

**M.C.E. Society's
ABEDA INAMDAR SENIOR COLLEGE OF ARTS, SCIENCE AND
COMMERCE (AUTONOMOUS), PUNE**

AZAM CAMPUS, CAMP, PUNE – 411001

Syllabus of S.Y.B.B.A (C.A)

Applicable for the Autonomous College Affiliated to

Savitribai Phule Pune University

B.B.A (C.A) Degree Course (Choice Based Credit System)

(2021 Pattern)

With effect from June 2022

Titles of Papers, Credit Allocation and Scheme of Evaluation

Semester I (Total Credits=21)

Course Type	Paper Code	Paper title	Credits		Evaluation		
			T	P	CIE	SEE	Total
CC	21CBCA111	Business and Professional Skills	3	-	40	60	100
CC	21CBCA112	Principles of Management	3	-	40	60	100
CC	21CBCA113	Programming in C	3	-	40	60	100
CC	21CBCA114	Database Management System	3	-	40	60	100
CC	21CBCA115	Business Statistics	3	-	40	60	100
Pr	21CBCA116	Computer Laboratory Based on 113 (2 credits)	-	2	20	30	100
		Computer Laboratory Based on 114(2 credits)	-	2	20	30	
SEC	21CBCA117A	Elective SEC Paper (Any One) Entrepreneurship Development (30 Hours)	2	-	20	30	50
	21CBCA117B	Introductory Course in Disaster Management (30 Hours)					

Note:

- Physical Education to be conducted in Sem-I, Code for the same is 21CPE11M2.

Semester II (Total Credits=21)

Course Type	Paper Code	Paper title	Credits		Evaluation		
			T	P	CIE	SEE	Total
CC	21CBCA121	Human Resource Management & Organizational Behavior	3	-	40	60	100
CC	21CBCA122	Advance C	3	-	40	60	100
CC	21CBCA123	Business Mathematics	3	-	40	60	100
CC	21CBCA124	Relational database management System	3	-	40	60	100
CC	21CBCA125	Web Technology HTML-JS-CSS	3	-	40	60	100
Pr	21CBCA126	Computer Laboratory Based on 124 (2 credits)	-	2	20	30	100
		Computer Laboratory Based on 122 & 125 (2 credits)	-	2	20	30	
SEC	21CBCA127M	Financial Accounting & Computerized Accounting (30 Hours)	2	-	20	30	50

Note:

- **Democracy, Election and Governance to be conducted in Sem-II, Code for the same is 21CDG12M2.**

Semester III (Total Credits=23)

Course Type	Paper Code	Paper title	Credits		Evaluation		
			T	P	CIE	SEE	Total
CC	21CBCA231	Digital Marketing	3	-	40	60	100
CC	21CBCA232	Data Structure Using C	3	-	40	60	100
CC	21CBCA233	Software Engineering	3	-	40	60	100
EC	21CBCA234A	Elective Course Paper –I (Any One) Angular JS	3	-	40	60	100
	21CBCA234B	PHP					
EC	21CBCA235A	Elective Course Paper –II (Any One) Big data	3	-	40	60	100
	21CBCA235B	Block chain					
Pr	21CBCA236	Computer Laboratory Based on 232 (2 credits each)	-	2	15	20	100
		Computer Laboratory Based on 234 (2 credits each)	-	2	15	20	
		Computer Laboratory Based on 235 (2 credits each)	-	2	10	20	
AECC	21CBAEEV23	Environmental Science Awareness Course	2	-	20	30	50

Note:

- **Departmental SEC Course - Self Employment through Freelancing**

Semester IV (Total Credits=22)

Course Type	Paper Code	Paper title	Credits			Evaluation		
			T	P	Pj	CIE	SEE	Total
CC	21BCA241	Networking	3	-	-	40	60	100
CC	21BCA242	Object Oriented Programming (C++)	3	-	-	40	60	100
CC	21BCA243	Operating System	3	-	-	40	60	100
EC	21BCA244A 21BCA244B	Elective Course Paper (Any One)	3	-	-	40	60	100
		NODE JS Advance PHP						
Pj	21BCA245	Project	-	-	4	40	60	100
Pr	21BCA246	Computer Laboratory Based on 242 (2 credits)	-	2	-	20	30	100
		Computer Laboratory Based on 244 (2 credits)	-	2	-	20	30	
SEC	21BCA247M	Bootstrap (30 Hours)	2	-	-	20	30	50

Semester V (Total Credits=22)

Course Type	Paper Code	Paper title	Credits			Evaluation		
			T	P	Pj	CIE	SEE	Total
CC	21BCA351	Cyber Security	3	-	-	40	60	100
CC	21BCA352	Object Oriented Software Engineering(OOSE)	3	-	-	40	60	100
CC	21BCA353	Core Java	3	-	-	40	60	100
EC	21BCA354A	Elective Course Paper (Any One) Mongo DB	3	-	-	40	60	100
	21BCA354B	Python						
Pj	21BCA355	Project	-	-	4	40	60	100
Pr	21BCA356	Computer Laboratory Based on 353 (2 credits)	-	2	-	20	30	100
		Computer Laboratory Based on 354(2 credits)	-	2	-	20	30	
SEC	21BCA357M	Data Science(30 Hours)	2	-	-	20	30	50

Semester VI (Total Credits=23)

Course Type	Paper Code	Paper title	Credits			Evaluation		
			T	P	Pj	CIE	SEE	Total
CC	21CBCA361	Data Mining and Data Warehouse	3	-	-	40	60	100
CC	21CBCA362	Human Computer Interaction (HCI)	3	-	-	40	60	100
CC	21CBCA363	Advanced Java	3	-	-	40	60	100
EC		Elective Course Paper (Any One)	3	-	-	40	60	100
	21CBCA364A	Android Programming						
	21CBCA364B	Dot Net Framework						
Pj	21CBCA365	Project	-	-	4	40	60	100
Pr	21CBCA366	Computer Laboratory Based on 363(2 credits)	-	2	-	20	30	100
		Computer Laboratory Based on 364(2 credits)	-	2	-	20	30	
SEC	21CBCA367M	Soft Skills Training (30 Hours)	2	-	-	20	30	50

SYBBA (CA) Semester III Syllabus Autonomous 2022-2023



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S.Y.B.B.A (C.A) DIGITAL MARKETING

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Digital Marketing
Course Code	21CBCA231
Semester	III
No. of Credits	3

Aims & Objectives of the Course

Sr. No.	Objectives
1.	The aim of this syllabus is to give knowledge about using digital marketing in and as business.
2.	To make SWOT analysis, SEO optimization and use of various digital marketing tools.
3.	To make students able to deal with digital marketing requirements of any business

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	Remembering, Understanding Abilities regarding concept and functions of Digital Marketing
2.	Understanding Digital marketing, SEO and need of it in current scenario
3.	Understanding Recent trends in social media marketing field and recent SEO trends and methodologies.

Syllabus

Unit No.	Table with Contents	Number of Lectures
Unit I	Digital Marketing Planning and Structure	10
	1. Inbound vs. Outbound Marketing,	1
	2. Content Marketing,	1
	3. Understanding Traffic,	1
	4. Understanding Leads,	1
	5. Strategic Flow for Marketing Activities.	1
	6. WWW (World wide web), Domains, Buying a Domain, Website Language & Technology, Core Objective of Website and Flow, One Page Website, Strategic Design of Home Page, Strategic Design of Products & Services Page, Strategic Design of Pricing Page, Portfolio, Gallery and Contact Us Page.	5
Unit II	Google Adwords	12
	1. Understanding Adwords, Google Ad Types, Pricing Models, PPC (Pay per click) Cost Formula, Ad Page Rank, Billing and Payments, Adwords User Interface,	4
	2. Keyword Planning, Keywords Control,	3
	3. Creating Ad Campaigns, Creating Text Ads, Creating Ad Groups, Bidding Strategy for CPC (Cost per click)	3
	4. Case Studies	2
Unit III	Facebook Marketing Fundamentals	10
	1. Profiles and Pages, Business Categories,	2
	2. Getting Assets Ready,	2
	3. Creating Facebook Pages, Page Info and Settings, Facebook Page Custom URL, Invite Page Likes,	2
	4. Featured Video, Pin Post and Highlights, Scheduling Posts, Facebook Events, Reply and Message,	3

	5. Facebook Insights Reports, Competitor's Facebook Page	1
Unit IV	YouTube Marketing	10
	1. Video Flow, Google Pages for YouTube Channel, Verify Channel	2
	2. Webmaster Tool –Adding Asset, Associated Website Linking, Custom Channel URL, Channel art, Channel Links, Channel Keywords, Branding Watermark, Featured Contents on Channel	3
	3. Channel Main Trailer, Uploading Videos, Uploading Defaults, Creator Library	3
	4. Case Studies.	2
Unit V	Email Marketing - Content Writing	12
	1. Email Machine –The Strategy, Email Frequency, Why People Don't Buy, The Fuel –Value	3
	2. Triggers in Email using 4Ps, Sequence of Email Triggers, Email Example - Topic, Introduction, Product, Secondary Value, Fear, Regret, Ask for Sales, Reinforcement, Offers Announcements, Urgency, Cross Sales, Re-Engagement,	4
	3. Buyer vs. Consumer.	1
	4. Email Software and Tools	4

References:

1. Deiss, R., & Henneberry, R. (2020). Digital marketing for dummies. John Wiley & Sons.
2. Belch, M., & Belch, G. (2011). Advertising and promotion: An integrated marketing communications perspective. McGraw-Hill Education.
3. Mohan, M. (1989). Advertising management: Concepts and cases. Tata McGraw-Hill Education.
4. Belch, Belch, G. E., & Belch, M. A. (2018). Advertising and promotion: An integrated marketing communications perspective. College Ie Overruns.
5. Safko, L. (2009). The social media Bible: Tactics, tools, and strategies for business success. John Wiley & Sons.
6. Rabazinski, C. (2015). Google Adwords for beginners: A do-it-Yourself guide to Ppc advertising. CreateSpace.
7. Brodie, I. (2013). Email persuasion: Captivate and engage your audience, build authority and generate more sales with email marketing.

Website Reference Link:

- <https://www.wearemarketing.com/blog/a-step-by-step-guide-to-structuring-a-digital-marketing-plan.html>
- https://ads.google.com/intl/en_in/home/
- <https://neilpatel.com/blog/facebook-marketing/>
- <https://optinmonster.com/9-tips-for-writing-email-marketing-copy-that-converts/>
- <https://www.campaignmonitor.com/resources/guides/high-performing-email/>



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S.Y.B.B.A (C.A) Data Structure Using C

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Data Structure Using C
Course Code	21CBCA232
Semester	III
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	The course aims to provide exposure to understand the concepts of ADTs , sorting, searching and hashing algorithms
2.	It aims to train the student to learn linear data structures – lists, stacks, and queues
3.	To Understand basic concepts about trees and graphs

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Implementing data structures in various applications
2.	Design and implement various data structures
3.	Apply sorting and searching algorithms to the small and large data sets
4.	To learn the concept of linked list, its types and applications
5.	To understand the concept of stacks and queues, their applications and implementations
6.	To learn the concept of trees, their types, various operations to be performed and make aware with various applications

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Basic Concept and Introduction to Data Structure	07
	1. Pointers and dynamic memory allocation	1
	2. Abstract Data Types (ADT) Introduction to Arrays and Structure	1
	3. Types of array and Representation of array	1
	4. Algorithm-Definition and characteristics	1
	5. Algorithm Analysis -Space Complexity -Time Complexity	
	6. Types of Data structure	1
	7. Self-Referential Structure	1
Unit II	Linear data structures	07
	1. Sorting algorithms with efficiency	5
	i. Bubble sort,	
	ii. Insertion sort,	
	iii. Merge sort	
	iv. Quick Sort	
	v. Selection Sort	
	2. Searching techniques	2
	i. Linear Search	
	ii. Binary search	
Unit III	Linked List	07
	1. Introduction to Linked List	1
	2. Implementation of Linked List – Static & Dynamic representation	2
	3. Types of Linked List	
	i. Singly Linked list(All type of operation)	4
	ii. Doubly Linked list (Create , Display)	
	iii. Circularly Singly Linked list (Create, Display)	
	iv. Circularly Doubly Linked list (Create, Display)	

Unit IV	Stacks	08
	<ol style="list-style-type: none"> 1. Introduction 2. Representation- Static & Dynamic 3. Primitive Operations on stack 4. Application of Stack 5. Conversion of Infix, prefix, postfix , Evaluation of postfix and prefix 	<p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>3</p>
Unit V	Queues	05
	<ol style="list-style-type: none"> 1. Introduction 2. Representation - Static & Dynamic 3. Primitive Operations on Queue 4. Circular queue, priority queue 5. Concept of doubly ended queue 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Unit VI	Trees	12
	<ol style="list-style-type: none"> 1. Concept & Terminologies 2. Binary tree, binary search tree 3. Representation – Static and Dynamic 4. Operations on BT and BST – create, Insert, delete, , counting leaf, non-leaf & total nodes 5. Tree Traversals (preorder, inorder, postorder) 6. Height balanced tree- AVL trees- Rotations, AVL tree example 	<p>1</p> <p>2</p> <p>1</p> <p>3</p> <p>3</p> <p>2</p>
UnitVII	Graph	08
	<ol style="list-style-type: none"> 1. Concept & Terminologies 2. Graph Representation – Adjacency matrix, adjacency list, 3. Degree of Graph 4. Traversals – BFS and DFS 	<p>1</p> <p>2</p> <p>2</p> <p>3</p>

Book References:

1. Horowitz Sahani, “Fundamentals of Data Structures”, Second Edition.
2. YedidyahLangsam, Aaron M. Tenenbaum, Moshe J. Augenstein, “Data Structures using C and C++”, Second Edition, Pearson Education.
3. Bandopadhyay & Dey,” Data Structures using C”, First Edition, Pearson Education.
4. S.K.Srivastava and Deepali Srivastava,” Data Structures Through C in Depth”, Second Edition, BPB Publication.
5. Ashok Kamthane,” Introduction to Data Structures using C”, Pearson Education.

Website Reference Link:

- https://www.tutorialspoint.com/data_structures_algorithms/index.htm
- <https://www.geeksforgeeks.org/data-structures>
- <https://www.javatpoint.com/data-structure-tutorial>

Best IDE used for Data Structure Using C:

Sr. No	Name of IDE or Tools	Latest Version
1.	Turbo C	3.2/3.3
2.	Microsoft Visual Studio Code	1.56
3.	Net Beans	12.4



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S.Y.B.B.A (C.A) Software Engineering

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Software Engineering
Course Code	21CBCA233
Semester	III
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	To understand System concepts.
2.	To understand Software Engineering concepts.
3.	To understand the applications of Software Engineering concepts and Design in Software

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Understand fundamental concepts of software engineering and analyze process models required to develop a software system.
2.	Analyze software requirements and model requirements for the given scenario.
3.	Apply design concepts and metrics for software development.
4.	Apply testing strategies and techniques for quality software.
5.	Analyze risks in software development life cycle and apply risk strategies to mitigate risks.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to System Concepts	03
	1. Definition and Basic Components of System	01
	2. Elements and Types of the System	01
	3. System Characteristics	01
Unit II	Introduction to Software Engineering	09
	1. Definition of Software	01
	2. Characteristics of Software	01
	3. Definition of Software Engineering	01
	4. Need for Software Engineering	01
	5. Mc Call's Quality factors	02
	6. The Software Process	01
	7. Software Product and Process	01
	8. Validation & Verification Model	01
Unit III	Software Development Life Cycle	09
	1. Introduction to Software Development Life Cycle	01
	2. Activities of SDLC	02
	3. A Generic Process Model	01
	4. Software Development Life Cycle	01
	5. Waterfall Model	01
	6. Incremental Process Models	01
	7. Prototyping Model	01
	8. Spiral Model	01
Unit IV	Requirement Engineering	09
	1. Introduction	01
	2. Requirement Elicitation	02
	3. Requirement Elaboration	02
	4. Requirement Gathering	01
	5. Feasibility study	01

	6. Fact Finding Techniques	01
	7. SRS Format	01
Unit V	Analysis And Design Tools	15
	1. Decision Tree and Decision Table	02
	2. Data Flow Diagrams (DFD) (Up to 2nd level)	04
	3. Data Dictionary	01
	4. Elements of Data Dictionary	01
	5. Advantages and Disadvantages of Data Dictionary	01
	6. Input and Output Design	02
	7. Structured Design Concepts	01
	8. Structure Chart	02
	9. Coupling and Cohesion	01
Unit VI	Software Testing	05
	1. Definition of Software testing Process	01
	2. Unit Testing	02
	3. Integration Testing	01
	4. System Testing	01
Unit VII	Software Maintenance and Software Re-Engineering	04
	1. Definition and Types of Maintenance	02
	2. Software reengineering and Reverse Engineering	01
	4. Restructuring and Forward Engineering.	01

Book References:

1. Software Engineering: A Practitioner's Approach- Roger S. Pressman, McGraw hill International Editions 2010(Seventh Edition)
2. System Analysis, Design and Introduction to Software Engineering (SADSE) - S. Parthsarthy, B.W. Khalkar
3. Analysis and Design of Information Systems (Second Edition) - James A. Senn, McGraw Hill
4. System Analysis and Design- Elias Awad, Galgotia Publication, Second Edition

Website Reference Link:

- <https://www.geeksforgeeks.org/software-engineering>
- <https://www.tutorialandexample.com/software-engineering-tutorial>



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S.Y.B.B.A (C.A) ANGULAR JS

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Angular JS
Course Code	21CBCA234A
Semester	III
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	Students should be able to Understand Client Side MVC and SPA.
2.	To understand and explore AngularJS Component.
3.	Develop an AngularJS Single Page Application
4.	Create and bind controllers with Java Script
5.	Apply filters in AngularJS application

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	To understand and implement core concepts of Angular JS.
2.	To understand Angular JS Modules, Controller, View and Scope.
3.	Ability to understand Angular JS Forms, Built –in filters.
4.	Ability to maintain dependency Injection and Services.

Syllabus

Unit. No	Title with Contents	No. of Lectures
Unit I	Angular JS Core Concepts	14
	1. What is Angular JS?	2
	2. Difference between JavaScript and Angular JS	2
	3. Advantages of Angular JS	2
	4. Angular JS MVC Architecture	2
	5. Introduction to Single Page Application	2
	6. Setting up the environment	2
	7. First App using MVC architecture	2
Unit II	AngularJS Directives and Expressions	10
	1. Understanding ng attributes	4
	i. ng-app,	
	ii. ng-init,	
	iii. ng-model,	
	iv. ng-controller,	
	v. ng-bind,	
	vi. ng-repeat,	
	vii. ng-show,	
	viii. ng-readonly,	
	ix. ng-disabled,	
	x. ng-if,	
	xi. ng-click,	3
	2. Expression and Data Binding	3
	3. Working with directives	3
Unit III	Angular JS Modules, Controller, View and Scope	10
	1. Angular Modules	3
	2. Angular Controller	3
	3. Angular View	2
	4. Scope hierarchy in AngularJS	2
Unit IV	Filter, Forms and Ajax Filters	10

	1. Built-in filters <ul style="list-style-type: none"> i. upper case and lower case filters, ii. date , iii. currency and number formatting , iv. orderBy, v. filter , vi. Custom filter. 	4
	2. Angular JS Forms <ul style="list-style-type: none"> i. Working with Angular JS forms, ii. model binding, iii. form controller, iv. Using CSS classes, v. form events, vi. custom model update triggers , vii. custom validation, viii. \$http service. 	4
	3. Ajax implementation using \$http	2
Unit V	Dependency Injection, Services	10
	1. What is dependency injection?	2
	2. Understanding services	2
	3. Using built-in service	2
	4. Creating custom service,	2
	5. Injecting dependency in service	2

Book References:

1. Greg Lim, “Beginning Angular with Typescript (updated to Angular 5)”, Createspace Independent Publications.
2. Pawel Kozlowski, “Peter Bacon Darwin, Mastering Web Application Development with AngularJS”, Ingram short title.

3. Shyam Seshadri, “Angular: Up and Running: Learning Angular, Step by Step”, O'Reilly Media, 1st edition.
4. Felix Alvaro, “ANGULARJS: Easy AngularJS For Beginners”, CreateSpace Independent Publishing Platform (June 11, 2016).
5. Matt Frisbie, “Angular 2 Cookbook”, Packt Publishing Limited; 2nd Revised edition (20 January 2017).
6. Matt Frisbie, “AngularJS Web Application Development Cookbook”, Packt Publishing (December 26, 2014).
7. Adam Freeman, “Pro AngularJS (Expert's Voice in Web Development)”, Apress 1st edition (March 27, 2014).

Website Reference Link:

- <https://www.w3schools.com/angular/>
- <https://www.tutorialspoint.com/angularjs/index.htm>
- <https://www.javatpoint.com/angularjs-tutorial>
- <https://www.guru99.com/angularjs-tutorial.html>
- <https://docs.angularjs.org/tutorial>
- <https://www.tutorialsteacher.com/angularjs/angularjs-tutorials>

Best IDE used for Angular JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Angular IDE	3.0
2.	Microsoft Visual Studio Code	1.59
3.	Sublime Text	4



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S.Y.B.B.A (C.A) PHP

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	PHP
Course Code	21CBCA234B
Semester	III
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	Understand how server-side programming works on the web
2.	Using PHP built-in functions and creating custom functions
3.	Understanding POST and GET in form submission.
4.	How to receive and process form submission data
5.	Read and process data in a MySQL database

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Write PHP scripts to handle HTML forms.
2.	Write regular expressions including modifiers, operators, and meta characters.
3.	Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4.	Analyze and solve various database tasks using the PHP language
5.	Analyze and solve common Web application tasks by writing PHP programs

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	PHP Basics	08
	1. Setting up a development environment	2
	2. Variables, numbers and strings	2
	3. Calculations with PHP	2
	4. Using Arrays	2
Unit II	Control Structures and Loops	07
	1. Conditional Statements	3
	2. Using Loops for Repetitive tasks	2
	3. Combining Loops and Arrays	2
Unit III	Functions, Objects and Errors	08
	1. PHP's Built-in functions	2
	2. Creating Custom functions	2
	3. Passing Values by Reference	2
	4. Understanding Objects	2
Unit IV	Working with Forms	08
	1. Building a Form	2
	2. Processing a Form's Data	2
	3. Differences between POST and GET	2
	4. Preserving User Input	2
Unit V	More with Forms	08
	1. Dealing with checkboxes and radio buttons	2
	2. Retrieving values from lists	2
	3. Validating and restricting data	2
	4. Sending Email	2
Unit VI	Storing and Protecting Data	07
	1. Setting and Reading Cookies	2
	2. Protecting Online Files	3
	3. Understanding Session Variables	2
Unit VII	MySQL Database Overview	08

	1. phpMyAdmin Overview	2
	2. Using a MySQL Database	3
	3. Reading and Writing Data	3

Book References:

1. Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition
by VikramVaswani
2. Murach's PHP and MySQL (2nd Edition) by Joel Murach and Ray Harris
3. PHP: The Complete Reference Paperback – 1 Jul 2017 by Steven Holzner (Author)

Website Reference Link:

- <https://www.php.net/>
- <https://www.w3schools.com/php/>
- <https://www.tutorialspoint.com/php/index.htm>

Best IDE used for PHP:

Sr. No	Name of IDE or Tools	Latest Version
1.	Microsoft Visual Studio Code	1.59
2.	Notepad++	8.1.3
3.	Dreamweaver	21.1



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Syllabus for S.Y.B.B.A (C.A) BIG DATA

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	BIG DATA
Course Code	21CBCA235A
Semester	III
No. of Credits	3

Aims & Objectives of the Course

Sr.No.	Objectives
1.	To enable learners to develop expert knowledge and analytical skills in current and developing areas of analysis statistics, and machine learning
2.	To enable the learner to identify, develop and apply detailed analytical, creative, problem solving skills.
3.	Provide the learner with a comprehensive platform for career development, innovation and further study.

Expected Course Specific Learning Outcomes

Sr.No.	Learning Outcome
1.	Understand and effectively explain the concepts of Big data technologies.
2.	Will Understand demonstrate proficiency with statistical analysis of data.

Syllabus

Unit No	Title with Contents	No. of Lectures
UNIT I	Introduction to big data	10
	1. Introduction to Big Data i. Types of Digital Data ii. Big Data Analytics	5
	2. Application of Big data	5
Unit II	Introduction to data scienceE	14
	1 Basics of Data Analytics	4
	2 Types of Analytics i. Descriptive ii. Predictive iii. Prescriptive iv. Statistical Inference	4
	3. Populations and samples i. Statistical modelling ii. Probability iii. Distribution iv. Correlation v. Regression	6
Unit III	Introduction to machine learning	18
	1 Basics of Machine Learning	4
	2 Supervised Machine Learning i. K- Nearest-Neighbours ii. Naïve Bayes iii. Decision tree iv. Support Vector Machines	6
	3 Unsupervised Machine Learning i. Cluster analysis ii. K means iii. EM Algorithm iv. Association Rule Mining v. Apriority algorithms	4

	4 Regression Analysis i Linear Regression ii Nonlinear Regression	4
Unit IV	Data analytics with r/ weka machine learning	12
	1 Introduction	3
	2 Data Manipulation	3
	3 Data Visualization	3
	4 Data Analysis	3

References:

1. SeemaAcharya “Big Data Analytics" Wiley 2015 SubhasiniChellappan
2. Jay Liebowitz “Big Data and Business Analytics” CRC press (2013)
3. ArvindSathi, “BigDataAnalytics” Disruptive Technologies.

Website Reference Link:

- <https://big-data-storage-and-streaming-by-mysql-ndb-cluster-69d363039238>
- <https://dev.mysql.com/doc/mysql-cluster-excerpt/8.0/en/mysql-cluster-ndbd-definition.html>
- <https://dev.mysql.com/doc/mysql-cluster-excerpt/5.6/en/mysql-cluster-disk-data.html>

Best IDE :

SR No	Name of IDE or Tool	Latest Version
1.	Microsoft Access 2010	10g



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Syllabus for S.Y.B.B.A (C.A) BLOCK CHAIN

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Block chain
Course Code	21CBCA235B
Semester	III
No. of Credits	3

Aims & Objectives of the Course

Sr.No.	Objectives
1.	Understand how block chain systems (mainly Bitcoin and Ethereum) work
2.	To securely interact with them.
3.	Design, build, and deploy smart contracts and distributed applications.
4	Integrate ideas from blockchain technology into their own projects.

Expected Course Specific Learning Outcomes

Sr.No.	Learning Outcome
1.	Understand what and why of Block chain.
2.	Explore the major components of Block chain
3	Deploy and exercise example smart contracts

Website Reference Link:

- <https://www.amazon.in/Blockchain-Revolution-Technology-Changing-Business/dp/1101980133>
- https://www.amazon.in/Blockchain-Revolution-Don-Tapscott/dp/0241237858/ref=pd_lpo_2?pd_rd_i=0241237858&psc=1

Best IDE :

SR No	Name of IDE or Tool	Latest Version
1.	Microsoft Access 2010	10g



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S.Y.B.B.A (C.A) Computer Laboratory Based on 232 (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 232 (2 credits)
Course Code	21CBCA236
Semester	III
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	To study various arrays, Sorting, Searching Techniques.
2.	To learn briefly the concept of Linked List, Stack, Queue.
3.	To understand the concept of Trees and Graph

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Explain use of Sorting and Searching Techniques.
2.	Write programs using Types of Linked List.
3.	Various operations to be performed on stack and Queue.
4.	The concept of trees, Graphs and their types

Best IDE used for Data Structure Using C:

Sr. No	Name of IDE or Tools	Latest Version
1.	Turbo C	3.2/3.3
2.	Microsoft Visual Studio Code	1.56
3.	NetBeans	12.4

Assignment No	Assignment Name	No. of Sessions
1.	Assignment based on Array	1
2.	Assignment based on Sorting Techniques	2
3.	Assignment based on Searching Techniques	2
4.	Assignment based on Linked List	2
5.	Assignment based on Stack	2
6.	Assignment based on Queue	1
7.	Assignment based on Trees	1
8.	Assignment based on Graph	1
	Total Number of Sessions	12



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S.Y.B.B.A (C.A) Computer Laboratory Based on 234(A) (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 234(A) (2 credits)
Course Code	21CBCA236
Semester	III
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	To study various AngularJS Directives, Expressions, Events.
2.	To learn briefly the concept of AngularJS Modules, Controller, View and Scope.
3.	To understand Filters and Form Validation.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	To understand and implement core concepts of Angular JS.
2.	To understand Angular JS Modules, Controller, View and Scope.
3.	Ability to understand Angular JS Forms, Built –in filters.
4.	Ability to maintain dependency Injection and Services.

Best IDE used for Angular JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Angular IDE	3.0
2.	Microsoft Visual Studio Code	1.59
3.	Sublime Text	4

Assignment No	Assignment Name	No. of Sessions
1	Assignment based on Introduction to Angular JS, AngularJS Directives, Expressions, Events.	4
2	Assignment based on AngularJS Modules, Controller, View and Scope.	4
3	Assignment based on Filter, Forms Validation.	2
4	Assignment based on AngularJS Services.	2
	Total Number of Sessions	12



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S.Y.B.B.A (C.A) Computer Laboratory Based on 234(B) (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 234(B) (2 credits)
Course Code	21CBCA236
Semester	III
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	To study various PHP built-in functions and creating custom functions.
2.	To learn POST and GET in form submission
3.	To understand Read and process data in a MySQL database.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Write PHP scripts to handle HTML forms.
2.	Write regular expressions including modifiers, operators, and meta characters.
3.	Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4.	Analyze and solve various database tasks using the PHP language

Best IDE used for Angular JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Microsoft Visual Studio Code	1.59
2.	Notepad++	8.1.3
3.	Dreamweaver	21.1

Assignment No	Assignment Name	No. of Sessions
1	Assignment on variables, number and string	2
2	Assignment on conditional statements	2
3	Assignment on Loops and Arrays	2
4	Assignment on PHP In-build functions.	2
5	Assignment on forms.	2
6	Assignment on PHP MYSQL Database	2
	Total Number of Sessions	12



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2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 235(A) (2 credits)
Course Code	21CBCA236
Semester	III
No. of Credits	2

Aims & Objectives of the Course

Sr.No.	Objectives
1.	Defining the scope of the course.
2.	To have continuous assessment of the course and students
3.	Providing ready reference for the students during practical implementation
4	Provide more options to students so that they can have good practice before facing the examination.
5	Catering to the demand of slow and fast learners and accordingly providing the practice assignments to them

Expected Course Specific Learning Outcomes

Sr.No.	Learning Outcome
1.	Understand what and why of Big Data
2.	Explore the major components of Big Data
3	Deploy and exercise example smart programs

Best IDE used for Big Data:

Sr. No	Name of IDE or Tools	Latest Version
1.	R Studio	3.0.1+
2.	Turbo C	3.7

Assignment No	Assignment Name	No. of Sessions
1	Assignment on Basic R Programming	2
2	Assignment on Decision making and loop control structures	2
3	Assignment on Sting and Function in R Programming	2
4	Assignment on Vector and List in R Programming	2
5	Assignment on Array and Matrices in R Programming	2
6	Assignment on Factor and Data Frame in R Programming, Data Analysis, Data Visualization.	2
	Total Number of Sessions	12



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2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 235(B) (2 credits)
Course Code	21CBCA236
Semester	III
No. of Credits	2

Aims & Objectives of the Course

Sr.No.	Objectives
1.	Defining the scope of the course.
2.	To have continuous assessment of the course and students
3.	Providing ready reference for the students during practical implementation
4.	Provide more options to students so that they can have good practice before facing the examination.
5.	Catering to the demand of slow and fast learners and accordingly providing the practice assignments to them

Expected Course Specific Learning Outcomes

Sr.No.	Learning Outcome
1.	Understand what and why of Block chain
2.	Explore the major components of Block chain
3.	Deploy and exercise example smart programs

Block Chain

Assignment No	Assignment Name	No. of Sessions
1	Working with Block chain	6
2	Implementation of Smart Contracts and Hyper ledger	6
	Total	12

Best IDE used for Block Chain:

Sr. No	Name of IDE or Tools	Latest Version
1.	Java	17.0. 1
2.	JavaScript SDK API	3.8



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Syllabus for

FYBA, S.Y.B. Sc., S.Y.B.Sc. (Computer Science), SYBCA (Science), S.Y.B. Com,

SYBBA (CA), SYBBA,

2021-22 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Environmental Science/ Environmental Awareness
Course Code	21ABAEV11- FYBA 21SBAEEV24- S.Y.B.Sc., S.Y.B.Sc. (Comp. Sci.), SYBCA (Science) 21CBAEEV23- S.Y.B. Com, SYBBA and SYBBA(CA)
Semester	I (FYBA) III (S.Y.B.Com., SYBBA and SYBBA(CA)) IV (S.Y.B.Sc., S.Y.B.Sc. (Comp. Sci.), SYBCA (Science))
No. of Credits	2 (36 Lectures of 50 minutes)

Aims & Objectives of the Course

Sr. No.	Objectives
1.	To ensure 'well variedness' with the basic, scientific concepts of many of the current environmental issues & happenings
2.	To encourage incitation of a thought process & hence, development of a practical perspective amongst the students
3.	To bring sensitization towards the environment but also increase student competency & employability.
4.	To inculcate sense of Scientific Temperament
5.	To inculcate the laws of Nature and to maintain the harmonious relationship with it.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Students will understand the multidisciplinary nature of the subject and thus the Scope of study
2.	Students will understand the importance of the subject in day today's life, thus understanding the basics of sustainability
3.	Students will understand the intricate relationship between all types of life and the present trend of man – environment relationship
4.	Students will understand about how the subject knowledge helps in solving various social, economic and environment related problems
5.	Students of each faculty will be empowered with the knowledge of environment and sustainability, which they can implement in their daily life to achieve sustainable lifestyle

Syllabus

Unit No.	Title with Contents	No. of Lectures
I	Introduction to Environmental Studies 1. Multidisciplinary nature of Environmental Studies 2. Scope & Importance 3. Environmental ethics 4. Concept of sustainability and sustainable development	03
II	Natural Resources 1. Types of Resources-Exhaustible & Inexhaustible 2. Renewable & Non-Renewable-Forest-Mineral-	04

	<p>Water-Land</p> <ol style="list-style-type: none"> 3. Energy Resources 4. Usage 5. Reasons For Their Degradation- 6. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations <ol style="list-style-type: none"> i. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). 7. Conservation of resources 	
III	<p>Ecosystem</p> <ol style="list-style-type: none"> 1. Structure & Function 2. Energy Flow 3. Food Chain & Food Web 4. Pyramids of Ecosystem 5. Ecological Succession 6. Types of Ecosystems- Terrestrial (Forest, Grassland, Desert), Aquatic ((ponds, streams, lakes, rivers, oceans, estuaries) 	04
IV	<p>Biodiversity & its Conservation</p> <ol style="list-style-type: none"> 1. Definition of Biodiversity 2. levels of Biodiversity (genetic, species and ecosystem diversity) 3. Biodiversity of India (Mega-diversed country) 4. Hotspots of Biodiversity 5. Endemic & Endangered species 6. Threats to biodiversity (Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions) 7. Biodiversity Conservation- In-situ & Ex-situ 	06

	8. National parks of India	
V	Environmental Pollution <ol style="list-style-type: none"> 1. Definition of Pollution 2. Pollutants 3. Air Pollution 4. Water Pollution 5. Noise Pollution 6. Soil Pollution 7. Control measures of Pollution (choosing sustainable lifestyle) 8. Solid Waste Management 9. Case Studies 	06
VI	Environmental Issues & Solutions <ol style="list-style-type: none"> 1. Climate change, 2. Global warming, 3. Ozone layer depletion, 4. Introduction to Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. 5. International agreements: Paris, Montreal and Kyoto protocols and Convention on Biological Diversity (CBD) 	06
VII	Human Communities and the Environment <ol style="list-style-type: none"> 1. Human population growth: Impacts on environment, human health and welfare. 2. Concept of Disaster management: floods, earthquake, cyclones and landslides. 3. Environmental movements: Chipko, Silent 	06

	valley, Bishnois of Rajasthan.	
VIII	Field Visit Report Field Visit to Local Ecosystem Site/ Pollution site/ Solid Waste management site/ Pollution control lab	01

References:

1. Barrow, C.J., Environmental Management, 1999. Routledge, N.Y.
2. Boubel, R.W., Fundamentals of Air Pollution, 1991. Academic Press, N.Y
3. Botbin, D., and Keller, E., Environmental Science, 1995. John Wiley and Sons, USA.
4. Chadha, K.L. and Swaminathan, M.S., Environment and Agriculture. Malhotra Publishing House, 2006, New Delhi
5. Carson, R., Silent Spring, 2002, , Houghton Mifflin Hartcourt
6. Odum, E.P., Odum, H.T. & Andrews, J. Fundamentals of Ecology, 1971. Philadelphia: Saunders
7. Sharma, P.D. Ecology and Environment 1994. Ashish Publications,
8. Wagner, K.D Environment Management 1998. W.B. Saunders Co, Philadelphia, USA
9. Singh, G.B. and Sharma Fifty Years of Natural Resource Management Research B.R. 1998, Indian Council of Agriculture Research, New Delhi
10. Singh, N. and Sontakke, N.A. On Climatic fluctuations and Environment changes on Indo-Gangetic Plains, India. Springer, Feb, 2002
11. Thapar, V. Land of the Tiger: A Natural History of the Indian Subcontinent 1998
12. World Commission on Environment and Development 1987, Our Common Future. Oxford University Press.

SYBBA (CA) Semester IV Syllabus



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S.Y.B.B.A (C.A) Networking

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Networking
Course Code	21CBCA241
Semester	IV
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1	To gain knowledge about Computer Networks concepts.
2	To know about working of networking models, addresses, transmission medias and connectivity devices.
3	To acquire information about network security and cryptography

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	To know how computer networks are organized with the concept of layered approach.
2.	Implement a simple LAN with hubs, bridges and switches.
3.	How packets in the Internet are delivered.
4.	Brief Knowledge of Network Topologies and Transmission media

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to Computer Network	12
	1. Basics of Computer Network <ul style="list-style-type: none"> i. Definition ii. Goals iii. Applications iv. Network Hardware –Broadcast, Point to Point v. Components of Data Communication 	3
	2. Network Topologies <ul style="list-style-type: none"> i. Mesh ,Star, Bus, Ring 	2
	3. Types of Networks <ul style="list-style-type: none"> i. LAN,MAN,WAN ii. Internetwork iii. Wireless Network 	3
	4. Modes of Communication <ul style="list-style-type: none"> i. Simplex, Half Duplex, Full Duplex 	1
	5. Server Based LANs & Peer-to-Peer LANs	2
	6. Protocols and Standards	1
Unit II	Network Models	10
	1. OSI Reference Model : Functions of each Layer	2
	2. TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Model.	2
	3. TCP/IP Protocol Suite	2
	4. Addressing <ul style="list-style-type: none"> i. Physical Addresses ii. Logical Addresses iii. Port Addresses iv. Specific Addresses 	2

	5. IP Addressing Classfull Addressing , Classless Addressing	2
Unit III	Transmission Media	08
	1. Introduction, Types of Transmission Media	1
	2. Guided Media: i. Twisted Pair Cable ii. Coaxial Cable iii. Fiber Optic Cable	3
	3. Unguided Media: i. Electromagnetic Spectrum for Wireless Communication ii. Propagation Modes Ground, Sky, Line-of-Sight iii. Wireless Transmission :Radio Waves, Microwaves, Infrared	4
Unit IV	Wired and Wireless LAN	12
	1. IEEE Standards	1
	2. Standard Ethernet MAC Sublayer, Physical Layer	1
	3. Fast Ethernet – Goals, MAC Sublayer, Topology, Implementation	1
	4. Gigabit Ethernet – Goals, MAC Sublayer, Topology, Implementation	1
	5. Ten-Gigabit Ethernet – Goals, MAC Sublayer, Physical Layer	2
	6. Backbone Networks -Bus Backbone, Star Backbone	2
	7. Virtual LANs Membership, IEEE standards advantages	2
	8. Wireless LAN i. IEEE 802.11 Architecture, ii. Bluetooth Architecture (Piconet, Scatternet)	2 2
Unit V	Network Devices	06
	1. Network Connectivity Devices i. Active and Passive Hubs ii. Repeaters iii. Bridges- Types of Bridges iv. Switches v. Router vi. Gateways	1 1 1 1 1 1

		1
Unit VI	Network Security	06
	1. Introduction	
	2. Need for Security	1
	3. Security Services :	
	i. Message- -Confidentiality, Integrity, Authentication, Non repudiation.	2
	4. Active and Passive attacks	1
	5. Cryptography (Symmetric and Asymmetric)	1
	6. Firewall	1

Book References:

1. Andrew Tanenbaum, “Computer Networks”, 4th Edition, Pearson Education.
2. Behrouz Forouzan, “Data Communication and Networking”, 4th Edition, TATA McGraw Hill.
3. Peter Lars Dordal,”An Introduction to Computer Networks”,2nd Edition
4. Willian Stallings,” Data and Computer Communications”, 9th Edition, Pearson Education.

Website Reference Link:

- <https://www.geeksforgeeks.org/basics-computer-networking>
- https://www.cisco.com/c/en_in/solutions/enterprise-networks/what-is-computer-networking.html
- <https://www.javatpoint.com/types-of-computer-network>
- https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
- https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_networking.htm



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S.Y.B.B.A (C.A) Object Oriented Programming (C++)
2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Object Oriented Programming (C++)
Course Code	21CBCA242
Semester	IV
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	Acquire an understanding of basic object oriented concepts and the issues involved in effective class design.
2.	To program using more advanced OOP's features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
3.	To enhance problem solving and programming skills in C++ by implementing the object oriented concepts.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Remember the characteristics of Procedure and Object Oriented Programming Languages.
2.	Understand the fundamentals of C++ programming structure, function overloading and constructors
3.	Understanding the features of C++ Programming.
4.	Understanding the advanced features of C++ specifically, Operator Overloading, Templates, Streams.
5.	Applying the major object-oriented concepts to implement programs, Inheritance and Polymorphism
6.	Implementing stream I/O, Files and usage of the available classes to handle stream objects.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to C++	04
	1. Basic concepts, features, advantages and applications of OOP	1 1
	2. Introduction, applications and features of C++	1
	3. Input and Output operator in C++	1
	4. Simple C++ program	
Unit II	Beginning with C++	08
	1. Data type and Keywords	1
	2. Declaration of variables, dynamic initialization of variables, reference variable	1
	3. Operators: Scope resolution operator, Memory management operators	2
	4. Manipulators	1
	5. Functions: Function prototyping, call by reference and return by reference	1
	6. Inline functions	1
	7. Default arguments	1
Unit III	Classes and Objects	09

	<ol style="list-style-type: none"> 1. Structure and Class, Object 2. Access specifiers, defining data member 3. Defining member functions inside and outside class definition. 4. Simple C++ program using class 5. Memory allocation for objects 6. Static data members and static member functions 7. Array of objects, objects as a function argument 8. Friend function and Friend class 9. Function returning objects 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Unit IV	Constructors and Destructors	06
	<ol style="list-style-type: none"> 1. Constructors 2. Types of constructor : Default, Parameterized, Copy, Multiple constructors in a class 3. Constructors with default argument 4. Dynamic constructor 5. Destructor 	<p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p>
Unit V	Inheritance	06
	<ol style="list-style-type: none"> 1. Introduction 2. Defining Base class and Derived class 3. Types of Inheritance 4. Virtual Base Class 5. Abstract class 6. Constructors in derived class 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Unit VI	Polymorphism	08
	<ol style="list-style-type: none"> 1. Compile Time Polymorphism <ol style="list-style-type: none"> i. Introduction, rules for overloading operators ii. Function overloading iii. Operator Overloading unary and binary 	<p>5</p>

	<ul style="list-style-type: none"> iv. Operator Overloading using friend function v. Overloading insertion and extraction operators <p>2. Runtime Polymorphism</p> <ul style="list-style-type: none"> i. this Pointer, pointers to objects, pointer to derived classes ii. Virtual functions and pure virtual functions 	3
Unit VII	Managing console I/O operations	05
	1. C++ streams and C++ stream classes	1
	2. Unformatted I/O operations	1
	3. Formatted console I/O operations	1
	4. Output formatting using manipulators	1
	5. User defined manipulators	1
Unit VIII	Working with Files	05
	1. Stream Classes for File operations	1
	2. File operations - Opening, Closing and updating	1
	3. File updating with random access.	1
	4. Error handling during File operations	1
	5. Command Line arguments	1
Unit IX	Templates	03
	1. Introduction ,Class Template and class template with multiple parameters	1
	2. Function Template and function template with multiple parameter	1
	3. Exception Handling Introduction	1

Book References:

1. E Balagurusamy, "Object oriented programming with C++", Eight Edition, Mc Graw Hill Publications.
2. Robert Lafore , "Object Oriented Programming with C++ ", Fourth Edition, Pearson Education.
3. Herbert Schildt, " The Complete Reference C++", Fourth Edition, Mc Graw Hill Publications.
4. Bhave, " Object Oriented Programming Using C++", Pearson Education
5. Strousstrup, " The C++ Programming Language", 3rd Edition, Pearson Education

Website Reference Link:

- <https://www.w3schools.com/CPP/default.asp>
- <https://www.programiz.com/cpp-programming>
- <https://www.javatpoint.com/cpp-tutorial>

Best IDE used for Object Oriented Programming (C++):

Sr. No	Name of IDE or Tools	Latest Version
1.	Turbo C	3.2/3.3
2.	Microsoft Visual Studio Code	1.56
3.	Net Beans	12.4



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S.Y.B.B.A (C.A) Operating System
2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Operating System
Course Code	21CBCA243
Semester	IV
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	To know the services provided by Operating System
2.	To know the scheduling concept
3.	To understand design issues related to memory management and various related algorithms.
4.	To understand design issues related to File management and various related algorithms

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Students will learn how Operating System is Important for Computer System
2.	To make aware of different types of Operating System and their services.
3.	To know virtual memory concepts.
4.	To make aware of different algorithm used in memory management.
5.	To make aware of different types of disk scheduling algorithms.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to Operating System	05
	<ol style="list-style-type: none"> 1. What is operating system 2. Computer system architecture 3. Services provided by OS 4. Types of OS 5. Operating System Structure 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Unit II	System Structure	05
	<ol style="list-style-type: none"> 1. User operating system Interface 2. System Calls <ol style="list-style-type: none"> i. Process or job control ii. Device Management iii. File Management 3. System Program 4. Operating System Structure 	<p>1</p> <p>2</p> <p>1</p> <p>1</p>
Unit III	Process Management	05
	<ol style="list-style-type: none"> 1. Process Concept <ol style="list-style-type: none"> i. The process ii. Process states iii. Process control block 2. Context Switch 3. Operation on Process <ol style="list-style-type: none"> i. Process creation ii. Process termination 	<p>2</p> <p>1</p> <p>2</p>
Unit IV	CPU Scheduling	10
	<ol style="list-style-type: none"> 1. What is scheduling 2. Scheduling Concepts <ol style="list-style-type: none"> i. CPU Scheduler ii. Preemptive and Non-preemptive scheduling iii. Dispatcher 3. Scheduling criteria 4. Scheduling Algorithms <ol style="list-style-type: none"> i. FCFS (Non-preemptive) ii. SJF (Non-preemptive & preemptive) iii. Priority (Non-preemptive & preemptive) iv. Round Robin 	<p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>2</p> <p>2</p> <p>1</p>

Unit V	Deadlock	08
	1. Introduction 2. Necessary Condition 3. Deadlock Prevention 4. Resource allocation graph algorithm 5. Bankers algorithm 6. Recovery from Deadlock <ol style="list-style-type: none"> i. Process Termination ii. Resource Preemption 	1 1 1 1 2 2
Unit VI	Memory Management	07
	1. Background <ol style="list-style-type: none"> i. Resident Monitor ii. Address binding iii. Logical Address vs Physical Address iv. Dynamic Loading v. Dynamic Linking 2. Swapping 3. Contiguous memory allocation 4. Non-contiguous memory allocation 5. Paging 6. Swapping 7. Segmentation 8. Page Replacement Algorithm <ol style="list-style-type: none"> i. FIFO ii. OPT iii. MRU iv. LRU 	2 3 2
Unit VII	File System	08
	1. Introduction & File concepts (file attributes, Operations on files) 2. Access methods <ol style="list-style-type: none"> i. Sequential access ii. Direct access 3. File Structure <ol style="list-style-type: none"> i. Contagious Allocation ii. Linked Allocation iii. Indexed Allocation 4. Free Space Management <ol style="list-style-type: none"> i. Bit Vector ii. Linked List iii. Grouping 	1 2 2 3
Unit VIII	I/O System	06

	1. Introduction	1
	2. Disk Scheduling	
	i. FCFS	1
	ii. Shortest Seek Time First	1
	iii. SCAN	1
	iv. C-Scan	1
	v. C- Look	1

Book References:

1. Operating System Concepts - Silberchatz, Galvin, Gagne (8th Edition).
2. Operating Systems : Principles and Design – Pabitra Pal Choudhary (PHI Learning Private Limited)

Website Reference Link:

- <https://www.webopedia.com/insights/windows-operating-system->
- https://en.wikipedia.org/wiki/Microsoft_Windows
- <https://www.brainkart.com/article/Introduction-to-Windows-Operating-System>



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S.Y.B.B.A (C.A) NODE JS
2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	NODE JS
Course Code	21CBCA244A
Semester	IV
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	Understand JavaScript and technical concepts behind Node JS.
2.	To examine Structure of a Node application in modules.
3.	To Understand and use the Event Emitter.
4.	To Understand Buffers, Streams, and Pipes.
5.	To Build a Web Server in Node and understand how it really works.
6.	To Connect to SQL or Mongo database in Node

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	Understanding concepts of Node JS and Modules.
2.	To understand and implement Node Package Manager.
3.	To understand use of Web server and File system.
4.	To understand application of Database connectivity.

Syllabus

Unit. No.	Title with Contents	No. of Lectures
Unit I	Introduction to Node JS	10
	1. Introduction	1
	2. What is Node JS?	1
	3. Advantages of Node JS	2
	4. Traditional Web Server Model	2
	5. Node.js Process Model	2
	6. Install Node.js on Windows	1
	7. Working in REPL	1
Unit II	Node JS Modules	12
	1. Functions	2
	2. Buffer	2
	3. Modules	2
	i. Module Types	2
	ii. Core Modules	2
	iii. Local Modules	1
	iv. Module. Exports	1
Unit III	Node Package Manager	08
	1. What is NPM?	2
	2. Installing Packages Locally	2
	3. Adding dependency in package.json	2
	4. Installing packages globally	1
	5. Updating packages	1
Unit IV	Web server	06
	1. Creating web server	2
	2. Handling http requests	2
	3. Sending requests	2
Unit V	File System	08
	1. fs.readFile	2

	2. Writing a File 3. Writing a file asynchronously 4. Opening a file 5. Deleting a file 6. Other IO Operations	2 1 1 1 1
Unit VI	Events	04
	1. Event Emitter class 2. Returning event emitter 3. Inheriting events	2 1 1
Unit VII	Database connectivity	06
	1. Connection string 2. Configuring 3. Working with select command 4. Updating records 5. Deleting records	2 1 1 1 1

Book References:

1. Velentin Bojinov, David Herron, Dioge Resende, “Node.js Complete Reference Guide”, packt Publishing ltd.
2. Sandro Pasquali, Kevin Faaborg, “Mastering Node.js”, Packt Publishing Limited; 2nd edition (29 December 2017).
3. Guillermo Rauch, “Smashing Node.js Javascript Everywhere”, John Wiley & Sons (31 August 2012).
4. Basarat Ali Syed, “Beginning Node.js”, Apress 1st edition (4 December 2014).
5. David Herron, “Node.js Web Development: Create real-time server-side applications with this practical, step-by-step guide”, Ingram short title; 3rd edition (1 January 2016).
6. Mario Casciaro, Luciano Mammino, “Node.js Design Patterns”, Packt Publishing Limited; 3rd edition (29 July 2020).
7. Shelley Powers, “Learning Node: Moving to the Server-Side”, O'Reilly Media; 2nd edition (24 May 2016).

8. Patrick Mulder, Kelsey Breseman, "Node.js for Embedded Systems", O'Reilly Media; 1st edition (10 October 2016).
9. Evan M. Hahn, "Express in Action. Writing, Building, and Testing Node.js Applications", Manning Publications; 1st edition (15 April 2016).
10. Valentin Bojinov, "RESTful Web API Design with Node.js 10", Packt Publishing; 3rd edition (30 April 2018).

Website Reference Link:

- <https://www.w3schools.com/nodejs/>
- <https://www.tutorialspoint.com/nodejs/index.htm>
- <https://nodejs.dev/learn>
- <https://www.javatpoint.com/nodejs-tutorial>

Best IDE used for Node JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Brackets	1.14.2
2.	Microsoft Visual Studio Code	1.56
3.	Sublime Text	4



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S.Y.B.B.A (C.A) Advance PHP

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Advance PHP
Course Code	21CBCA244B
Semester	IV
No. of Credits	3

Objectives of the Course

Sr. No.	Objectives
1.	To know & understand concepts of internet programming.
2.	Understand how server-side programming works on the web.
3.	Understanding How to use PHP Framework (Joomla)

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcomes
1.	Students will able to implement OOP's concept in PHP.
2.	Students will able to write interactive programs using PHP.
3.	Students will able to Analyze the construction of a web page and relate how PHP and XML combine to produce the web page.
4.	Students will able to combine Ajax with PHP.
5.	Students learn different type of web services
6.	Students will able to use Joomla CMS to Build websites or online applications.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to Object Oriented Programming in PHP	08
	1. Classes	1
	2. Objects	1
	3. Introspection	1
	4. Serialization	1
	5. Inheritance	2
	6. Interfaces	1
	7. Encapsulation	1
Unit II	Web Techniques	05
	1. Server information	1
	2. Processing forms	2
	3. Sticky forms	1
	4. Setting response headers	1
Unit III	XML	08
	1. Introduction XML	1
	2. XML document Structure	1
	3. PHP and XML	2
	4. XML parser	1
	5. The document object model	1
	6. The simple XML extension	1
	7. Changing a value with simple XML	1
Unit IV	Ajax with PHP	10

	<ol style="list-style-type: none"> 1. Understanding java scripts for AJAX 2. AJAX web application model 3. AJAX –PHP framework 4. Performing AJAX validation 5. Handling XML data using php and AJAX 6. Connecting database using php and AJAX 	<p>1</p> <p>1</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
Unit V	Introduction to Web Services	11
	<ol style="list-style-type: none"> 1. Definition of web services 2. Basic operational model of web services, tools and technologies enabling web services 3. Benefits and challenges of using web services. 4. Web services Architecture and its characteristics 5. Core building blocks of web services 6. Standards and technologies available for implementing web services 7. Web services communication models 8. Basic steps of implementing web services. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p>
Unit VI	PHP Framework (Joomla)	12
	<ol style="list-style-type: none"> 1. Introduction to Joomla <ol style="list-style-type: none"> i. Introduction ii. Joomla features iii. How joomla works ? iv. The platform Components, Modules and Plugins 2. Administering Joomla <ol style="list-style-type: none"> i. Presentation Administration ii. Content Administration iii. System Administration 3. Working with Joomla <ol style="list-style-type: none"> i. Adding articles ii. Adding menus to point to content 	<p>3</p> <p>4</p> <p>5</p>

	<ul style="list-style-type: none"> iii. Installing new templates iv. Creating templates v. Adding a Module and Component vi. Modifying the existing templates vii. Creating templates with web editors viii. Creating real templates 	
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Book References:

1. Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition by VikramVaswani
2. Murach’s PHP and MySQL (2nd Edition) by Joel Murach and Ray Harris
3. PHP: The Complete Reference Paperback – 1 Jul 2017 by Steven Holzner (Author)
4. Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
5. Java Web Services, D.A. Chappell & T. Jewell, O’Reilly, SPD.

Website Reference Link:

- www.php.net.in
- www.W3schools.com

Best IDE used for Advance PHP

IDE	Version
Visual Studio Code	Version 1.59
Notepad++	Version 8.1.3
Brackets	Version 1.14.2



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S.Y.B.B.A (C.A) Computer Laboratory Based on 242 (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 242 (2 credits)
Course Code	21CBCA246
Semester	IV
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	Identify and practice the object-oriented programming concepts and techniques
2.	Practice the use of C++ classes and class libraries, arrays.
3.	To understand inheritance and file I/O stream concepts.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Creating simple programs using classes and objects in C++.
2.	Implement Object Oriented Programming Concepts in C++.
3.	Develop applications using stream I/O and file I/O.

Best IDE used for Object Oriented Programming (C++):

Sr. No	Name of IDE or Tools	Latest Version
1.	Turbo C	3.2/3.3
2.	Microsoft Visual Studio Code	1.56
3.	NetBeans	12.4

Assignment No	Assignment Name	No. of Sessions
1	Assignment based on Beginning with C++	1
2	Assignment based on Operators and Functions in C++	1
3	Assignment based on Classes and Objects	1
4	Assignment based on Constructors and Destructors	2
5	Assignment based on Inheritance	2
6	Assignment based on Polymorphism	2
7	Assignment based on Managing Console I/O operations	1
8	Assignment based on Working with Files	1
9	Assignment based on Templates	1
	Total Number of Sessions	12



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S.Y.B.B.A (C.A) Computer Laboratory Based on 244(A) (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 244(A) (2 credits)
Course Code	21CBCA246
Semester	IV
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	To examine Structure of a Node application in modules.
2.	Understand JavaScript and technical concepts behind Node JS.
3.	To Connect to SQL or Mongo database in Node.

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Understanding concepts of Node JS and Modules.
2.	To understand and implement Node Package Manager.
3.	To understand use of Web server and File system.
4.	To understand application of Database connectivity.

Best IDE used for Node JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Brackets	1.14.2
2.	Microsoft Visual Studio Code	1.56
3.	Sublime Text	4

Assignment No	Assignment Name	No. of Sessions
1	Assignment based on Node JS web server, modules & NPM.	4
2	Assignment based on File System.	4
3	Assignment based on Events in Node JS.	2
4	Assignment based on Node JS with database.	2
	Total Number of Sessions	12



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S.Y.B.B.A (C.A) Computer Laboratory Based on 244(B) (2 credits)

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Computer Laboratory Based on 244(B) (2 credits)
Course Code	21CBCA246
Semester	IV
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	To know & understand concepts of internet programming.
2.	Understand how server-side programming works on the web.
3.	Understanding How to use PHP Framework (Joomla)

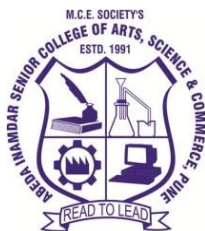
Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcome
1.	Students will able to implement OOP's concept in PHP.
2.	Students will able to write interactive programs using PHP.
3.	Students will able to analyze the construction of a web page and relate how PHP and XML combine to produce the web page.
4.	Students will able to combine Ajax with PHP.
5.	Students learn different type of web services
6.	Students will able to use Joomla CMS to build websites or online applications.

Best IDE used for Angular JS:

Sr. No	Name of IDE or Tools	Latest Version
1.	Visual Studio Code	Version 1.59
2.	Notepad++	Version 8.1.3
3.	Brackets	Version 1.14.2

Assignment No	Assignment Name	No. of Sessions
1	Assignment on OOP's concept	3
2	Assignment on Web Techniques	3
3	Assignment on XML with PHP	3
4	Assignment on Ajax with PHP	3
	Total Number of Sessions	12



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S.Y.B.B.A (C.A) Bootstrap

2022-23 (CBCS – Autonomy 21 Pattern)

Course/ Paper Title	Bootstrap
Course Code	21CBCA247M
Semester	IV
No. of Credits	2

Objectives of the Course

Sr. No.	Objectives
1.	How to design web page look and feel by using Bootstrap.
2.	To learn the basics of Bootstrap Framework using which you can create web projects with ease that
3.	To learn about the Bootstrap Grids in web design organize and structure content,

Expected Course Specific Learning Outcomes

Sr. No.	Learning Outcomes
1.	Enable learners to design the front end easily.
2.	Students will get knowledge on over a dozen reusable components built to provide iconography, dropdowns, input groups, navigation, alerts, and much more.
3.	It makes the websites easy to scan and reduces the cognitive load on users.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	Introduction to Bootstrap	10
	1. What is Bootstrap Framework	1
	2. Why Bootstrap	1
	3. History of Bootstrap	1
	4. Advantages of Bootstrap Framework	1
	5. What is Responsive web page	1
	6. How to remove Responsiveness	1
	7. Major Features of Bootstrap	1
	8. What is Mobile-First Strategy	1
	9. Setting up Environment	1
	10. How to apply Bootstrap to Applications	1
Unit II	Bootstrap Grid	12
	1. What is Bootstrap Grid and apply Bootstrap Grid	1
	2. What is Container	1
	3. What is Offset Column and How to Reordering Columns	1
	4. Advantages of Bootstrap Grid	1
	5. How to Display responsive Images	1
	6. How to change class properties	1
	7. What is Bootstrap Tables	1
	8. What is Bootstrap Form Layout	1
	9. What is Bootstrap Button	1
	10. How display images & text in different styles	1
	11. What is Carets Classes	1
	12. How to hide or show the text in Bootstrap	1
Unit III	Bootstrap Components	14
	1. What is Bootstrap Components	1
	2. Advantages and types of Bootstrap Components	1

3. How to use Button Groups and Button Toolbar	1
4. What are different Input Groups Components	1
5. How to use Navigation Pills and Tabs Components	1
6. What is Navbar Component	1
7. How to build a Responsive Navbar	1
8. How to Add Forms and other controls to Navbar	1
9. How to Fix the position of navbar	1
10. What is Labels / Badge Components	1
11. What is Jumbotron / Page Header Components	1
12. What is Thumbnail Component	1
13. What is Alerts & Dismissible Alerts	1
14. What is Bootstrap List Group & Panel Components	1

Book References:

1. Jacob Lett (Author), “Bootstrap Reference Guide”, Kindle Edition.
2. Jennifer Kyrnin, ”Bootstrap in 24 Hours”, SAMS publication

Website Reference Link:

1. <https://getbootstrap.com>
2. <https://github.com>
3. <https://www.w3schools.com>



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**Syllabus for SYBBACA
(CBCS – Autonomy 21 Pattern)**

Course/ Paper Title	Self-Employment Through Freelancing
Course Code	21CVADO2
Semester	Semester: III
No. of Credits	No. of Credits: 2

Aims & Objectives of the Course

Sr. No.	Objectives
1.	Develop the ability to select potential areas for self-employment.
2.	Get licenses, follow legal policies and procedures to start and improve business
3.	Manage customer needs effectively through need identification and strong customer relationship
4.	Demonstrate creativity, Innovation and enthusiasm to grow business

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	Remembering, Understanding Abilities regarding concept and functions of self-employment
2.	Understanding business plan, ability to make strong customer relationship.
3.	Understanding creativity, Innovation and enthusiasm to grow business

Syllabus:

Unit No.	Title with Contents	No. of Lectures
Unit I	Introduction to self-employment:	12
	1. Introduction of self-employment, Concept and need in present Indian job market context.	6
	2. Characteristics of self-employment	6
	3. Self-employment areas for Computer Application field, broader ways to identify self-employment areas in the Computer Application field.	6
	4. Creativity, concept, examples of creativity in Computer Application field.	6
Unit II	Online Freelancing:	12
	1. Introduction	3
	2. Niche in the freelancing World, The lucrative freelancing work categories, Main skills for freelancers	3
	3. Acquiring right skills for freelancing	3
	4. Skills Up-gradation	3
Unit III	Freelancing Practices	12
	1. Popular Freelance job sites, Social Media for Freelancing	2
	2. Freelancing Proposal	2
	3. Setting Rates for freelancing work	2
	4. Pricing Strategies	2
	5. Managing project deadlines	2
	6. Building Reputation with Clients	2

Book References:

1. Horowitz, S., &Poynter, T. S. (2012). The freelancer's Bible: Everything you need to know to have the career of your DreamsOn your terms. Workman Publishing.
2. Kempster, R. (2019). Freelancing: Making money online with freelancing jobs: How to Succeed with Freeelancing.
3. Hood, J. (2018). Freelance, and business, and stuff: A guide for creatives.
4. Doriwala, J. (2014). Freelancing-thefutureofwork: Start working from any part of the world with a computer and internet. TenaciousTechies.