

# **Savitribai Phule Pune University, Pune**

## **Bachelor of Business Administration (Computer Application)**

### **BBA(CA)**

**(Under faculty of Commerce & Management)**

**(To be implemented from Academic year 2019-20)**

**1. Name of Programme:** Bachelor of Business Administration (Computer Application)

#### **2. Introduction:**

The degree shall be titled as Bachelor of Business Administration (B.B.A.)( Computer Application) under the Faculty of Commerce and Management. First Year B.B.A.(CA) choice based credit system is implemented w.e.f. the academic year 2019-2020 , Second Year B.B.A.(CA) II will be implement w.e.f. 2020-2021 and Third Year B.B.A.(CA) III w.e.f. 2021-2022

#### **3. Programme Objectives:**

- To produce skill oriented human resource.
- To impart practical skills among students.
- To make industry ready resource.
- To bring the spirit of entrepreneurship.

#### **4. Programme Structure:**

- The Programme is of a Three Year (Six semesters) Full Time Degree Programme.
- The programme shall be based on credit system comprising 132 credits.

## **5. Eligibility for Admission**

- A candidate is eligible for admission to the Degree in Bachelor of Business Administration – Computer Application after passing 12th Std. examination (H.S.C. 10 +2) from any stream with English as passing subject and has secured 40% marks at 12<sup>th</sup> std.
- Three Years Diploma after S.S.C. i.e. 10<sup>th</sup> Standard of Board of Technical Education conducted by Government of Maharashtra or its equivalent.
- Two Years Diploma in Pharmacy after H.S.C., of Board of Technical Education conducted by Government of Maharashtra or its equivalent.
- MCVC

## **6. Medium of Instruction: English**

## **7. Award of Credits:**

- Each course having 3 credits shall be evaluated out of 100 marks and student should secure at least 40 marks to earn full credits of that course.
- Each course with 2 credits for Sem-I & Sem-II, Sem-V & Sem-VI is divided in theory (50%) & practical (50%) and for Sem-III,IV there will be project work for students. For all practical and project there will be university evaluation. For Sem-I,II,V&VI (30%Internal & 70%Extrenal) is the pattern of evaluation.
- GPA shall be calculated based on the marks obtained in the respective subject provided that student should have obtained credits for that course.

## **8. Evaluation Pattern:**

- Each course carrying 100 marks shall be evaluated with Continuous Assessment (CA) and University Evaluation (UE) mechanism. Continuous assessment shall be of 30 marks while University Evaluation shall be of 70 marks. To pass in the course, a student has to secure minimum 40 marks provided that he should secure minimum 28 marks in University Evaluation (UE).
- CA shall be based on internal tests (minimum 2 for 20 marks). In addition, for remaining 10 marks a teacher may assign various activities such as home assignments,

tutorials, seminars, presentations, group discussion etc, to the students and evaluate accordingly.

**9. Method of Evaluation and Evaluation Criteria:** - 1. Internal Assessment 30 marks for all theory related subjects 2. Practical and Project will be evaluated separately 3.SPPU - Examination will be 70 marks

- **1. Instructions for teachers for internal evaluation for 30 Marks** - The purpose of internal evaluation is to assess the depth of knowledge, understanding and awareness. For this purpose a teacher is expected to use different evaluation methods in order to have rational and objective assessment of the learners and available resources.
- The class work will carry 30 marks in each course. Internal Evaluation includes continuous evaluation of a student by adopting variety of techniques such as Assignments, Presentation, Internal examination, Group Discussions , Projects etc.
- There shall be Four small projects /Tutorials for internal evaluation as compulsory part of assessment (Semester I ,II ,III and IV).

## **2. Project Examination**

For course on Practical and Project work as per the regular practice there will be Written Report and viva presentation of 100 marks at SPPU level.

**3. External Examination:** - There will be written Examination of 70 marks and 3 hrs duration for every course at the end of each Semester.

### **Setting of Question Papers (Applicable to theory subjects)**

1. A candidate shall have to answer the questions in all the subjects in English only.
2. Question papers shall be framed so as to ensure that no part of the syllabus is left out of study by a candidate.
3. question paper shall be balanced in respect of various topics outlined in the syllabus.
4. The question papers shall have a combination of long, short answer and MCQ type questions.

## 10. Restructuring of courses –Equivalence and Transitory Provision

The University will conduct examination of old course for next three academic years from the date of implementation of new course.

The candidate of old course will be given three chances to clear his subjects as per the old course and thereafter he will have to appear for the subjects under new course as per the equivalence given to old course.

## 11. Completion of Degree Programme:

A student who earns 132 credits, shall be considered to have completed the requirements of the B.B.A.(CA) degree program and CGPA will be calculated for such student.

## 12. Credit Allocation

**CC-Core Course, EC-Elective Course, PR-Practical, PJ-Project,**

**AECC-Ability Enhancement Compulsory Courses, SEC-Skill Enhancement Courses.**

**Total - 132 Credits for Three years Programme**

Sr. No.	Sem ester	CC – Credit	EC Credit	PR Credit	PJ Credit	AEC C-credit	SEC – Credit	Lectures + Project +add on courses= Total Credits
1	I	15		4			2	15+4+2 =21
2	II	15		4			2	15 +4 +2=21
3	III	9	6	6		2		9+6+6+2=23
4	IV	9	3	4	4		2	9+3+4+4+2=22
5	V	9	3	4	4		2	9+3+4+4+2=22
6	VI	10	3	4	4		2	10+3+4+4+2=23
<b>Total</b>		<b>67</b>	<b>15</b>	<b>26</b>	<b>12</b>	<b>2</b>	<b>10</b>	<b>67+15+26+12+2+10=132</b>

**13. Titles of Papers and Scheme of Study for B.B.A. (C.A.) Programme****CC-Core Course, EC-Elective Course, PR-Practical, PJ-Project,****AECC-Ability Enhancement Compulsory Courses, SEC-Skill****Enhancement Courses.****SEMESTER- I**

<b>Subject Code</b>	<b>Subject Name</b>	<b>Course</b>	<b>Credits</b>	
			<b>Th</b>	<b>Pr</b>
CA-101	Business Communication	CC	3	
CA-102	Principles of Management	CC	3	
CA-103	C Language	CC	3	
CA-104	Database Management System	CC	3	
CA-105	Statistics	CC	3	
CA-106	Computer Laboratory Based on 103 &104 (2 credits each)	PR		4
107	Add-On (PPA) (30 Hours)	SEC	2	

**SEMESTER- II**

<b>Subject Code</b>	<b>Subject Name</b>	<b>Course</b>	<b>Credits</b>	
			<b>Th</b>	<b>Pr</b>
CA-201	Organization Behavior & Human Resource Management	CC	3	
CA-202	Financial Accounting	CC	3	
CA-203	Business Mathematics	CC	3	
CA-204	Relational database	CC	3	
CA-205	Web Technology HTML-JS-CSS	CC	3	
CA-206	Computer Laboratory Based on 204 & 205(2 credits each)	PR		4
207	Add-On (Advance C) (30 Hours)	SEC	2	

**SEMESTER- III**

Subject Code	Subject Name	Course	Credits	
			Th	Pr
CA-301	Digital Marketing	CC	3	
CA-302	Data Structure	CC	3	
CA-303	Software Engineering	CC	3	
CA-304	Angular JS	EC	3	
<b>OR</b>				
CA-304	PHP	EC	3	
CA-305	Big data	EC	3	
<b>OR</b>				
CA-305	Block chain	EC	3	
CA-306	Computer Laboratory Based on 302 , 304 and 305 (2 credits each)	PR		2+2+2 = 6
307 AECC	Environment Awareness	AECC	2	

#### **SEMESTER- IV**

Subject Code	Subject Name	Course	Credits	
			Th	Pr
CA-401	Networking	CC	3	
CA-402	Object Oriented Concepts Through CPP	CC	3	
CA-403	Operating System	CC	3	
<b>CA-404</b>	<b>NODE JS</b>	<b>EC</b>	<b>3</b>	
<b>OR</b>				
<b>CA-404</b>	<b>Advance PHP</b>	<b>EC</b>	<b>3</b>	
CA-405	Project	EC		4
CA-406	Computer Laboratory Based on 402,404 (2 credits each)	PR		4
4	ADD-On (30 Hours)	SEC	2	

#### **SEMESTER- V**

Subject Code	Subject Name	Course	Credits	
			Th	Pr
CA-501	Cyber Security	CC	3	
CA-502	OOSE	CC	3	
CA-503	Core Java	CC	3	
CA-504	Mongo DB	EC	3	
OR				
CA-504	Python	EC	3	
CA-505	Project	PJ		4
CA-506	Computer Laboratory Based on 503 and 504(2 credits each)	PR		4
5	Add on Course-IOT(30 Hours)		2	

### SEMESTER- VI

Subject Code	Subject Name	Course	Credits	
			Th	Pr
CA-601	Recent Trends in Information Technology(Tutorial/Assignment)	CCT	3+1	
CA-602	Software Testing	CC	3	
CA-603	Advanced Java	CC	3	
CA-604	Android Programming	EC	3	
OR				
CA-604	Dot Net framework	EC	3	
CA-605	Project	PJ		4
CA-606	Computer Laboratory Based on 603 and 604(2 credits each)	PR		4
6	Add on Course-Soft Skills Training		2	

**14. Acknowledgement:** The focus of BBA CA Programme (CBCS-2019 Pattern) has always been raising the academic standards, excellence and holistic development of students. Hon. Prof.

Dr. Nitin Karmalkar, Vice Chancellor, Hon. Dr. N. S. Umarani, Pro-Vice Chancellor, Hon. Dr.Parag Kalkar, Dean, and Associate Dean, Dr. Yashodhan Mithare, Faculty of Commerce and Management have given insights in designing the BBA CA Programme.

Dr. Sanjay Kaptan ,Head ,Savkar Chair has shared his immense knowledge and expertise for designing the structure. Also, the Industry experts panel has added insights in course titles ofthe BBA CA Programme. Dr. Tanuja Devi co-ordinated the BBA CA Restructuring Committee Dr. Ranjit Patil , Shakila Sishawantan , Prashant Mule Shivendu Bhushan have contributed greatly. This synergy of contributors is very crucial in fine tuning of the BBA CA Programme in its present form.

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# Savitribai Phule Pune University, Pune

## B.B.A. (Computer Application)

(Under faculty of Commerce & Management)

(To be implemented from Academic year 2019-20)

### Business Communication Skills

Course Code: -- 101

Credit 3

Depth of the syllabus - Reasonable knowledge of the communication

#### Program objectives

- 1 To understand what is the role of communication in personal and business world
2. To understand system and communication and their utility
3. To develop proficiency in how to write business letters and other communications in required b

Unit No.	Contents	Lectures
1	<b>1. Concept of Communication and Introduction to Communication</b>  1.1 Role of Communication in social and economic system 1.2 Need for effective communication 1.3 Meaning and definition 1.4 Principles of effective communication 1.5 Barriers to communication and over comings	12
2	<b>Methods and types of Communication</b>  2.1 Written communication, 2.2 Forms of written communication. 2.3 Qualities ,difficulties in written communication , 2.4 Constraints in developing effective written communication 2.5 Merits and Limitations of written communication 2.6 Listening Written communication, 2.7 Forms of written communication. 2.8 Qualities, difficulties in written communication , 2.9 Constraints in developing effective written communication	12
3.	<b>Business Correspondence</b>  3.1 Concept , 3.2 Need and functions of Business .Correspondence , 3.3 Types of Business letters , 3.4 Layout Drafting of business , 3.5 Sales Letter , 3.6 Orders sales circulars and business promotion letters 3.7 written methods& types of communication	12
4.	<b>Analysis of different Media of Communication</b>  4.1 Fax communication ,	12

	4.2 Voice mail , 4.3 e-mails , 4.4 Tele conferencing , 4.5 Communication through social media	
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## References

Sr. No.	Title of the Book	Author/s	Publication
1	Business Communication	Meenakshi Raman , Prakash Singh	Oxford
2	Business Communication	HomaiPradhan , N.S. Pradhan	Himalaya Publishing House
3	Business Communication	R.K. Madhukar	Vikas Publishing House
4	Business Communication and personality Development	BiswajitDas .ipswwtaSatpathy	Excel Books
5	Business Communication – Concepts , Cases and applications	P.D Chaturvedi , MukeshChaturvedi	Dorling Kindersley
6	Business Communication – Connecting at work	HorySankarMukerjee	Oxford
7	Business Communication Today	Courtland L. Bovee , John V. Thill , AbhaChatterjee	Pearson
8	Hand Book of internal Communication	Eileen Scholes	Infinity Books

**Principles of Management**  
**Course Code 102**  
**Credit -3**

**Depth of the course-** Reasonable working knowledge

**Program Objectives**

- To understand basic concept regarding org. Business Administration
- To examining how various management principles
- To develop managerial skills among the students

Unit No.	Contents	Lectures
1	<p><b>Nature of management</b></p> <p>Meaning , importance , functions ,types            Management as an art ,science and social system            Universality of concept of management            and organization</p>	<b>12</b>
2	<p><b>Evolution of management thoughts</b></p> <p>Concept of managerial thoughts            Contribution of Taylor, Mayo and Fayol and Drucker and            Indian Management Ethos</p>	<b>12</b>
3.	<p><b>Major managerial Functions</b></p> <p>Planning , need types ,methods , advantages ,merits            Forecasting. need types ,methods , advantages ,merits            Decision making types process and techniques            Directions nature and principles and            Motivation –nature, principles and theories            Organizing –concept delegation of authorities decentralization            concepts and importance</p>	<b>12</b>
4.	<p><b>Recent trends in Management</b></p> <p>Management of change , Mgt of crises ,TQM ,stress            management            (Principles ,concepts merits )</p>	<b>12</b>

## References

<b>Sr. No.</b>	<b>Title of the Book</b>	<b>Author/s</b>	<b>Publication</b>
1	Management Concepts and Strategies	J.S. Chandan	Vikas Publishing House Pvt. Ltd.
2	Principles of Management	Harold Koontz , Heinz Wehrich , A. RamachandraArysri	McGraw hill companies
3	Management A Global and Entrepreneurial Perspective	Heinz Wehrich , Mark V. Cannice , Harold Koontz	McGraw hill companies
4	Management – 2008 Edition	Robert Kreitner , MamataMohapatra	Biztantra – Management For Flat World
5	Introduction to Management	John R. Schermerhorn	Wiley India Pvt. Ltd.
6	Principles of Management	P.C. Tripathi , P.N. reddy	McGraw hill companies
7	Management Text and Cases	R. SatyaRaju , A. Parthasarthy	PHI learning Pvt. Ltd
7	Management (Multi-Dimensional Approach )	H. R. Appannaiah , G. Dinakar , H.A. Bhaskara	Himalaya Publishing House

**Subject : C-Programming**  
**Course Code-103**  
**Credit-3**

Unit No.	Topics	No. of Lectures
1	<b>Introduction to C language</b> 1.1 History 1.2 Basic structure of C Programming 1.3 Language fundamentals 1.3.1 Character set, tokens 1.3.2 Keywords and identifiers 1.3.3 Variables and data types 1.4 Operators 1.4.1 Types of operators 1.4.2 Precedence and associativity 1.4.3 Expression	3
2	<b>Managing I/O operations</b> 2.1 Console based I/O and related built-in I/O functions 2.1.1 printf(), scanf() 2.1.2 getch(), getchar() 2.2 Formatted input and formatted output	2
3	<b>Decision Making and looping</b> 3.1 Introduction 3.2 Decision making structure 3.2.1 If statement 3.2.2 If-else statement 3.2.3 Nested if-else statement 3.2.4 Conditional operator 3.2.5 Switch statement 3.3 Loop control structures 3.3.1 while loop 3.3.2 Do-while loop 3.3.3 For loop 3.3.4 Nested for loop 3.4 Jump statements 3.4.1 break 3.4.2 continue 3.4.3 goto 3.4.4 exit	9
4	<b>Programs through conditional and looping statements</b> Addition / Multiplication of integers Determining if a number is +ve / -ve / even / odd Maximum of 2 numbers, 3 numbers Sum of first n numbers, given n numbers Integer division, Digit reversing, Table generation for n, ab Factorial, sine series, cosine series, nCr , Pascal Triangle Prime number, Factors of a number	5

	Other problems such as Perfect number, GCD of 2 numbers etc (Write algorithms and draw flowcharts)	
5	<b>Arrays and Strings</b> 5.1 Introduction to one-dimensional Array 5.1.1 Definition 5.1.2 Declaration 5.1.3 Initialization 5.2 Accessing and displaying array elements 5.3 Finding smallest and largest number from array 5.4 Reversing array 5.5 Finding odd/even/prime number from array 5.4 Introduction to two-dimensional Array 5.4.1 Definition 5.4.2 Declaration 5.4.3 Initialization 5.5 Accessing and displaying array elements 5.6 Matrices: Addition, Multiplication, Transpose, Symmetry, upper/lower triangular 5.7 Introductions to Strings 5.7.1 Definition 5.7.2 Declaration 5.7.3 Initialization 5.8 Standard library functions 5.9 Implementations without standard library functions.	12
6	<b>Functions</b> 6.1 Introduction 6.1.1 Purpose of function 6.1.2 Function definition 6.1.3 Function declaration 6.1.4 Function call 6.2 Types of functions 6.3 Call by value and call by reference 6.4 Storage classes	9
7	<b>7 Introduction to pointer</b> 7.1 Definition 7.2 Declaration 7.3 Initialization 7.4 Indirection operator and address of operator 7.5 Pointer arithmetic 7.6 Dynamic memory allocation 7.7 Functions and pointers	4
8	<b>8 Structures</b> 8.1 Introduction to structure 8.2 Definition 8.3 Declaration 8.4 Accessing members 8.5 structure operations 8.6 nested structure	4

Reference Book :-

- 1) Let us C –YashwantKanetkar, BPB publication.
- 2) Ansi C- Balagurusamy
- 3) The complete Reference- Herbeltschildt

**Subject Name :- Database Management Systems**  
**Course Code: 104**  
**Credit-3**

Sr. No.	Chapter No.	Name of Chapter and Contents	No. of Lect.
1	1	File Structure and Organization 1.1 Introduction 1.2 Logical and Physical Files 1.2.1 File 1.2.2 File Structure 1.2.3 Logical and Physical Files Definitions 1.3 Basic File Operations 1.3.1 Opening Files 1.3.2 Closing Files 1.3.3 Reading and Writing 1.3.4 Seeking 1.4 File Organization 1.4.1 Field and Record structure in file 1.4.2 Record Types 1.4.3 Types of file organization 1.4.3.1 Sequential 1.4.3.2 Indexed 1.4.3.3 Hashed 1.5 Indexing 1.5.1 What is an Index? 1.5.2 When to use Indexes? 1.5.3 Types of Index 1.5.3.1 Dense Index 1.5.3.2 Sparse Index	6

2	2	<p>Database Management System</p> <p>2.1 Introduction</p> <p>2.2 Basic Concept and Definitions</p> <p>    2.2.1 Data and Information</p> <p>    2.2.2 Data Vs Information</p> <p>    2.2.3 Data Dictionary</p> <p>    2.2.4 Data Item or Field</p> <p>    2.2.5 Record</p> <p>2.3 Definition of DBMS</p> <p>2.4 Applications of DBMS</p> <p>2.5 File processing system Vs DBMS</p> <p>2.6 Advantages and Disadvantages of DBMS</p> <p>2.7 Users of DBMS</p> <p>    2.7.1 Database Designers</p> <p>    2.7.2 Application programmer</p> <p>    2.7.3 Sophisticated Users</p> <p>    2.7.4 End Users</p> <p>2.8 Views of Data</p> <p>2.9 Data Models</p>	14
		<p>2.9.1 Object Based Logical Model</p> <p>    a. Object Oriented Data Model</p> <p>    b. Entity Relationship Data Model</p> <p>2.9.2 Record Base Logical Model</p> <p>    a. Relational Model</p> <p>    b. Network Model</p> <p>    c. Hierarchical Model</p> <p>2.10 Entity Relationship Diagram(ERD)</p> <p>2.11 Extended features of ERD</p> <p>2.12 Overall System structure</p>	

<b>3</b>	<b>3</b>	<b>Relational Model</b> 3.1 Introduction 3.2 Terms a. Relation b. Tuple c. Attribute d. Cardinality e. Degree of relationship set f. Domain 3.3 Keys 3.3.1 Super Key 3.3.2 Candidate Key 3.3.3 Primary Key 3.3.4 Foreign Key 3.4 Relational Algebra Operations a. Select b. Project c. Union d. Difference e. Intersection f. Cartesian Product g. Natural Join	<b>8</b>
<b>4</b>	<b>4</b>	<b>SQL (Structured Query Language)</b> 4.1 Introduction 4.2 History Of SQL 4.3 Basic Structure 4.4 DDL Commands 4.5 DML Commands 4.6 Simple Queries 4.7 Nested Queries 4.8 Aggregate Functions	<b>12</b>
<b>5</b>	<b>5</b>	<b>Relational Database Design</b> 5.1 Introduction 5.2 Anomalies of un normalized database 5.3 Normalization 5.4 Normal Form 5.4.1 1 NF 5.4.2 2 NF 5.4.3 3 NF 5.4.3.4 BCNF	<b>8</b>

**References:**

- 1) Database System Concepts By Henry korth and A. Silberschatz
- 2) SQL, PL/SQL The Programming Language Oracle :- Ivan Bayross, BPB Publication.
- 3) Database Systems Concepts, Designs and Application by Shio Kumar Singh, Pearson
- 4) Introduction to SQL by Reck F. van der Lans by Pearson
- 5) Modern Database Management by Jeffery A Hoffer , V.Ramesh, Heikki Topi ,Pearson
- 6) Database Management Systems by Debabrata Sahoo ,Tata MacgrawHill

## Business Statistics

Course code 105

Credit 3

Depth Reasonable working knowledge

Objective of the program

1. To understand role and importance of statistics in various business situations
2. To develop skills related with basic statistical technique
3. Develop right understanding regarding regression, correlation and data interpretation

Unit No.	Contents	Lectures
1	<b>Concept of statistics.</b>  Role of statistics. In informatics business science Tabulation, Data condensations and tabulation, Data Condensation and graphical Methods :Raw data , attributes and variables , classification , frequency distribution ,cumulative frequency distributions. Graphs - Histogram, Frequency polygon. Diagrams - Multiple bar , Pie ,Subdivided bar.	12
2	<b>Measures of central tendency and dispersion</b>  Criteria for good measures of central tendency, Arithmetic mean, Median and Mode for grouped and ungrouped data, combined mean.	12
3.	<b>Measures of Dispersion :</b>  Concept of dispersion , Absolute and relative measure of dispersion, Range, Variance, Standard deviation, Coefficient of variation, Quartile Deviation , Coefficient of Quartile deviation.	12
4	<b>Correlation and Regression( for ungrouped data )</b>  Concept of correlation, positive & negative correlation, Karl Pearson's Coefficient of correlation, meaning of regression, Two regression equations, Regression coefficients and properties.	12

## References

<b>Sr. No.</b>	<b>Title of the Book</b>	<b>Author/s</b>	<b>Publication</b>
1	Business Statistics	GirishPhatak	Tech – Max
2	Statistics for Business	Dr. S. K. Khandelwal	International Book House
3	Fundamentals of Business Statistics	J.K. Sharma	Pearson
4	Business Statistics	G.C. Beri	The McGraw-Hill companies
5	Statistics Theory and Practice	R.S. N. Pillai Bagavathi	S. Chand
6	Statistics for Managerial decision Making	Dr. S. K. Khandelwal	International Book House
7	Business Statistics For Contemporary Decision Making	Ken Black	Wiley India Edition
8	Fundamentals of statistics	S.C. Gupta	Himalaya Publication House

**Savitribai Phule Pune University**  
**FY BBA- CA Semester II (CBCS) Pattern 2019**  
**Organizational Behavior & Human Resource Management**  
**Course code 201**  
**Credit 3**

**Depth of the course-** Basic working knowledge

**Program Objectives:**

- i) To understand basic concept of HRM & OB
- ii) To make aware students about traditional & modern methods of procurement & development in organization.
- iii) To know the major trends in HRM & OB

Unit No.	Unit Title	Contents	Purpose and Skills to be developed
1	<b>Introduction to Organizational Behavior</b>	Definition, concept, scope, Models of OB, Major trends in OB:-Total Quality management, Cultural diversity, Organizational change, Stress Management: Sources of Stress, Effects of Stress & Stress Management, Work life Balance and Quality of Work Life	To understand the basic concept of OB & To develop knowledge about major trends & ability to handle cultural diversity Stress, change and to maintain work life balance.
2	<b>Introduction to HRM</b>	<b>Introduction to HRM-</b> Definition, Concepts, scope, importance Functions ,Objectives & limitations, , Role of HR Manager , Areas in which Human Resource Manager can be of assistance	To understand the basic concept of HRM & developing knowledge & ability of the student about HRM.
3	<b>Procurement</b>	<b>HRP-</b> Concept, Definition, Merits & Demerits, process , influencing factors of HRP <b>Recruitment-</b> Concept, Definition, sources of recruitment and their utility in identifying vacancies, methods, E-recruitment, <b>Selection-</b> Concepts, definition, process, Types of interviews and frequently asked interview questions from the candidate at each step and how to answer them, E- selection	To understand process & importance of HR procurement and to develop the skills among students regarding awareness of new trends of Recruitment Selection and interview preparation
4	<b>Training &amp; Development</b>	<b>Training &amp; Development-</b> Concept, definition, importance, Methods, E-Training, Recent trends in Training	To know the training & performance appraisal methods & To develop evaluation skill.

### Teaching Methodology

Teaching Hours	Innovative methods to be used	Project	Expected Outcome
10	Lecture ,Interactive teaching & Ice breaking session	Role play on HR Manager	To develop group cohesiveness.
10	Lab activity of Searching links about E-recruitment and E- selection.	Project report	Up gradation of knowledge of new trends in Recruitment and Selection.
12	Guest lecture	Assignment	Up gradation of skill.
13	Case Study , Video clips on Cultural Diversity and Stress management	Case study report	To develop decision making skill.

### Evaluation Method

Internal Evaluation	External Evaluation
<b>One project Report : 5 Marks</b> <b>One assignment : 5 marks</b> <b>One Case Study Solution Report : 5 marks</b> <b>Internal Examination : 15 marks</b>	<b>25% MCQ</b> <b>Short notes 35%</b> <b>Long answers 40%</b>
<b>30</b>	<b>70</b>

### Suggested references

<b>Sr. No.</b>	<b>Title of the Book</b>	<b>Author/s</b>	<b>Publication</b>	<b>Place</b>
<b>1</b>	Human Resources Management.	-L.M. Prasad	<b>Sultan and Chand Publishing Company</b>	<b>New Delhi</b>
<b>2</b>	Human Resources Management.	K. Ashwathappa –	<b>Tata McGraw Hill</b>	<b>New Delhi</b>
<b>3</b>	Personnel Management.	C. B. Mamoria		
<b>4</b>	Organizational Behavior Text, Cases and Games	- K. Aswathappa,	<b>Tata McGraw Hill</b>	<b>New Delhi</b>
<b>5</b>	Organizational Behavior -	L.M. Prasad	<b>Sultan and Chand Publishing Company</b>	<b>New Delhi</b>

**Savitribai Phule Pune University**  
**FY BBA- CA Semester II (CBCS) Pattern 2019**  
**Financial Accounting**  
**Course code 202**  
**Credit 3**

**Depth of the syllabus: Reasonable working knowledge**

**Program objectives**

- i) To develop right understanding regarding role and importance of monetary and financial transactions in business
- ii) To cultivate right approach towards classifications of different transactions and their implications
- iii) To develop proficiency preparation of basic financial as to how to write basis accounting statement - Trading and P&L

<b>Unit No.</b>	<b>Unit Title</b>	<b>Contents</b>	<b>Purpose and Skills to be developed</b>
<b>1</b>	<b>Financial Accounting-</b>	definition and Scope, objectives, Accounting concepts, principles and conventions	To understand role and importance of accounting in Business and how accounting concept can be implemented in business Computation ability in business ability to distinguished between various accounting concepts and practices
<b>2</b>	<b>Accounting Transactions and Final Accounts</b>	Voucher system; Accounting Process, Journals, Ledger, Cash Book , subsidiary books ,Trial Balance preparation of Final Accounts of Sole Proprietorship(Trading and Profit & Loss Account and Balance Sheet	To understand how to record different financial transactions and their financial implications Ability to write different accounting tractions and prepare basic financial tractions
<b>3.</b>	<b>Bank Reconciliation Statements</b>	Meaning, importance and preparation of Bank Reconciliation Statement	To understand the kind of accounting relationship between customer and bank Ability to write necessary set of entries in books of accounts and in cash book and compare them with bank statement to understand their implications and effect

<b>Computerized Accounting</b>	Role of computers and Financial application, Accounting Software packages	Ability to understand growing importance of software and to know how to use software and to write books of accounts Ability to use software like tally for writing of accounts
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### Teaching Methodology

Teaching Hours	Innovative methods to be used	AV Applications	Project	Expected Outcome
10	Applying accounting concepts in real life business Ability to distinguish between accounting transactions and real life business	Role of accounting in business	Importance of accounting of business and nonprofit organizations	To learn about importance of acc. In business
15	Using practical situations for writing Transactions And applying accounting concepts different situations	Writing ledger and cash book	Developing model of Journals and model books of accounts Preparing flow chart of accordance of different transactions	Ability to distinguish between different transactions and its nature
11	Interpretation of bank passbook and its statement Comparative analysis of bank pass book and statement and their interpretation	Lesson on How to write bank reconciliations. Statement from YouTube	Preparing BR. With imaginary data	Ability to prepare and interpret bank reconciliation statement
12	NIL	To Understand how various transactions are recorded while using software and what cautions are need to be taken while recording transactions.	Film on silent features of tally accounting As business software	Applying software basic financial statement and converting row financial data into well written financial data

### Evaluation Method

Unit No	Internal Evaluation	External Evaluation	Suggested Add on Course
I	MCQ on various aspects of accounting Presentations on accounting and its importance in business	25%MCQ Short notes 35% Long answers 40%	Tally and computer based accounting
II	Practical problems on how to write different accounting tractions and maintaining books of accounts		
III	Practical problems on Bank Reconciliation		
IV	Demonstrations and hands on of experience regarding application of Tally and other accounting software		
	<b>30</b>	<b>70</b>	

### References

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Advance Accounting Vou- I	S.N. Maheshwari & S.K. Maheshwari	Vikas Publication	New Delhi
2	Advance Accounting Vou- I	M.C. Shukla , T.C. Grewal , S.C Gupta	S. Chand	New Delhi
3	Accountancy (Vol- I )	S. Kr. Paul	Central Educational Enterprises (P). Ltd.	Kolkata
4	Accounting (text and Cases )	Robert N. Anthony , David F. Hawkins , Kenneth A. Merchant	McGraw Hill Companies	New Delhi
5	Advanced Accountancy( Volume – I)	R.L. Gupta , M. Radhaswamy	Sultan Chand & Sons	New Delhi

**Savitribai Phule Pune University**  
**FY BBA- CA Semester II (CBCS) Pattern 2019**  
**Business Mathematics**  
**Course code 203**  
**Credit 3**

**Course Depth:** Fundamental Knowledge

**Objectives:**

- i) To understand role and importance of Mathematics in various business situations and while developing softwares.
- ii) To develop skills related with basic mathematical technique

<b>Unit No.</b>	<b>Topic</b>	<b>No. of Lecture</b>
1	<b>1. Ratio, Proportion and Percentage:</b> Ratio – Definition, Continued Ratio, Inverse Ration, Proportion, Continued Proportion, Direct Proportion, Inverse Proportion, Variation, Inverse Variation, Joint Variation, Percentage, computation of Percentage.	8
2	<b>2. Profit and Loss: -</b> Terms and Formulae, Trade discount, Cash discount, Problems involving cost price, selling price, Trade discount and cash discount. Introduction to Commission and brokerage, Problems on commission and brokerage	6



**Reference Books:**

- 1) Business Mathematics by Dr. AmarnathDikshit and Dr. Jinendrakumar Jain.
- 2) Business Mathematics by V. K. Kapoor – Sultan, Chand and sons. Delhi.
- 3) Business Mathematics by Bari – New Literature publishing company, Mumbai.
- 4) Operation Research by S. D. Sharma - Sultan, Chand and sons.
- 5) Operation Research by J. K. Sharma - Sultan, Chand and sons.

**Savitribai Phule Pune University**  
**FY BBA- CA Semester II (CBCS) Pattern 2019**  
**Relational Data Base**  
**Course code 204**  
**Credit 3**

**Course Depth:** Fundamental Knowledge

**Objectives:**

- i) Enables students to understand relational database concepts and transaction management concepts in database system.
- ii) Enables student to write PL/SQL programs that use: procedure, function, package, cursor and trigger.

Unit No.	Unit Title	Contents	Purpose	Expected Outcome
1.	<b>Introduction To RDBMS</b>	Introduction to popular RDBMS product and their features	To understand concept of RDBMS & use in business	Understanding of various RDBMS products()
		Difference Between DBMS and RDBMS	To understand advantages of RDBMS over DBMS	Use of relational database
		Relationship among application programs and RDBMS	To understand interface between application programs and data	To get knowledge of Front End and Backend

2.	<b>PL-SQL</b>	Overview of PLSQL Data Types ,PLSQL Block	To understand various data types , operators , functions and control statements	Understanding of various programming aspects
		Exception Handling	To understand predefined and user defined exceptions	Learning of different exceptions
		Functions, Procedures	To understand concept of compact program writing by making use of functions and procedure	Writing of compact code (Small program writing)
		Cursor	To understand types of cursors and selective data retrieval	Understanding of exact data retrieval
		Trigger Package	To understand concept of stored	Writing of triggers and

			procedure and compiled data	packages(S all application using all contents)
3.	<b>Transaction Management</b>	Transaction Concept	To understand effect of transaction process on database	Understanding use of transaction and effect on database
		Transaction Properties	To understand properties like atomicity, consistency, isolation and durability	Application of properties (Case solving)
		Transaction States	To understand various states such as active, partially committed, Failed , aborted, committed	Understanding of various states
		Concurrent Execution	To understand concept of reduction in waiting time	
		Serializability	To understand Conflict Serializability and View Serializability	
4	<b>Concurrency Control &amp; Recovery System</b>	Lock Based Protocol	To understand meaning Locks, Granting of Locks ,Two Phase Locking Protocol	To understand concept of shared and exclusive lock
		Timestamp Based Protocol	To understand Timestamp and timestamp ordering protocol	To learn how to prevent deadlock situation
		Deadlock Handling	To understand dead lock detection, prevention and recovery	Understand what deadlock is and how it can occur when giving mutually exclusive access to multiple resources
		Failure Classification	To understand transaction failure and system crash	To learn concepts related to hardware failures
		Recovery & Atomicity	To understand log based recovery and checkpoint	Data recovery with different techniques
		Recovery with concurrent transaction	To understand concept of transaction rollback	Restoring of data which is changed by mistake

**Suggested References:**

<b>Sr. No.</b>	<b>Title of the Book</b>	<b>Author/s</b>	<b>Publication</b>	<b>Place</b>
<b>1</b>	Database Management System	Bipin Desai	Galgotia Publications	New Delhi
<b>2</b>	SQL/PLSQL the programming language of oracle	Ivan Bayross	BPB Publications	New Delhi
<b>3</b>	An Introduction to Database Systems Eighth Edition	C. J.Date, A.Kannan, S.Swamynathan	Pearson Publications	North America
<b>4</b>	Database System Concepts 5th Edition	Silberschatz, Korth, Sudershan	McGraw-Hill	New York

**Savitribai Phule Pune University**  
**FY BBA- CA Semester II (CBCS) Pattern 2019**  
**Web Technology (HTML-JSS-CSS)**  
**Course code 205**  
**Credit 3**

**Course Depth:** Fundamental Knowledge

**Objectives:**

- i) To know & understand concepts of internet programming.
- ii) To understand how to develop web based applications using JavaScript.

<b>Unit No</b>	<b>Topic</b>	<b>No. of Lecture</b>
1	<b>1. Introduction</b> 1.1 Clients- Servers and Communication 1.2 Internet-Basic, Internet Protocols (HTTP, FTP, IP) 1.3 World Wide Web(WWW) 1.4 HTTP request message, HTTP response message	5
2	<b>2. Web Design</b> 2.1 Concepts of effective web design 2.2 Web design issues including Browser Bandwidth and Cache 2.3 Display resolution 2.4 Look and Feel of the Website 2.5 Page Layout and linking 2.6 User centric design 2.7 Sitemap 2.8 Planning and publishing website 2.9 Designing effective navigation	9

<b>3</b>	<b>3. HTML</b> 3.1 Introduction to HTML 3.2 Basic HTML Structure 3.3 Common HTML Tags 3.4 Physical and Logical HTML 3.5 Types of Images, client side and server-side Image mapping 3.6 List, Table, Frames 3.7 Embedding Audio, Video 3.8 HTML form and form elements 3.9 Introduction to HTML Front Page	<b>12</b>
<b>4</b>	<b>4. Style sheets</b> 4.1 Need for CSS 4.2 Introduction to CSS 4.3 Basic syntax and structure 4.4 Using CSS- 4.4.1 background images, colors and properties, 4.4.2 manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS 4.5 Overview and features of CSS2 and CSS3	<b>10</b>
<b>5</b>	<b>5. JavaScript</b> 5.1 Introduction to Java Script 5.2 Identifier & operator, control structure, functions 5.3 Document object model(DOM), 5.4 DOM Objects (window, navigator, history, location) 5.5 Predefined functions, math & string functions 5.6 Array in Java scripts 5.7 Event handling in Java script	<b>12</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

1. Complete HTML- Thomas Powell
2. HTML and JavaScript – Ivan Bayross
3. HTML & CSS: The Complete Reference, Fifth Edition
4. Mastering HTML, CSS & Javascript Web Publishing

**Reference websites:**

1. [www.w3schools.com](http://www.w3schools.com)
2. [www.tutorialspoint.com](http://www.tutorialspoint.com)

SPPU/BBA(CA) SYLLABUS SEMESTER-II CBCS/2019 PATTERN

# B.B.A.(C.A) Semester I

Subject Code : - 107

Subject Name :- Principles of Programming and Algorithms

Total Contact Hours: -30

Total Credits: - 2

Pre requisite: Basic Mathematics.

Objectives: To develop Analytical / Logical thinking and Problem solving capabilities

Credit Distribution: - 1 credit for theory (15 Lectures) and 1credit for Practical's.

Note: - **Practical of PPA is on Computer fundamental and Scratch Programming.**

Unit No.	Contents	Lectures
1	Algorithm  1.1 Concept: Problem, Algorithm. 1.2 Characteristics of an algorithm. 1.3 Examples 1.3.1 Addition / Multiplication of integers 1.3.2 Determining if a number is +ve / -ve , even / odd 1.3.3 Maximum of 2 numbers , 3 numbers 1.3.4 Sum of first n numbers, sum of given n numbers , Sum of digits of a given number, sum of first and last digit of a Number. 1.3.5 Digit reversing, Table generation for number n, Factorial of a number, Prime number, Factors of a number, Perfect number, Palindrome number , Armstrong number, GCD And LCM of 2 numbers.	6
2	Flowchart 2.1 Introduction 2.2 Symbols 2.3 Draw flowcharts for algorithms implemented in chapter 1.	3
3	Function 3.1 Definition, Syntax. 3.2 Introduction to Library functions : such as pow(),sqrt() etc 3.3 Recursion 3.3.1. Factorial of a number. 3.3.2. Sum of digits of a given number.	2
4	Array 4.1 Introduction 4.2 Algorithms and Flowcharts using array 4.2.1. Maximum and minimum element from an array 4.2.2. Reversing elements of an array 4.2.3. Mean and Median of n numbers 4.2.4. Row major and Column major representation of an array 4.2.5. Sum of elements of an array 4.2.6. Matrices: Addition, Multiplication, Transpose, Symmetry, upper/lower triangular	4

References:

<b>Sr. No.</b>	<b>Title of the Book</b>	<b>Author/s</b>	<b>Publication</b>
1	How to solve it by Computer	R. G. Dromy	Pearson
2	Fundamentals of Data Structures	Horowitz and Sahani	Universities Press
3	Introduction to algorithms	Cormen, Leiserson, Rivest, Stein	MIT Press

**Savitribai Phule Pune University**  
**Syllabus for B.B.A (CA) (CBCS 2019 Pattern)**  
**Semester II - Subject Code: - 207**  
**Subject Name -: Advance C Programming**

Total Contact Hours: -30

Total Credits: - 2

Pre requisite: Basics of C, Array, Structure, Pointer.

Objectives:

- To study advanced concepts of programming using the 'C' language.
- To understand code organization with complex data types and structures.
- To work with files

Credit Distribution: - 1 credit for theory (15 Lectures) and 1 credit for Practical.

Unit No.	Contents	Lectures
1	Union and Enumeration 1.1 Union 1.1.2. Def, Syntax. 1.2 Working with union 1.3 Initializing union 1.4 Advantages of union 1.3 Structures versus union 1.5 Advantages of union  Enumeration 1.6 Enum keyword 1.7 typedef keyword 1.8 Working with Enum	3
2	File handling: 2.1 File 2.1.1 Def 2.1.2 File Opening Modes 2.1.3 Types of files - text and binary,  2.2 Functions: fopen(), fclose(), fgetc(), fputc(), fgets(), fputs(), fscanf(), fprintf(), getw(), putw(), fread(), fwrite(), fseek(),ftell() etc  2.3 File Management  2.3.1 Opening/Closing a File 2.3.2. Input/Output operations on Files  2.3.3. Error Handling During I/O Operations 2.3.4. Command Line Arguments  2.4. Random Access File	4

3	<p>Graphics programming</p> <p>3.1 Introduction of graphics</p> <p>3.2 Graphical functions</p> <p>3.3 Simple Programs</p>	2
4	<p>Hardware Interfacing with C</p> <p>4.1.Introduction</p> <p>4.1.1 The C Standard(s)</p> <p>4.2. Embedded C Fundamentals</p> <p>4.2.1.Fixed-Width Integers</p> <p>4.2.2 Binary Data Manipulation</p> <p>4.2.3.Fixed and Floating Point Math</p> <p>4.2.4 Performance Improvement</p> <p>4.2.5 Data Storage and Lifetimes</p> <p>4.2.6 The World Before main()</p> <p>4.3. Peripheral Control</p> <p>4.3.1. Peripheral Registers</p> <p>4.3.2.Memory-Mapped I/O</p> <p>4.3.3.Struct Overlays</p> <p>4.3.4.Volatile Keyword</p> <p>4.3.5. Bitmasks vs. Bitfields</p> <p>4.3.6. Device Drivers</p> <p>4.4. Interrupt Handling</p> <p>4.4.1. Interrupt Service Routines</p> <p>4.4.2.Vector Tables</p> <p>4.4.3.Hardware Hurdles</p> <p>4.4.4. Disabling Interrupts</p> <p>4.4.5.Interrupt Latency</p>	6

References:

1. C: the Complete Reference, Schildt Herbert, 4 th edition, McGraw Hill
2. A Structured Programming Approach Using C, Behrouz A. Forouzan, Richard F. Gilberg, Cengage Learning India
3. The 'C' programming language, Brian Kernighan, Dennis Ritchie, PHI
4. Programming in C ,A Practical Approach, Ajay Mittal , Pearson
5. Programming with C, B. Gottfried, 3rd edition, Schaum's outline Series, Tata McGraw Hill.
6. Programming in ANSI C, E. Balagurusamy, 7th Edition, McGraw Hill
7. Let Us C by Yashwant Kanetkar

**S.Y.B.B.A.(C.A.) Semester –III**

**Course Code: CA-301**

**Subject: Digital Marketing**

**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.

<b>Unit</b>	<b>Topic</b>	<b>No. of Lectures</b>
<b>1.</b>	<b>E-Commerce</b> 1.1 Introduction 1.2 Understanding Internet Marketing 1.3 Search Engine Optimization 1.4 Search Engine Marketing 1.5 Email Marketing 1.6 Digital Display Marketing	<b>4</b>
<b>2.</b>	<b>Introduction to New Age Media (Digital) Marketing</b> 2.1 What is Digital Marketing 2.2 Digital vs. Real Marketing 2.3 Digital Marketing Channels 2.4 Types of Digital Marketing(Overview)-Internet Marketing ,Social Media Marketing, Mobile Marketing	<b>4</b>
<b>3.</b>	<b>Creating Initial Digital Marketing Plan</b> 3.1 Content management 3.2 SWOT analysis: Strengths, Weaknesses, Opportunities, andThreats 3.3 Target group analysis EXERCISE: Define a target group	<b>4</b>
<b>4.</b>	<b>Marketing using Web Sites</b> 4.1 Web design 4.2 Optimization of Web sites 4.3 MS Expression Web EXERCISE: Creating web sites, MS Expression	<b>4</b>
<b>5.</b>	<b>Search Engine Optimization</b> 5.1 SEO Optimization 5.2 Writing the SEO content EXERCISE: Writing the SEO content	<b>4</b>
<b>6.</b>	<b>Customer Relationship Management</b> 6.1 Introduction to CRM 6.2 CRM platform 6.3 CRM models EXERCISE: CRM strategy	<b>4</b>

<b>7.</b>	<b>Social Media Marketing</b>	
	7.1 Understanding Social Media Marketing	<b>1</b>
	7.2 Social Networking (Facebook, LinkedIn, Twitter, etc.) Social Media (Blogging, Video Sharing - Youtube, Photosharing – Instagram, Podcasts)	<b>2</b>
	7.3 Web analytics - levels	<b>2</b>
	7.4 Modes of Social Media Marketing-	
	7.4.1 <b>Creating a Facebook page</b> Visual identity of a Facebook page , Types of publications, Facebook Ads , Creating Facebook Ads , Ads Visibility	<b>3</b>
	7.4.2 <b>Business opportunities and Instagram options</b> Optimization of Instagram profiles , Integrating Instagram with a Web Site and other social networks , Keeping up with posts	<b>3</b>
	7.4.3 <b>Business tools on LinkedIn</b> Creating campaigns on LinkedIn , Analyzing visitation on LinkedIn	<b>3</b>
	7.4.4 <b>Creating business accounts on YouTube</b> YouTube , Advertising , YouTube Analytics	<b>3</b>
	7.4.5 <b>E-mail marketing</b> E-mail marketing plan , E-mail marketing campaign analysis , Keeping up with conversions	<b>3</b>
	7.5 Digital Marketing tools: Google Ads, FaceBook Ads, Google Analytic, Zapier, Google Keyword Planner EXERCISE: Social Media Marketing plan. EXERCISE: Making a Facebook page and Google Ads	<b>(20)</b>
<b>8.</b>	<b>Digital Marketing Budgeting</b>	<b>4</b>
	8.1 Resource planning	
	8.2 Cost estimating	
	8.3 Cost budgeting	
	8.4 Cost control	
<b>Total</b>		<b>48</b>

### Reference Books:

- 1) Digital Marketing for Dummies By Ryan Deiss and Russ Hennesberry
- 2) Advertising and Promotion: An Integrated Marketing Communications Perspective, George Belch, San Diego University Michael Belch, San Diego University
- 3) Advertising Management: Rajeev Batra, John G. Myers, David A. Aaker
- 4) Belch: Advertising & Promotions (TMH)
- 5) The Social Media Bible: Tactics, Tools, & Strategies for Business Success by Lon Safko
- 6) Web Analytics 2.0 – AvinashKaushik

## S.Y.B.B.A(C.A) Semester – III

Course Code: CA-302

Subject : Data Structure

### Objectives:

1. To understand the concepts of ADTs
2. To learn linear data structures – lists, stacks, and queues
3. To understand sorting, searching and hashing algorithms
4. To apply Tree and Graph structures

Unit	Topic	No. of Lectures
1	<b>Basic Concept and Introduction to Data Structure</b> 1.1 Pointers and dynamic memory allocation 1.2 Algorithm-Definition and characteristics 1.3 Algorithm Analysis -Space Complexity -Time Complexity - Asymptotic Notation Introduction to Data structure 1.4 Types of Data structure 1.5 Abstract Data Types (ADT) Introduction to Arrays and Structure 1.6 Types of array and Representation of array 1.7 Polynomial - Polynomial Representation - Evaluation of Polynomial - Addition of Polynomial 1.8 Self Referential Structure	5
2	<b>Linear data structures</b> 2.1 Introduction to Arrays - array representation 2.2 Sorting algorithms with efficiency - Bubble sort, Insertion sort, Merge sort, Quick Sort, Selection Sort 2.3 Searching techniques –Linear Search, Binary search	6
3	<b>Linked List</b> 3.1 Introduction to Linked List 3.2 Implementation of Linked List – Static & Dynamic representation, 3.3 Types of Linked List - Singly Linked list(All type of operation) - Doubly Linked list (Create , Display) - Circularly Singly Linked list (Create, Display) - Circularly Doubly Linked list (Create, Display) 3.4 Generalized linked list – Concept and Representation	6
4	<b>Stacks</b> 4.1 Introduction 4.2 Representation- Static & Dynamic 4.3 Primitive Operations on stack 4.4 Application of Stack 4.5 Conversion of Infix, prefix, postfix , Evaluation of postfix and prefix	8

	4.6 Simulating recursion using stack	
<b>5</b>	<b>Queues</b> 5.1 Introduction 5.2 Representation - Static & Dynamic 5.3 Primitive Operations on Queue 5.4 Circular queue, priority queue 5.5 Concept of doubly ended queue	<b>4</b>
<b>6</b>	<b>Trees</b> 6.1 Concept & Terminologies 6.2 Binary tree, binary search tree 6.3 Representation – Static and Dynamic 6.4 Operations on BT and BST – create, Insert, delete, , counting leaf, non-leaf & total nodes , 6.5 Tree Traversals (preorder, inorder, postorder) 6.6 Application - Heap sort 6.7 Height balanced tree- AVL trees- Rotations, AVL tree examples.	<b>12</b>
<b>7</b>	<b>Graph</b> 7.1 Concept & terminologies 7.2 Graph Representation – Adjacency matrix, adjacency list, inverse Adjacency list, adjacency multilist, orthogonal list 7.3 Degree of Graph 7.4 Traversals – BFS and DFS 7.5 Applications – AOV network – topological sort, AOE network – criticalPath	<b>7</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

1. Fundamentals of Data Structures ---- By Horowitz Sahani (Galgotia)
2. Data Structures using C and C++ --- By YedidyahLangsam, Aaron M. Tenenbaum, Moshe J. Augenstein
3. Introduction to Data Structures using C---By Ashok Kamthane
4. Data Structures using C --- Bandopadhyay&Dey (Pearson)
5. Data Structures using C ---By Srivastava BPB Publication.

**S.Y.B.B.A. (C.A.) Semester –III**

**Course Code: CA-303**

**Subject: Software Engineering**

**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 development

<b>Unit</b>	<b>Topic</b>	<b>No. of lectures</b>
<b>1</b>	<b>Introduction to System Concepts</b> 1.1 Definition 1.2 Basic Components 1.3 Elements of the System 1.4 Types of System 1.5 System Characteristics	<b>4</b>
<b>2</b>	<b>Introduction to Software Engineering</b> 2.1 Definition of Software 2.2 Characteristics of Software 2.3 Definition of Software Engineering 2.4 Need for Software Engineering 2.5 Mc Call's Quality factors 2.6 The Software Process 2.7 Software Product and Process 2.8 V& V Model	<b>6</b>
<b>3</b>	<b>Software Development Life Cycle</b> 3.1 Introduction 3.2 Activities of SDLC 3.3 A Generic Process Model 3.4 SDLC 3.5 Waterfall Model 3.6 Incremental Process Models 3.7 Prototyping Model 3.8 Spiral Model	<b>8</b>
<b>4</b>	<b>Requirement Engineering</b> 4.1 Introduction 4.2 Requirement Elicitation 4.3 Requirement Elaboration 4.4 Requirement Gathering 4.5 Feasibility study	<b>8</b>

	4.6 Fact Finding Techniques 4.7 SRS Format	
<b>5</b>	<b>Analysis And Design Tools</b> 5.1 Decision Tree and Decision Table 5.2 Data Flow Diagrams (DFD) (Up to 2 <sup>nd</sup> level) 5.3 Data Dictionary 5.4 Elements of DD 5.5 Advantages and Disadvantages of DD 5.6 Input and Output Design 5.7 Structured Design Concepts 5.8 Structure Chart 5.9 Coupling and Cohesion 5.10 Compulsory Case Studies on above topics	<b>12</b>
<b>6</b>	<b>Software Testing</b> 6.1 Definition 6.2 Software testing Process 6.3 Unit Testing 6.4 Integration Testing 6.5 System Testing	<b>6</b>
<b>7</b>	<b>Software Maintenance and Software Re-Engineering</b> 7.1 Maintenance definition and types 7.2 Software reengineering 7.3 Reverse Engineering 7.4 Restructuring and forward Engineering.	<b>4</b>
<b>Total</b>		<b>48</b>

### Reference Books:

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. Parthasarthy, 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

**S.Y.B.B.A.(C.A.) Semester – III**

**Course Code: CA- 304 (Option)**

**Subject: Angular - JS**

**Objectives:**

- By the end of this course, the students should be able to Understand Client Side MVC and SPA
- Explore AngularJS Component
- Develop an AngularJS Single Page Application
- Create and bind controllers with Javascript
- Apply filter in AngularJS application

<b>Unit</b>	<b>Topics</b>	<b>No. of Lectures</b>
<b>1</b>	<b>AngularJS Core Concepts:</b> 1.1 What is AngularJS? 1.2 Difference between Javascript and Angular JS 1.3 Advantages of Angular 1.4 AngularJS MVC Architecture 1.5 Introduction to SPA 1.6 Setting up the environment 1.7 First App using MVC architecture	<b>8</b>
<b>2</b>	<b>AngularJS Directives and Expressions:</b> 2.1 Understanding ng attributes ng-app, ng-init, ng-model, ng-controller, ng-bind, ng-repeat, ng-show, ng-readonly, ng-disabled, ng-if, ng-click 2.2 Expression and Data Binding 2.3 Working with directives	<b>10</b>
<b>3</b>	<b>AngularJS Modules, Controller, View and Scope:</b> 3.1 Angular Modules 3.2 Angular Controller 3.3 Angular View 3.4 Scope hierarchy	<b>10</b>
<b>4</b>	<b>Filter, Forms and Ajax Filters</b> 4.1 Built-in filters - upper case and lower case filters, date ,currency and number formatting ,orderBy, filter ,custom filter, 4.2 Angular JS Forms – Working with AngularJS forms, model binding,	<b>12</b>

	form controller ,Using CSS classes, form events , custom model update triggers ,custom validation, \$http service , 4.3 Ajax implementation using \$http	
<b>5</b>	<b>Dependency Injection, Services</b> 5.1 What is dependency injection? 5.2 Understanding services 5.3 Using built-in service 5.4 Creating custom service, 5.5 Injecting dependency in service	<b>8</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

1. Beginning Angular with Typescript (updated to Angular 5) by Greg Lim
2. Mastering Web Application Development with AngularJS by Pawel Kozlowski, Peter Bacon Darwin
3. <https://www.tutorialsteacher.com/angularjs/angularjs-scope>

**S.Y.B.B.A.(C.A.) Semester – IV**

**Course Code: CA- 304(Optional)**

**Subject: PHP**

**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.

<b>Unit</b>	<b>Topic</b>	<b>No. of Lectures</b>
<b>1</b>	<b>PHP Basics</b> 1.1 Setting up a development environment 1.2 Variables, numbers and strings 1.3 Calculations with PHP 1.4 Using Arrays	<b>6</b>
<b>2</b>	<b>Control Structures and Loops</b> 2.1 Conditional Statements 2.2 Using Loops for Repetitive tasks 2.3 Combing Loops and Arrays	<b>7</b>
<b>3</b>	<b>Functions, Objects and Errors</b> 3.1 PHP's Built-in functions 3.2 Creating Custom functions 3.3 Passing Values by Reference 3.4 Understanding Objects	<b>7</b>
<b>4</b>	<b>Working with Forms</b> 4.1 Building a Form 4.2 Processing a Form's Data 4.3 Differences between POST and GET 4.4 Preserving User Input	<b>7</b>
<b>5</b>	<b>More with Forms</b> 5.1 Dealing with checkboxes and radiobuttons 5.2 Retrieving values from lists 5.3 Validating and restricting data 5.4 Sending Email	<b>7</b>
<b>6</b>	<b>Storing and Protecting Data</b> 6.1 Setting and Reading Cookies 6.2 Protecting Online Files 6.3 Understanding Session Variables	<b>7</b>
<b>7</b>	<b>MySQL Database Overview</b>	<b>7</b>

	7.1 phpMyAdmin Overview	
	7.2 Using a MySQL Database	
	7.3 Reading and Writing Data	
<b>Total</b>		<b>48</b>

**Reference Books:**

1. Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition by Vikram Vaswani
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)

**S.Y.B.B.A.(C.A.) Semester – III**

**Course Code: CA- 305(Optional)**

**Course Title : Big Data**

**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.

<b>Unit</b>	<b>Topic</b>	<b>No. of lectures</b>
<b>1</b>	<b>INTRODUCTION TO BIG DATA</b> 1.1 Introduction to Big Data 1.2 Types of Digital Data 1.3 Big Data Analytics 1.4 Application of Big data	<b>5</b>
<b>2</b>	<b>INTRODUCTION TO DATA SCIENCE</b> 2.1 Basics of Data Analytics 2.2 Types of Analytics – 2.2.1 Descriptive, 2.2.2 Predictive, 2.2.3 Prescriptive 2.2.4 Statistical Inference 2.3 Populations and samples 2.3.1 Statistical modelling, 2.3.2 Probability 2.3.3 Distribution 2.3.4 Correlation 2.3.5 Regression	<b>10</b>
<b>3</b>	<b>INTRODUCTION TO MACHINE LEARNING</b> 3.1 Basics of Machine Learning 3.2 Supervised Machine Learning 3.2.1 K- Nearest-Neighbours, 3.2.2 Naïve Bayes 3.2.3 Decision tree 3.2.4 Support Vector Machines	<b>20</b>

	3.3 Unsupervised Machine Learning 3.3.1 Cluster analysis 3.3.2 K means 3.3.3 EM Algorithm 3.3.4 Association Rule Mining 3.3.5 Apriori algorithms 3.4 Regression Analysis 3.4.1 Linear Regression 3.4.2 Nonlinear Regression	
<b>4</b>	<b>DATA ANALYTICS WITH R/ WEKA MACHINE LEARNING</b> 4.1 Introduction 4.2 Data Manipulation 4.3 Data Visualization 4.4 Data Analysis	<b>13</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

1. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. ArvindSathi, "BigDataAnalytics: Disruptive Technologies for Changing the Game", MC Press, 2012

**S.Y.B.B.A.(C.A.) Semester – III**

**Course Code: CA-305 (Option)**

**Course Title : BlockChain**

**PREREQUISITES:**

This course is highly technical in nature and would require the student to be comfortable with coding. To prepare for the class all students MUST:

- Understanding of basic programming language like Java, or Javascript.
- Understanding of PKI and Docker.

**WHAT YOU'LL LEARN**

- Understand what and why of Blockchain
- Explore the major components of Blockchain
- Learn about Bitcoin, Cryptocurrency, Ethereum
- Deploy and exercise example smart contracts
- Identify a use case for a Blockchain application
- Create your own Blockchain network application

**COURSE OBJECTIVES**

By the end of the course, students will be able to

1. Understand how blockchain 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.

<b>Unit</b>	<b>Topic</b>	<b>No. of Lectures</b>
<b>1</b>	<b>Introduction To Blockchain</b> 1.1 Digital Trust 1.2 Asset 1.3 Transactions 1.4 Distributed Ledger Technology 1.5 Types of network 1.6 Components of blockchain or DLT 1.7 Ledger 1.7.1. Blocks 1.7.2. Blockchain 1.8 PKI and Cryptography 1.8.1. Private keys 1.8.2. Public keys 1.8.3. Hashing 1.8.4. Digital Signature 1.9. Consensus	<b>12</b>

	<ul style="list-style-type: none"> <li>1.9.1. Byzantine Fault</li> <li>1.9.2. Proof of Work</li> <li>1.9.3. Poof of Stake</li> <li>1.10. Security <ul style="list-style-type: none"> <li>1.10.1.DDos</li> </ul> </li> <li>1.11 Cryptocurrency</li> <li>1.12.Digital Token</li> </ul>	
<b>2.</b>	<b>How Blockchain Works</b> <ul style="list-style-type: none"> <li>2.1 How Blockchain Works</li> <li>2.2. Structure of Blockchain</li> <li>2.3.Block</li> <li>2.4. Hash</li> <li>2.5. Blockchain</li> <li>2.6. Distributed</li> <li>2.7. Lifecycle of Blockchain</li> <li>2.8. Smart Contract</li> <li>2.9. Consensus Algorithm</li> <li>2.10 Proof of Work</li> <li>2.11 Proof of Stake</li> <li>2.12 Practical Byzantine</li> <li>2.13 Fault Tolerance</li> <li>2.14 Actors of Blockchain</li> <li>2.15 Blockchain developer</li> <li>2.16 Blockchain operator</li> <li>2.17 Blockchain regulator</li> <li>2.18 Blockchain user</li> <li>2.19 Membership service provider</li> <li>2.20 Building A Small Blockchain Application</li> </ul>	<b>12</b>
<b>3.</b>	<b>Introduction to Bitcoin</b> <ul style="list-style-type: none"> <li>3.1 Currency</li> <li>3.2 Double Spending</li> <li>3.3 Cryptocurrency</li> <li>3.4 P2P Payment Gateway</li> <li>3.5 Wallet</li> <li>3.6 Mining</li> </ul>	<b>8</b>
<b>4.</b>	<b>Ethereum</b> <ul style="list-style-type: none"> <li>4.1.Ethereum network</li> <li>4.2. EVM</li> <li>4.3.Transaction fee</li> <li>4.4.Mist</li> <li>4.5.Ether, gas</li> <li>4.6.Solidity - Smart contracts</li> <li>4.7.Truffle</li> <li>4.8.Web3</li> <li>4.9.Design and issue Cryptocurrency</li> <li>4.10. Mining</li> </ul>	<b>8</b>

	4.11. DApps 4.12. DAO	
<b>5</b>	<b>Introduction To Hyperledger Fabric V1.1</b> 5.1. Introduction to Hyperledger 5.2 What is Hyperledger 5.3 Why Hyperledger 5.4 Where can Hyperledger be used 5.5 Hyperledger Architecture 5.6 Membership 5.7 Blockchain 5.8 Transaction 5.9 Chaincode 5.10 Hyperledger Fabric 5.11 Features of Hyperledger	<b>8</b>
<b>Total</b>		<b>48</b>

#### References:

##### Text Book

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder,  
Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

##### Reference Books

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies
2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
3. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger," Yellow paper. 2014.
4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts

**SavitribaiPhule Pune University**  
**Syllabus for BBA(CA) (CBCS 2019 Pattern)**  
**Details for Skill Enhancement (Add-On) Courses**

**AECC - Course Title: - ( M )Basic Course in Environmental Awareness**  
**Credit -2 & Hours -30**

**Objectives:**

- 1) To provide an opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment
- 2) To develop conscious towards a cleaner and better managed environment

**Course content**

**1** Introduction - Environmental studies Definition, scope importance and need for public awareness. (Multidisciplinary nature of environmental studies)

**2** Environmental Pollution -Definition, Causes, effects on human, water, soil, air (Mother Earth)

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

**3** Various Government initiatives for conservation of Environment. Controlling measures)

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution. Pollution case studies.
- Disaster management: floods, earthquake, cyclone and landslides.

**4** Field work Visit / Project Report preparation

- Visit to a local area to document environmental assets - river / forest / grassland / hill / mountain.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Effects on plants, insects, birds – As Elements of ecosystem

**Evaluation of the course:** Continuous evaluation of the student through oral, necessary writing assignments / Quiz and presentations.

**Certification:** A Course Completion Certificate will be provided by the college to every student who has passed in the continuous evaluation and the Grade as per his / her performance in the evaluation will appear on the Certificate.

**OR – (Select Any One Course In Semester III – For BBA , BBA- IB , and BBA –CA )**

**SavitribaiPhule Pune University  
Syllabus for BBA (CA) (CBCS 2019 Pattern)**

**Details for Skill Enhancement (Add-On) Courses**

**AECC - Course Title: - (N)Advance Course in Environmental Awareness  
Credit -2 & Hours -30**

**Course Objectives**

- Understand current concern about our impact on the environment.
- Recognize the things they do affect the environment.
- Promote green practices at home and at work.
- Describe what is being done and what we all can do to help prevent harm to the environment.

**Course Contents**

- **Environmental and Ecosystem Management:**

Concept and scope, Systems of approaches, Standards – International and National, Ecomark, Environmental accounting and auditing, Green funding and taxes, Trade and environmental management. Ecosystem analysis, Modelling, Monitoring and Planning, Ecotourism and Heritage management, Eco restoration,

- **Management of solid waste**

Different types of solid wastes, Methods of disposal and management of Municipal and thermal power plant generated solid wastes, Bio medical wastes and Hazardous wastes, Recycling of wastes, Power generation and waste minimization techniques.

**Sanction and enforcement bodies of environmental laws in India.**

Legal, administrative and constitutional provisions for environmental protection in India; Role of Supreme Court and Green Bench of High Court; Public awareness and Government measures; Role of Pressure Groups and NGOs; Concepts and Aspects of Public Interest Litigation (PIL); Public Interest Litigation in India on different Environmental Issues.

- **National and Regional Environmental Issues Resource and its conservation;**

Ecological refugees; Conservation strategies of the environment: Mines, riverine networks; forest, soil and wild life

Current Environmental Movements in India. Silent Valley, Chipko, Narmada dam, Appiko, TehriGarwal Dam, Uttara Kannada and Almatti dam movements.

- **Environmental Ethics and Global Imperatives.**

Concepts and aspects of Environmental ethics, Anthropocentrism and Eco-centrism; Deep ecology. Global environmental problems. Green house effect, global warming and climate change, ozone layer depletion, acid rain, deforestation and loss of biodiversity, unplanned urbanization.

**Evaluation of the course:** Continuous evaluation of the student through oral, necessary writing assignments/ Quiz and presentations.

**Certification:** A Course Completion Certificate will be provided by the college to every student who has passed in the continuous evaluation and the Grade as per his / her performance in the evaluation will appear on the Certificate.

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## S.Y.B.B.A.(C.A.) Semester –IV

**Course Code: CA-401**

**Subject: Networking**

### 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.

Unit	Topic	No. of Lectures
<b>1</b>	<b>Introduction to Computer Network</b> 1.1 Basics of Computer Network 1.1.1 Definition 1.1.2 Goals 1.1.3 Applications, 1.1.4 Network Hardware –Broadcast, Point to Point 1.1.5 Components of Data Communication 1.2 Network Topologies 1.2.1 Mesh 1.2.2 Star, 1.2.3 Bus, 1.2.4 Ring 1.3 Types of Networks 1.3.1 LAN, MAN, WAN, 1.3.2 Internetwork, 1.3.3 Wireless Network 1.4 Modes of Communication 1.4.1 Simplex, 1.4.2 Half Duplex, 1.4.3 Full Duplex 1.5. Server Based LANs & Peer-to-Peer LANs 1.6. Protocols and Standards 1.7. Network Software 1.7.1 Protocol Hierarchies, Layers, Peers, Interfaces 1.7.2 Design Issues of the Layers 1.7.3 Connection Oriented and Connectionless Service	<b>10</b>
<b>2</b>	<b>Network Models</b> 2.1 OSI Reference Model : Functions of each Layer 2.2 TCP/IP Reference Model, Comparison of OSI and TCP/IP	<b>8</b>

	<p>Reference Model</p> <p>2.3 TCP/IP Protocol Suite</p> <p>2.4 Addressing</p> <p>    2.4.1 Physical Addresses</p> <p>    2.4.2 Logical Addresses</p> <p>    2.4.3 Port Addresses,</p> <p>    2.4.4 Specific Addresses</p> <p>2.5 IP Addressing</p> <p>    2.5.1 Classful Addressing</p> <p>    2.5.2 Classless Addressing</p>	
<b>3</b>	<p><b>Transmission Media</b></p> <p>3.1 Introduction, Types of Transmission Media</p> <p>3.2 Guided Media:</p> <p>    3.2.1 Twisted Pair Cable- Physical Structure, Categories, Connectors &amp; Applications</p> <p>    3.2.2 Coaxial Cable – Physical Structure, Standards, Connectors &amp; Applications</p> <p>    3.2.3 Fiber Optic Cable- Physical Structure, Propagation Modes, Connectors &amp; Applications</p> <p>3.3 Unguided Media:</p> <p>    3.3.1 Electromagnetic Spectrum for Wireless Communication</p> <p>    3.3.2 Propagation Modes Ground, Sky, Line-of-Sight</p> <p>    3.3.3 Wireless Transmission: Radio Waves, Microwaves, Infrared</p>	<b>8</b>
<b>4</b>	<p><b>Wired and Wireless LAN</b></p> <p>4.1 IEEE Standards</p> <p>4.2 Standard Ethernet MAC Sublayer, Physical Layer</p> <p>4.3 Fast Ethernet – Goals, MAC Sublayer, Topology, Implementation</p> <p>4.4 Gigabit Ethernet – Goals, MAC Sublayer, Topology, Implementation</p> <p>4.5 Ten-Gigabit Ethernet – Goals, MAC Sublayer, Physical Layer</p> <p>4.6 Backbone Networks - Bus Backbone, Star Backbone</p> <p>4.7 Virtual LANs Membership, IEEE standards advantages</p> <p>4.8 Wireless LAN</p> <p>    4.8.1 IEEE 802.11 Architecture,</p> <p>    4.8.2 Bluetooth Architecture (Piconet, Scatternet)</p>	<b>8</b>
<b>5</b>	<p><b>Network Devices</b></p> <p>5.1 Network Connectivity Devices</p> <p>    5.1.1 Active and Passive Hubs</p> <p>    5.1.2 Repeaters</p> <p>    5.1.3 Bridges- Types of Bridges</p> <p>    5.1.4 Switches</p> <p>    5.1.5 Router</p> <p>    5.1.6 Gateways</p>	<b>6</b>

<b>6</b>	<b>Network Security</b> 6.1 Introduction 6.2 Need for Security 6.3 Security Services : 6.3.1 Message- -Confidentiality, Integrity, Authentication, Non repudiation. 6.3.2 Entity (User)- Authentication. 6.4 Types of Attack 6.5 Cryptography, PlainText,Cipher Text, Encryption,Decryption, Symmetric Key and Asymmetric Key Cryptography 6.6 SubstitutionTechniques, Caesar Cipher,and Transposition Cipher (Problems should be covered.) 6.7 Firewalls- Packet Filter firewall, Proxy firewall 6.8 Steganography, Copyright	<b>8</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

1. Computer Networks by Andrew Tanenbaum, Pearson Education.[4th Edition]
2. Data Communication and Networking by BehrouzForouzan, TATA McGraw Hill. .[4th Edition]

**S.Y.B.B.A.(C.A.) Semester –IV**

**Course Code: CA-402**

**Subject: Object Oriented Concepts Through CPP**

**Objectives:**

1. Acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.
2. Enable students to write programs using C++ features like operator overloading, constructor and destructor, inheritance, polymorphism and exception handling.

<b>Unit</b>	<b>Topic</b>	<b>No. of Lectures</b>
<b>1</b>	<b>Introduction to C++</b> 1.1 Basic concepts, features, advantages and applications of OOP 1.2 Introduction, applications and features of C++ 1.3 Input and Output operator in C++ 1.4 Simple C++ program	<b>2</b>
<b>2</b>	<b>Beginning with C++</b> 2.1 Data type and Keywords 2.2 Declaration of variables, dynamic initialization of variables, reference variable 2.3 Operators: 2.3.1 Scope resolution operator 2.3.2 Memory management operators 2.4 Manipulators 2.5 Functions: 2.5.1 Function prototyping, call by reference and return by reference 2.5.2 Inline functions 2.6 Default arguments	<b>6</b>
<b>3</b>	<b>Classes and Objects</b> 3.1 Structure and class, Class, Object 3.2 Access specifiers, defining data member 3.3 Defining member functions inside and outside class definition. 3.4 Simple C++ program using class 3.5 Memory allocation for objects 3.6 Static data members and static member functions 3.7 Array of objects, objects as a function argument 3.8 Friend function and Friend class 3.9 Function returning objects	<b>8</b>
<b>4</b>	<b>Constructors and Destructors</b> 4.1 Constructors 4.2 Types of constructor : Default, Parameterized, Copy 4.3 Multiple constructors in a class 4.4 Constructors with default argument	<b>6</b>

	4.5 Dynamic initialization of constructor 4.6 Dynamic constructor 4.7 Destructor	
<b>6</b>	<b>Inheritance</b> 6.1 Introduction 6.2 Defining Base class and Derived class 6.3 Types of Inheritance 6.4 Virtual Base Class 6.5 Abstract class 6.6 Constructors in derived class	<b>6</b>
<b>7</b>	<b>Polymorphism</b> 7.1 Compile Time Polymorphism 7.1.1 Introduction, rules for overloading operators 7.1.2 Function overloading 7.1.3 Operator Overloading unary and binary 7.1.4 Operator Overloading using friend function 7.1.5 Overloading insertion and extraction operators 7.1.6 String manipulation using operator overloading 7.2 Runtime Polymorphism 7.2.1 this Pointer, pointers to objects, pointer to derived classes 7.2.2 Virtual functions and pure virtual functions	<b>8</b>
<b>8</b>	<b>Managing console I/O operations</b> 8.1 C++ streams and C++ stream classes 8.2 Unformatted I/O operations 8.3 Formatted console I/O operations 8.4 Output formatting using manipulators 8.5 User defined manipulators	<b>3</b>
<b>9</b>	<b>Working with Files</b> 9.1 Stream Classes for File operations 9.2 File operations - Opening, Closing and updating 9.3 File updating with random access. 9.4 Error handling during File operations 9.5 Command Line arguments	<b>6</b>
<b>10</b>	<b>Templates</b> 10.1 Introduction 10.2 Class Template and class template with multiple parameters 10.3 Function Template and function template with multiple parameter 10.4 Exception Handling Introduction	<b>3</b>
<b>Total</b>		<b>48</b>

### Reference Books:

- 1) Object Oriented programming with C++ by E Balagurusamy
- 2) Object Oriented Programming with C++ by Robert Lafore
- 3) The Complete Reference C++ by Herbert Schildt
- 4)

**S.Y.B.B.A.(C.A.) Semester-IV**

**Subject: Operating System**

**Course Code:CA-403**

**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

<b>Unit</b>	<b>Topic</b>	<b>No. of Lectures</b>
<b>1</b>	<b>Introduction to Operating System</b> 1.1 What is operating system 1.2 Computer system architecture 1.3 Services provided by OS 1.4 Types of OS 1.5 Operating System Structure – - Simple structure -Layered approach -Micro kernels -Modules 1.6 Virtual Machines – Introduction, Benefits	<b>3</b>
<b>2</b>	<b>System Structure</b> 2.1 User operating system Interface 2.2 System Calls– -Process or job control -Device Management - File Management 2.3 System Program 2.4 Operating System Structure	<b>3</b>
<b>3</b>	<b>Process Management</b> 3.1 Process Concept – - The process - Process states - Process control block 3.2 Process Scheduling – - Scheduling queues - Schedulers -Context Switch 3.3 Operation on Process – - Process Creation -Process Termination 3.4 Interprocess Communication –	<b>4</b>

	<ul style="list-style-type: none"> <li>- Shared memory system</li> <li>- Message passing systems.</li> </ul>	
<b>4</b>	<p><b>CPU Scheduling</b></p> <p>4.1 What is scheduling</p> <p>4.2 Scheduling Concepts –</p> <ul style="list-style-type: none"> <li>- CPU- I/O Burst Cycle</li> <li>- CPU Scheduler</li> <li>-Preemptive and Non-preemptive scheduling</li> <li>- Dispatcher</li> </ul> <p>4.3 Scheduling criteria</p> <p>4.4 Scheduling Algorithms –</p> <ul style="list-style-type: none"> <li>- FCFS</li> <li>- SJF ( Preemptive&amp; non-preemptive)</li> <li>- Priority Scheduling (Preemptive&amp; Non- preemptive)</li> <li>- Round Robin Scheduling <ul style="list-style-type: none"> <li>- Multilevel Queues</li> <li>- Multilevel Feedback queues</li> </ul> </li> </ul>	<b>6</b>
<b>5</b>	<p><b>Process Synchronization</b></p> <p>5.1 Introduction</p> <p>5.2 Critical section problem</p> <p>5.3 Semaphores –</p> <ul style="list-style-type: none"> <li>- Concept</li> <li>- Implementation</li> <li>- Deadlock &amp; Starvation</li> <li>- Types of Semaphores</li> </ul> <p>5.4 Classical Problems of synchronization –</p> <ul style="list-style-type: none"> <li>-Bounded buffer problem</li> <li>- Readers &amp; writers problem</li> <li>- Dining Philosophers problem</li> </ul>	<b>6</b>
<b>6</b>	<p><b>Deadlock</b></p> <p>6.1 Introduction</p> <p>6.2 Deadlock Characterization</p> <p>6.3 Necessary Condition</p> <p>6.4 Deadlock Handling Technique–</p> <ul style="list-style-type: none"> <li>-Deadlock Prevention <ul style="list-style-type: none"> <li>- Deadlock Avoidance –</li> </ul> </li> <li>- Safe State</li> <li>- Resource allocation graph algorithm</li> <li>- Bankers algorithm <ul style="list-style-type: none"> <li>- Deadlock Detection</li> <li>- Recovery from Deadlock –</li> </ul> </li> <li>-Process Termination</li> <li>-Resource Preemption</li> </ul>	<b>7</b>

<b>7</b>	<p><b>Memory Management</b></p> <p>7.1. Background –</p> <ul style="list-style-type: none"> <li>- Basic hardware</li> <li>- Address binding</li> <li>- Logical versus physical address space</li> <li>- Dynamic loading</li> <li>- Dynamic linking and shared libraries</li> </ul> <p>7.2 Swapping</p> <p>7.3 Contiguous Memory Allocation –</p> <ul style="list-style-type: none"> <li>- Memory mapping and protection</li> <li>- Memory allocation</li> <li>- Fragmentation</li> </ul> <p>7.4 Paging –</p> <ul style="list-style-type: none"> <li>- Basic Method</li> <li>- Hardware support</li> <li>- Protection</li> <li>- Shared Pages</li> </ul> <p>7.5 Segmentation –</p> <ul style="list-style-type: none"> <li>- Basic concept</li> <li>- Hardware</li> </ul> <p>7.6 Virtual Memory Management –</p> <ul style="list-style-type: none"> <li>- Background</li> <li>- Demand paging</li> <li>- Performance of demand paging</li> <li>- Page replacement –</li> </ul> <ul style="list-style-type: none"> <li>- FIFO</li> <li>- OPT</li> <li>- LRU</li> <li>- Second chance page replacement</li> <li>- MFU</li> <li>- LFU</li> </ul>	<b>8</b>
<b>8</b>	<p><b>File System</b></p> <p>8.1 Introduction &amp; File concepts (file attributes, Operations on files)</p> <p>8.2 Access methods –</p> <ul style="list-style-type: none"> <li>- Sequential access</li> <li>- Direct access</li> </ul> <p>8.3 File structure –</p> <ul style="list-style-type: none"> <li>- Allocation methods</li> <li>- Contiguous allocation</li> <li>- Linked Allocation</li> <li>- Indexed Allocation</li> </ul> <p>8.4 Free Space Management –</p> <ul style="list-style-type: none"> <li>- Bit Vector</li> <li>- Linked List</li> <li>- Grouping</li> </ul>	<b>7</b>

	- Counting	
<b>9</b>	<b>I/O System</b> 9.1 Introduction 9.2 I/O Hardware 9.3 Application of I/O Interface 9.4 Kernel I/O Subsystem 9.5 Disk Scheduling – - FCFS - Shortest Seek time first - SCAN - C- SCAN - C- Look	<b>4</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

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

## S.Y.B.B.A.(C.A.) Semester – IV

**Course Code: CA- 404 (Option)**

**Course Title : Advance PHP**

### 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 / Druple)

Unit No	Topic	No. of Lectures
1	<b>Introduction to Object Oriented Programming in PHP</b> 1.1 Classes 1.2 Objects 1.3 Introspection 1.4 Serialization 1.5 Inheritance 1.6 Interfaces 1.7 Encapsulation	6
2	<b>Web Techniques</b> 2.1 Server information 2.2 Processing forms 2.3 Sticky forms 2.4 Setting response headers	4
3	<b>XML</b> 3.1 Introduction XML 3.2 XML document Structure 3.3 PHP and XML 3.4 XML parser 3.5 The document object model 3.6 The simple XML extension 3.7 Changing a value with simple XML	8
4	<b>Ajax with PHP</b> 4.1 Understanding java scripts for AJAX 4.2 AJAX web application model 4.3 AJAX –PHP framework 4.4 Performing AJAX validation 4.5 Handling XML data using php and AJAX 4.6 Connecting database using php and AJAX	6

5	<p><b>Introduction to Web Services</b></p> <p>5.1 Definition of web services</p> <p>5.2 Basic operational model of web services, tools and technologies enabling web services</p> <p>5.3 Benefits and challenges of using web services.</p> <p>5.4 Web services Architecture and its characteristics</p> <p>5.5 Core building blocks of web services</p> <p>5.6 Standards and technologies available for implementing web services</p> <p>5.7 Web services communication models</p> <p>5.8 Basic steps of implementing web services.</p>	10
6	<p><b>PHP Framework (Joomla / Druple)</b></p> <p><b>6.1 Introduction to Joomla/Druple</b></p> <p>6.1.1 Introduction</p> <p>6.1.2 Joomla/Druple features</p> <p>6.1.3 How joomla/Drupleworks ?</p> <p>6.1.4 The platformComponents, Modules and Plugins</p> <p><b>6.2 Administering Joomla/Druple</b></p> <p>6.2.1 Presentation Administration</p> <p>6.2.2 Content Administration</p> <p>6.2.3 System Administration</p> <p><b>6.3 Working with Joomla/Druple</b></p> <p>6.3.1 Adding articles</p> <p>6.3.2 Adding menus to point to content</p> <p>6.3.3 Installing new templates</p> <p>6.3.4 Creating templates</p> <p>6.3.5 Adding a Module and Component</p> <p>6.3.6 Modifying the existing templates</p> <p>6.3.7 Creating templates with web editors</p> <p>6.3.8 Creating real templates</p>	14

### Reference Books

- Php: A Beginner's Guide 1st Edition McGraw-Hill Osborne Media; 1 edition by Vikram Vaswani
- Murach's PHP and MySQL (2nd Edition) by Joel Murach and Ray Harris
- PHP: The Complete Reference Paperback – 1 Jul 2017 by Steven Holzner (Author)
- Building Web Services with Java, 2nd Edition, S. Graham and others, Pearson Edn., 2008.
- Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SPD.
- [www.php.net.in](http://www.php.net.in)
- [www.W3schools.com](http://www.W3schools.com)

**S.Y.B.B.A.(C.A.) Semester – IV**

**Course Code: CA- 404(Optional)**

**Course Title : Node - JS**

**Objectives:**

1. Understand the JavaScript and technical concepts behind Node JS
2. Structure a Node application in modules
3. Understand and use the Event Emitter
4. Understand Buffers, Streams, and Pipes
5. Build a Web Server in Node and understand how it really works
6. Connect to a SQL or Mongo database in Node

**Pre-requisite / Target Audience:**

- 1) Basic Knowledge of JavaScript and OOPS
- 2) Knowledge in async programming will be added advantage

<b>Unit</b>	<b>Topics</b>	<b>No. of Lectures</b>
<b>1</b>	<b>Introduction to Node JS</b> 1.1 Introduction 1.2 What is Node JS? 1.3 Advantages of Node JS 1.4 Traditional Web Server Model 1.5 Node.js Process Model 1.6 Install Node.js on Windows 1.7 Working in REPL	<b>8</b>
<b>2</b>	<b>Node JS Modules</b> 2.1 Functions 2.2 Buffer 2.3 Module 2.4 Module Types 2.5 Core Modules 2.6 Local Modules 2.7 Module.Exports	<b>10</b>
<b>3</b>	<b>Node Package Manager</b> 3.1 What is NPM ? 3.2 Installing Packages Locally 3.3 Adding dependency in package.json 3.4 Installing packages globally 3.5 Updating packages	<b>6</b>
<b>4</b>	<b>Web server</b>	

	4.1 Creating web server 4.2 Handling http requests 4.3 Sending requests	<b>6</b>
<b>5</b>	<b>File System</b> 5.1 Fs.readFile 5.2 Writing a File 5.3 Writing a file asynchronously 5.4 Opening a file 5.5 Deleting a file 5.6 Other IO Operations	<b>8</b>
<b>6</b>	<b>Events</b> 6.1 EventEmitter class 6.2 Returning event emitter 6.3 Inhering events	<b>4</b>
<b>7</b>	<b>Database connectivity</b> 7.1 Connection string 7.2 Configuring 7.3 Working with select command 7.4 Updating records 7.5 Deleting records	<b>6</b>
<b>Total</b>		<b>48</b>

**Reference Books:**

- 1) Node.js complete reference guid , velentinBojinov, David Herron, DiogeResende, packt Publishing ltd
- 2) Mastering Nod.js By SandroPasquali , packt Publishing
- 3) Smashing Node.js Javascript Everywhere , Guillermo Rauch, John wiley& Sons

## **Acknowledgement**

The Syllabus Restructuring of BBA (CA) Programme (CBCS-2019 Pattern) is a manifestation of excellence in the faculty of Commerce and Management. Savitribai Phule Pune University's focus has always been in raising the academic standards and excellence in the field of education.

The BBA (CA) Programme predominantly endeavours for holistic development of students. It has emphasized on cultivating various skills and has also desired software technology acumen amongst the students.

This revision has been possible only with the help and support of different eminent personalities. The contribution of all the members as a team has enabled the robust revision of all the titles of the Programme. This synergy of the contributors is very crucial in fine tuning of the BBA(CA) Programme in its present form.

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# Savitribai Phule Pune University

## Syllabus for B.B.A (CA) (CBCS 2019 Pattern) Semester IV

**Subject Code: - 407**

**Subject Name -: jQuery**

**Total Contact Hours: -30**

**Total Credits: - 2**

**Prerequisite:** HTML, CSS, JavaScript

### **Objectives:**

- To get hands-on experience on JavaScript and jQuery.
- To learn how to work with binding events to the controls in JavaScript.
- To learn how to download jQuery library and refer it to the Html page.
- To learn the importance of `$(document).ready(function(){ });`
- To learn selecting the Html elements by name, attribute name, id or by content.
- To Learn Traversing of Html elements.
- To learn handling different events for different Controls.
- To learn how to provide effects to the elements or sections in the Html page.
- To learn manipulating elements by adding CSS classes dynamically, by inserting Elements.

**Credit Distribution:** - 1 credit for theory (15 Lectures) and 1 credit for Practical.

### **Syllabus**

<b>Unit No</b>	<b>Contents</b>	<b>Lectures</b>
<b>1.</b>	<b>Introduction</b> 1.1 jQuery Introduction 1.2 Install and Use jQuery Library 1.3 Un-Obstructive JavaScript 1.4 First jQuery Example 1.5 jQuery Syntax 1.6 How to escape a special characters 1.7 Basic Selectors 1.8 Traversal Functions	<b>5</b>
<b>2.</b>	<b>HTML Manipulation</b> 2.1 Getting Setting values from elements 2.2 Handling attributes 2.3 Inserting New elements 2.4 Deleting/Removing elements 2.5 CSS manipulations 2.6 Dimensions 2.7 Positioning	<b>5</b>
<b>3.</b>	<b>Effects and Events</b> <b>Effects:</b> 3.1 Showing/Hiding elements 3.2 Sliding elements	<b>5</b>

	<p>3.3 Fading elements 3.4 Deleting animation elements 3.5 Custom animation</p> <p><b>Events:</b></p> <p>3.6 Working with events.</p>	
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**References:**

1. jQuery pocket reference by David Flanagan
2. Learning jQuery by Jonathan Chaffer
3. JavaScript and jQuery by David Sawyer McFarland
4. w3schools.com website.

# **Savitribai Phule Pune University**

## **Syllabus for B.B.A (CA) (CBCS 2019 Pattern) Semester IV**

**Subject Code: - 407**

**Subject Name -: jQuery**

### **Practical Assignments:**

1. Write a jQuery code to check whether jQuery is loaded or not.
2. Write a jQuery code to scroll web page from top to bottom and vice versa.
3. Write a jQuery code to disable right click menu in html page.
4. Write a jQuery code to disable the submit button until the visitor has clicked a check box.
5. Write a jQuery code to fix broken images automatically.
6. Write a jQuery code to blink text continuously.
7. Write a jQuery code to create a zebra stripes table effect.
8. Write a jQuery code to print a page.
9. Write a jQuery code to allow the user to enter only 15 characters into the textbox.
10. Write a jQuery code to make first word of each statement to bold.
11. Write a jQuery code to create a division (div tag) using jQuery with style tag.
12. Write a jQuery code to select values from a JSON object.
13. Write a jQuery code to add list elements within an unordered list element.
14. Write a jQuery code to remove all the options of a select box and then add one option and select it.
15. Write a jQuery code to underline all the words of a text.
16. Write a jQuery code to demonstrate how to get the value of a textbox.
17. Write a jQuery code to remove all CSS classes from an application.
18. Write a jQuery code to distinguish between left and right mouse click.
19. Write a jQuery code to check if an object is a jQuery object or not.
20. Write a jQuery code to detect whether the user has pressed 'Enter key' or not.
21. Write a jQuery code to count number of rows and columns in a table.
22. Write a jQuery code to display form data onto the browser.
23. Write a jQuery code to find absolute position of an element.
24. Write a jQuery code to remove a specific value from an array.
25. Write a jQuery code to change button text.
26. Write a jQuery code to add options to a drop-down list.
27. Write a jQuery code to set background-image to the page.
28. Write a jQuery code to get the selected value and currently selected text of a dropdown box.
29. Write a jQuery code to disable a link.
30. Write a jQuery code to Restrict "number"-only input for textboxes including decimal points.
31. Write a jQuery code to set value in input text.