3	PO1, PO2, PO3,PO4

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Programme Outcome & Course Outcome

Course Code: BCA 313 **L T C**
Course Name: Machine Learning with Python **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To make student able to learn mathematical concepts, and algorithms used in machine learning techniques for solving real world problems and developing new applications based on machine learning.
2. To introduce students to the state-of-the-art concepts and techniques of Machine Learning using Python.

PRE-REQUISITES:

1. Basics of Python Programming

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO#
CO1	Explain machine learning concepts on real world applications and problems.	BTL2	PO1, PO2, PO8
CO2	Analyze and Implement Regression techniques.	BTL2, BTL3	PO1, PO4, PO5, PO7
CO3	Solve and design solution of Classification problem	BTL3, BTL6	PO2, PO3, PO4,PO8
CO4	Understand and implement Unsupervised learning algorithms	BTL2, BTL3	PO4, PO5, PO6, PO8
CO5	Interpret various machine learning algorithms in a range of real world applications.	BTL3	PO2, PO6, PO7

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Programme Outcome & Course Outcome

Course Code: BCA 315 **L T C**
Course Name: Web Security **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Students will be able to learn the techniques needed for providing protection and security to our data and information resources over internet.
2. To understand and learn web application and its Architecture.
3. Students will be able to develop awareness regarding Cyber laws and crimes.
4. Students will be able to understand the internet and web application security issues.
5. Students will be able to learn and understand wireless network security issues.
6. To learn and understand the concept of web services, ajax and other technology which are helpful.

PRE-REQUISITES:

1. Computer Network
2. C/C++/HTML (Programming Knowledge of C/C++/HTML/JS)

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #

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Programme Outcome & Course Outcome

CO1	Define overall web security infrastructure, components, issues and basic concept etc.	BTL1	PO1, PO4, PO7
CO2	Describe briefly various types of security like social media security, email security, web application and web services security etc. Explain Web related services.	BTL2	PO1, PO2, PO4, PO5, PO7
CO3	Apply and implementing various vulnerabilities for Ethically hacking a websites / Web Applications.	BTL3	PO1, PO4, PO6, PO8
CO4	Focusing Penetration Testing, Computer Forensics.	BTL4	PO1, PO2, PO7
CO5	Evaluate different web security algorithms with the help of program.	BTL5	PO1, PO3, PO4, PO6, PO7, PO8
CO6	Design and implement XSS attacks, SQL Injection attack, password hashing and cracking.	BTL6	PO1, PO3, PO4, PO7, PO8

Course Code: BCA 317 **L T C**
Course Name: Web Development with Java & JSP **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:-

1. Learn Web development using Java.
2. Understand the basics of J2EE and Web development.
3. Understand and implement Servlet
4. Creating and implementing JDBC application.
5. Implement JSP and JSF concepts.
6. Understand the fundamentals of Hibernate, Struts and springs.

PRE-REQUISITES:

1. Programming Knowledge of Java

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Programme Outcome & Course Outcome

2. HTML

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the concept of HTML, CSS and Java Script.	BTL2	PO3, PO4, PO5
CO2	Understand J2EE architecture, web application structure and web architecture models.	BTL2	PO3, PO4, PO5, PO8
CO3	Creating and configuring Servlets.	BTL6	PO3, PO4, PO5
CO4	Understand JDBC architecture and design database applications using JDBC.	BTL2	PO3, PO4, PO5, PO8
CO5	Design applications using JSP and JSF.	BTL3	PO3, PO4, PO5, PO8
CO6	Elaborate the functional programming concepts of Hibernate, Struts and Springs.	BTL1	PO3, PO4, PO5, PO7, PO8

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Programme Outcome & Course Outcome

	L	T	C
Course Code: BCA 331			
Course Name: Summer Training Project	**0**	**0**	**2**

Summer Training Project Guidelines

Objective:

All the students enrolled for BCA Programme, have to undergo compulsory summer training/ Project of minimum 06 weeks in an organization in the IT field. The aim of the project is to give the students an integrated experience in solving a real-life problem by applying knowledge and skills gained on completion of theory papers and in-house practical papers during BCA course. It provides an occasion for students to realize the importance of resource and time management, ownership of task towards deliverables, innovation and efficiency in the task management. It also provides a good opportunity for students to build, enhance and sustain high levels of professional conduct and performance and evolves a problem solver frame of mind in students at early stage. It also prepares students for taking up responsible assignments in the corporate establishment.

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Programme Outcome & Course Outcome

Course Code: BCA 371 **L T/PC**
Course Name: LINUX – OS LAB **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:

1. Unix/Linux environment
2. Understanding of Linux commands and scripts

PRE-REQUISITES:

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Understand Linux Environment with the help of its architecture.	BT Level 1	PO1,PO2
CO2	Understand the Linux environment by using general Linux Commands.	BT Level 2	PO1,PO2,PO4
CO3	Implement Process Related commands.	BT Level 4	PO1,PO2,PO4,PO5
CO4	Implement File Permission concept.	BT Level 4	PO1,PO2,PO4,PO5
CO5	Understanding the shell script by combining commands.	BT Level 2	PO1,PO2,PO4

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Programme Outcome & Course Outcome

Course Code: BCA 373 **L T/P C**
Course Name: Practical - XI CG Lab **0 4 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to:

1. Concept of Computer graphics, the coordinate system of display devices.
2. Implementing various scan converting algorithms.
3. Methods of drawing of graphic objects on the display devices.
4. Generating complex graphic objects
5. Implementation of various 2D transformations
6. Implementing line clipping algorithms

PRE-REQUISITES:

Knowledge of Programming in C/C++ is preferable
Understanding of various functions included in graphics.h header files

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop basic computer generated graphic and drawing of graphic objects on 2D display devices.	BTL3	PO1, PO6
CO2	To perform various algorithms for generating objects	BTL4	PO4
CO3	To implement various 2D transformation operations through matrices.	BTL4	PO4, PO8

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Programme Outcome & Course Outcome

CO4	Implementation of cohen-sutherland line clipping algorithm.	BTL3	PO1

Course Code: BCA 302 **L T C**
Course Name: Data Ware Housing and Data Mining **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:-

1. To understand the basic principles, concepts and applications of Data warehousing and ELT tools.
2. Differentiate Online Transaction Processing and Online Analytical processing
3. To understand the Data Mining Process, Technologies & Rules, platform tools and data pre-processing or data visualization techniques.
4. Identifying business applications of data mining
5. Develop skills in selecting the appropriate data mining algorithm for solving practical problems.

PRE-REQUISITES:

1. Discrete Mathematics
2. Information system concept

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COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	**Detailed Statement of the CO**	***BT Level**	**Mapping to PO #**
CO1	Understand the various component of Datawarehouse	BTL2	PO1, PO2, PO3, PO7,PO5
CO2	Appreciate the strengths and limitations of various data mining and data warehousing models	BTL3	PO1, PO2, PO3,PO7, PO10
CO3	Critically evaluate data quality to advocate application of data pre-processing techniques.	BTL3	PO1, PO2, PO3,PO4
CO4	Describe different methodologies used in data mining and data ware housing.	BTL4	PO1, PO2, PO3,PO4, PO7
CO5	Design a data mart or data warehouse for any organization	BTL5	PO1, PO2, PO3, PO4, PO11
CO6	Test real data sets using popular data mining tools such as WEKA	BTL6	PO1, PO2, PO3,PO4, PO6, PO7,PO8

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Programme Outcome & Course Outcome

Course Code: BCA 304 **L T C**
Course Name: E-Commerce **3 1 4**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. To learn and understand the basic nature of e-commerce.
2. To study how the internet and web support e-commerce.
3. To explain how to use technologies to build e-commerce websites.
4. To make students aware of the business environment associated with e-commerce.

PRE-REQUISITES:

1. Basic Knowledge of computers and business concepts.
2. Basic knowledge of the Internet.

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the framework and business models of E-commerce.	BTL2	PO1, PO2, PO3, PO7
CO2	Explain the concept of network infrastructure and gain knowledge about mobile commerce.	BTL2	PO1, PO2, PO3, PO7, PO10
CO3	Demonstrate the process of secure electronic transactions for E-commerce.	BTL3	PO1, PO2, PO3, PO4
CO4	Analyze various e-commerce secure payment gateway.	BTL4	PO1, PO2, PO3, PO4, PO7
CO5	Evaluate Internet banking platform to work with E-commerce infrastructure.	BTL5	PO1, PO2, PO3, PO4, PO11
CO6	Implement ecommerce website for online business.	BTL6	PO1, PO2, PO3, PO4, PO6, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 306 **L T C**
Course Name: Internet of Things **3 1 4**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. To learn and understand the concept of Internet of Things (IOT).
2. To study the constituent components of Internet of Things.
3. To design and develop IoT applications using different, Sensors/actuators.
4. To seek working knowledge of Arduino, Raspberry pi Boards and to develop cloud based IOT projects.

PRE-REQUISITES:

1. Basic Programming Knowledge
2. Use of Internet

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the architecture and the functional blocks of Internet of Things.	BTL2	PO1, PO2, PO3
CO2	Explain the concepts of Internet of Things and gain knowledge to design IoT applications	BTL2	PO1, PO2, PO3,PO7, PO10
CO3	Demonstrate the process of capturing and analyzing data in Internet of Things.	BTL3	PO1, PO2, PO3,PO4
CO4	Examine the various components involved in IoT design methodology.	BTL4	PO1, PO2, PO3,PO4,PO7
CO5	Evaluate an IoT device to work with a Cloud Computing infrastructure.	BTL5	PO1,PO2,PO3, PO4,PO11
CO6	Implement IoT protocols for communication.	BTL6	PO1,PO2, PO3,PO4, PO6, PO7,PO8

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Programme Outcome & Course Outcome

	L	T/P	C
Course Code: BCA 308			
Course Name: Major Project	**0**	**12**	**6**

PROJECT REPORT

All the students are required to submit a report based on the project work done by them during the sixth semester.

SYNOPSIS (SUMMARY/ABSTRACT) :

All students must submit a summary/abstract separately with the project report. Summary, preferably, should be of about 3-4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following:

- Name / Title of the Project
- Statement about the Problem
- Why is the particular topic chosen?
- Objective and scope of the Project
- Methodology (including a summary of the project)
- Hardware & Software to be used
- Testing Technologies used
- What contribution would the project make?

TOPIC OF THE PROJECT- This should be explicitly mentioned at the beginning of the Synopsis. Since the topic itself gives a peep into the project to be taken up, candidate is advised to be prudent on naming the project. This being the overall impression on the future work, the topic should corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objective should be clearly specified. What the project ends up to and in what way this is going to help the end user has to be mentioned.

PROCESS DISCRIPTION: The process of the whole software system proposed, to be developed, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing and developing the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

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CONCLUSION: The write-up must end with the concluding remarks- briefly describing innovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stand out from the rest.

Course Code: BCA 312 **L T C**
Course Name: Machine Learning with Python **4 1 5**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:

1. To make student able to learn mathematical concepts, and algorithms used in machine learning techniques for solving real world problems and developing new applications based on machine learning.
2. To introduce students to the state-of-the-art concepts and techniques of Machine Learning using Python.

PRE-REQUISITES:
Basics of Python Programming

COURSE OUTCOMES(COs):
After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Explain machine learning concepts on real world applications and problems.	BTL2	PO2
CO2	Analyze and Implement Regression techniques.	BTL3	PO3, PO4
CO3	Solve and design solution of Classification problem	BTL4	PO3, PO4
CO4	Understand and implement Unsupervised learning algorithms	BTL5	PO4, PO6
CO5	Interpret various machine learning algorithms in a range of real-world applications.	BTL6	PO2, PO6, PO7, PO8

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Programme Outcome & Course Outcome

Course Code: BCA 314 **L T C**
Course Name: Deep Learning with Python **4 1 5**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to the following:-
1. To present the mathematical, statistical and computational challenges of building neural networks
2. To study the concepts of deep learning and important deep learning techniques
3. To introduce important Deep Learning architectures
4. To enable the students to apply deep learning techniques to support real-life applications

PRE-REQUISITES:
Basics of Python Programming

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the basic concepts of Deep Learning and differentiate between shallow learning and deep learning.	BTL2	PO1, PO2, PO6
CO2	Implement various Deep Learning Models.	BTL3	PO2, PO3, PO4,PO8
CO3	Understand different Deep Learning architectures and training algorithms.	BTL3	PO1, PO2, PO3,PO5, PO8

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CO4	Understanding Dimensionality Reduction and optimization in Deep Learning.	BTL4	PO1, PO2, PO3,PO4
CO5	Understanding and implementing Recurrent Neural Network (RNN).27	BTL3	PO1,PO2,PO3, PO8
CO6	Applying Deep Learning techniques in real life applications such as object detection and analysis.	BTL6	PO2, PO3,PO4, PO5, PO6,PO8

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Programme Outcome & Course Outcome

Course Code: BCA 316 **L T C**
Course Name: IT Act and Cyber Laws **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Students will be able to have the basic clarity and understanding of cybercrimes and cyber security laws
2. Students will be able to understand the need for cyber laws, will be able to describe and differentiate between substantive, procedural, and preventive cybercrime laws.
3. To understand and critically assess national, regional, and international cybercrime laws.
4. To create awareness among the students about how crime being is committed in the cyber world.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Define various Cyber laws in the world, Classification of Cybercrime	BTL1	PO1, PO7
CO2	Describe and explain the ways in which certain cybercrimes are perpetrated.	BTL2	PO3
CO3	Explain and use the objectives of national cyber security strategies.	BTL2 BTL3	PO3, PO7
CO4	Discover IPR and E-commerce law.	BTL4	PO2
CO5	Explain and Evaluate E-Commerce Issues and provisions in Indian Law.	BTL5	PO3, PO4
CO6	Design and create frameworks for international cooperation on cyber security Matters.	BTL6	PO4, PO6

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Programme Outcome & Course Outcome

Course Code: BCA-318 **L T C**
Course Name: Mobile Application Development **4 1 5**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:-

1. Identify various concepts of mobile application programming that make it unique from programming for other platforms.
2. To help learner to gain a basic understanding of Android application development.
3. Program mobile applications for the Android operating system that use basic and advanced phone features, and deploy applications to the Android marketplace for distribution.

PRE-REQUISITES:

1. Java Programming
2. Programming fundamental

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Recognize the concept of application development for mobile devices.	BTL2	PO1, PO2,
CO2	Understand the basic technologies used by the Android platform	BTL2	PO1, PO2,
CO3	Recognize and use Android Environment Emulator and Application life cycle	BTL3	PO1, PO2, PO3, PO4

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CO4	Develop mobile applications for the Android operating system that use basic and advanced phone features	BTL5	PO1, PO2, PO3, PO4, PO7
CO5	Deploy applications to the Android marketplace for distribution	BTL6	PO1, PO2, PO3, PO4, PO11

Course Code: BCA 332 **L T C**
Course Name: Seminar/ Conference Presentation **0 0 2**

OBJECTIVE:

Seminars/Conferences and Presentations provide a platform to the students, where they can learn from what others are doing, learn about new things, ideas and important tips related to new technologies. To foster the Innovations happening in upcoming technologies and harnessing the entrepreneurial opportunities, Institutes must provide ample opportunities to the students to learn and yield the advantages of new advancements in the field of technology. It is expected from a student to learn latest in the industry and write an article related to it and present their findings in front of a panel.

The following points need to considered while planning and evaluating the presentation

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- The seminars must be conducted after every 15 days/ or a month. A minimum of 3-4 seminar sessions can be organized during the semester.
- A minimum of 7-8 slides must be there which would include the title slide. The first slide should be the Introduction slide and the last one reference slide wherein all the links/books references/paper reference to paper must be quoted. The rest of the slides should focus on the technology, application areas etc.
- The title of the seminar must be related to the field of Information technology and must talk about the latest innovation/technology like IOT, Machine learning, Deep learning, AI Cloud computing, Mobility, Hand held devices, Social Computing, NOSQL Database, CRM, Social CRM, Open Source Application Development Frameworks, Zero Trust Security Framework/ Architecture, Big Data/ Data Lake, Emerging and Innovative Technologies, Conversational AI, Sentiments Analysis, DevOps, Real time Analytics, Fraud Detection. Proper approval must be taken before starting the work.
- Student's feedback must be taken after taking the seminar as to what learning they have gathered after studying the topics. For this, a feedback form may be designed using Google form utility.

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Programme Outcome & Course Outcome

Course Code: BCA 372 **L T C**
Course Name: Practical-XII IOT Lab **0 4 2**

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

5. To learn and understand the concept of Internet of Things (IOT).
6. To study the constituent components of Internet of Things.
7. To design and develop IoT applications using different, Sensors/actuators.
8. To seek working knowledge of Arduino, Raspberry pi Boards and to develop cloud based IOT projects.

PRE-REQUISITES:

3. Basic Programming Knowledge
4. Use of Internet

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understand the architecture and the functional blocks of Internet of Things.	BTL2	PO1, PO2, PO3
CO2	Explain the concepts of Internet of Things and gain knowledge to design IoT applications	BTL2	PO1, PO2, PO3,PO7, PO10
CO3	Demonstrate the process of capturing and analyzing data in Internet of Things.	BTL3	PO1, PO2, PO3,PO4
CO4	Examine the various components involved in IoT design methodology.	BTL4	PO1, PO2, PO3,PO4,PO7
CO5	Evaluate an IoT device to work with a Cloud Computing infrastructure.	BTL5	PO1,PO2,PO3, PO4,PO11
CO6	Implement IoT protocols for communication.	BTL6	PO1,PO2, PO3,PO4, PO6, PO7,PO8

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Programme Outcome & Course Outcome

Course Code: BCA 374	**L**	**T**	**C**
Course Name: NSS/NCC/Cultural Clubs/Technical Society/Technical Club	**-**	**-**	**2**

NUES: Comprehensive evaluation of the students by the concerned coordinator of NSS/NCC/Cultural Clubs/Technical Society/Technical Club, out of 100 as per the evaluation scheme worked out by these activity societies, organizations at the institution/ university level; the coordinators shall be responsible for the evaluation for the same. These activities shall start from the first semester and the evaluation shall be conducted at the end of sixth semester for students admitted in the first semester.

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SEMESTER WISE EVALUATION SCHEME

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Programme Outcome & Course Outcome

FIRST SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 101	Discrete Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 103	Programming Using 'C' Language	Core Course Theory	3	1	4	25	75	100
BCA 105#	Fundamentals of Computers & IT	Core Course Theory	3	1	4	25	75	100
BCA 107#	Web Technologies	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 109	Technical Communication	AECC	3	1	4	25	75	100
Core Course Practicals								
BCA 171	Practical – I 'C' Prog. Lab	Core Course Practical	0	4	2	40	60	100
BCA 173#	Practical – II IT Lab	Core Course Practical	0	4	2	40	60	100
BCA 175#	Practical-III Web Tech Lab	Core Course Practical	0	4	2	40	60	100
Bridge Course (Mandatory for Students from Non Mathematics background)								
BCA 181^{+}	Bridge Course in Mathematics	Mandatory for Students from Non Mathematics background	2	0	0	Pass Grade	------	------
	Total Credits				**26**			**800**

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[+] Non Credit subject mandatory for the students who do not have mathematics in 12th std. The student has to obtain at least pass marks (40). The examination of this paper shall be conducted by the concerned teacher teaching the course / paper as Teacher's Continuous Evaluation for total 100 marks. Only the Pass / Fail status is to be specified on the marksheet of the examination and the result of the student. Passing is mandatory for student not having mathematics in 12th std.

 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 800

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Programme Outcome & Course Outcome

SEMESTER WISE EVALUATION SCHEME

SECOND SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 102	Applied Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 104	Web based Programming	Core Course Theory	3	1	4	25	75	100
BCA 106	Data Structure And Algorithm Using 'C'	Core Course Theory	3	1	4	25	75	100
BCA 108#	Database Management System	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 110	Environment Studies	AECC	2	0	2	25	75	100
***Skill Enhancement Course (AEEC) (Choose any One)**								
BCA 132	**MOOC course from SWAYAM / NPTEL	SEC-1	0	0	2	100	0	100
BCA 134	Front End Design Tool VB.Net Lab	SEC-1	0	4	2	100	0	100
BCA 136	Statistical Analysis using Excel	SEC-1	0	4	2	100	0	100
BCA 138	Designing Lab Photoshop	SEC-1	0	4	2	100	0	100
Core Course Practical								
BCA 172	Practical-IV WBP Lab	Core Course Practical	0	4	2	40	60	100

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BCA 174	Practical – V DS Lab	Core Course Practical	0	4	2	40	60	100
BCA 176#	Practical – VI DBMS Lab	Core Course Practical	0	4	2	40	60	100
	Total				**26**			**900**

***NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute)**

Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 900

**Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.
3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.
4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

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Programme Outcome & Course Outcome

SEMESTER WISE EVALUATION SCHEME

THIRD SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 201	Computer Network	Core Course Theory	3	1	4	25	75	0	100
BCA 203	Computer Organization and Architecture	Core Course Theory	3	1	4	25	75	0	100
BCA 205#	Object Oriented Programming with C++	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 207	Human Values and Ethics	AECC	2	0	2	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 211#	Basics of Python Programming	DSE-1	4	1	5	25	50	25	100
BCA 213	Cyber Security	DSE-1	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 221	Principles of Management & Organizational Behaviour	GE-1	3	1	4	25	75	0	100
BCA 223	Open Elective offered by other Department/School	GE-1	3	1	4	25	75	0	100

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Programme Outcome & Course Outcome

	/programme								
*****Skill Enhancement Course (AEEC) (Choose any One)**									
BCA 231	****MOOC course from SWAYAM / NPTEL	SEC-2	0	0	2	100	0	0	100
BCA 233	Designing Lab CorelDraw	SEC-2	0	4	2	100	0	0	100
BCA 235	ASP.Net	SEC-2	0	4	2	100	0	0	100
BCA 237	AR/VR	SEC-2	0	4	2	100	0	0	100
BCA 239	Cyber Ethics	SEC-2	2	0	2	100	0	0	100
Core Course Practical									
BCA 271#	Practical – VII C++ Lab #	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

 # Generic Elective (GE) for other undergraduate programmes
*** First Subject from Discipline specific chosen group**
**** Choose one subject from list of GE-1**
***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

****Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.
3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.

4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

TOTAL MARKS: 800

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Programme Outcome & Course Outcome

SEMESTER WISE EVALUATION SCHEME

FOURTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 202	Java Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 204	Software Engineering	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 206	Introduction to Management & Entrepreneurship Development	AECC	3	1	4	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 212	Introduction to Data Science	DSE-2	4	1	5	25	50	25	100
BCA 214	Introduction to Artificial Intelligence	DSE-2	4	1	5	25	50	25	100
BCA 216	Network Security	DSE-2	4	1	5	25	50	25	100
BCA 218	Web Development Using Python and Django	DSE-2	4	1	5	25	50	25	100

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Programme Outcome & Course Outcome

****Generic Elective (Choose any One)**									
BCA 222	Digital Marketing	GE-2	3	1	4	25	75	0	100
BCA 224	Principles of Accounting	GE-2	3	1	4	25	75	0	100
BCA 226	Open Elective offered by other Department/ School /programme	GE-2	3	1	4	25	75	0	100
*****Skill Enhancement Course (AEEC)**									
BCA 232	Personality Development Skills	SEC-3	2	0	2	100	0	0	100
Core Course Practical									
BCA 272	Practical –VIII Java Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 274	Practical – IX SE Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Second Subject from Discipline specific chosen group**
**** Choose one subject from list of GE-2**
***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

Summer Training will be held for 4 weeks after the end of fourth semester.
Viva-Voce will be conducted in fifth semester.

TOTAL MARKS: 800

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Programme Outcome & Course Outcome

SEMESTER WISE EVALUATION SCHEME

FIFTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 301	Operating System & Linux Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 303	Computer Graphics	Core Course Theory	3	1	4	25	75	0	100
BCA 305	Cloud Computing	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 307	Minor Project	AECC	0	8	4	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 311	Data Visualization & Analytics	DSE-3	4	1	5	25	50	25	100
BCA 313	Machine Learning with Python	DSE-3	4	1	5	25	50	25	100
BCA 315	Web Security	DSE-3	4	1	5	25	50	25	100
BCA 317	Web Development with Java & JSP	DSE-3	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 331	Summer Training Project	SEC-4	0	0	2	100	0	0	100

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Programme Outcome & Course Outcome

Core Course Practical									
BCA 371	Practical – X Linux - OS Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 373	Practical – XI CG Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Third Subject from Discipline specific chosen group**
*****NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment. Evaluation will be based on Summer Training held after fourth semester.**
TOTAL MARKS: 800

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Programme Outcome & Course Outcome

SEMESTER WISE EVALUATION SCHEME

SIXTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 302	Data Ware Housing & Data Mining	Core Course Theory	3	1	4	25	75	0	100
BCA 304#	E- Commerce	Core Course Theory	3	1	4	25	75	0	100
BCA 306	Internet of Things	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 308	**Major Project	AECC	----	12	6	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 312	Machine Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 314	Deep Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 316	IT Act and Cyber Laws	DSE-4	4	1	5	25	75		100
BCA 318	Mobile Application Development	DSE-4	4	1	5	25	50	25	100
****Skill Enhancement Course (AEEC)**									
BCA 332	Seminar/ Conference Presentation	SEC – 5	0	0	2	100	0	0	100
Core Course Practical									
BCA 372	Practical – XII IOT Lab	Core Course Practical	0	4	2	40	0	60	100

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Vasant Kunj, New Delhi-110070

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Recognized u/s 2(f) by UGC & Accredited with 'A' Grade by NAAC
Participant of UNGC & UNPRME, New York
ISO 9001:2015 Quality Certified

Bachelor of Computer Applications

Programme Outcome & Course Outcome

$ BCA 374	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory	0	0	2	100	0	0	100
	Total				**29**				**800**

*__Fourth Subject from Discipline specific chosen group.__

**** The student shall do the Major project in the Discipline Specific Area/Curriculum based subject /any emerging technology.**

***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment .Evaluation will be based on the presentation on any latest technology/research article in in-house/external seminar/conference and will be conducted by the college committee only.**

 # Generic Elective (GE) for other undergraduate programmes

$ NUES (Non – University Examination Subject) Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs out of 100 marks as per evaluation schemes worked out by these societies / organizations at the institution / University level. The coordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and evaluation shall be conducted at the end of 6th semester for the students admitted in the first semester.

Note: Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.