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 import 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 12th std.
- Three Years Diploma after S.S.C. i.e. 10th 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.	Semester	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
Total		67	15	26	12	2	10	67+15+26+12+2+10=132

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

Subject Code	Subject Name	Course	Credits	
			Th	Pr
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

Subject Code	Subject Name	Course	Credits	
			Th	Pr
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	
OR				
CA-304	PHP	EC	3	
CA-305	Big data	EC	3	
OR				
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	
CA-404	**NODE JS**	**EC**	**3**	
OR				
CA-404	**Advance PHP**	**EC**	**3**	
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	**1.Concept of Communication and Introduction to Communication** 1.1 Role of Communication in social and economic system 1.2Need for effective communication 1.3 Meaning and definition 1.4Principles of effective communication 1.5Barriers to communication and over comings	12
2	**Methods and types of Communication** 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.	**Business Correspondence** 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.	**Analysis of different Media of Communication** 4.1 Fax communication ,	12

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

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	**Nature of management** Meaning , importance , functions ,types Management as an art ,science and social system Universality of concept of management and organization	**12**
2	**Evolution of management thoughts** Concept of managerial thoughts Contribution of Taylor, Mayo and Fayol and Drucker and Indian Management Ethos	**12**
3.	**Major managerial Functions** 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	**12**
4.	**Recent trends in Management** Management of change , Mgt of crises ,TQM ,stress management (Principles ,concepts merits)	**12**

References

Sr. No.	Title of the Book	Author/s	Publication
1	Management Concepts and Strategies	J.S. Chandan	Vikas Publishing House Pvt. Ltd.
2	Principles of Management	Harold Koontz , Heinz Weihrich , A. RamachandraArysri	McGraw hill companies
3	Management A Global and Entrepreneurial Perspective	Heinz Weihrich , 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	**Introduction to C language** 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	**Managing I/O operations** 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	**Decision Making and looping** 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	**Programs through conditional and looping statements** 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	**Arrays and Strings** 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	**Functions** 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	**7 Introduction to pointer** 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	8 Structures 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	Database Management System 2.1 Introduction 2.2 Basic Concept and Definitions 2.2.1 Data and Information 2.2.2 Data Vs Information 2.2.3 Data Dictionary 2.2.4 Data Item or Field 2.2.5 Record 2.3 Definition of DBMS 2.4 Applications of DBMS 2.5 File processing system Vs DBMS 2.6 Advantages and Disadvantages of DBMS 2.7 Users of DBMS 2.7.1 Database Designers 2.7.2 Application programmer 2.7.3 Sophisticated Users 2.7.4 End Users 2.8 Views of Data 2.9 Data Models	14
		2.9.1 Object Based Logical Model a. Object Oriented Data Model b. Entity Relationship Data Model 2.9.2 Record Base Logical Model a. Relational Model b. Network Model c. Hierarchical Model 2.10 Entity Relationship Diagram(ERD) 2.11 Extended features of ERD 2.12 Overall System structure	

3	**3**	**Relational Model** 3.1 Introduction 3.2 Terms a. Relation b. Tuple c. Attribute d. Cordinality 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	**8**
4	**4**	**SQL (Structured Query Language)** 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	**12**
5	**5**	**Relational Database Design** 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	**8**

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	**Concept of statistics.** 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	**Measures of central tendency and dispersion** Criteria for good measures of central tendency, Arithmetic mean, Median and Mode for grouped and ungrouped data, combined mean.	12
3.	**Measures of Dispersion :** Concept of dispersion , Absolute and relative measure of dispersion, Range, Variance, Standard deviation, Coefficient of variation, Quartile Deviation , Coefficient of Quartile deviation.	12
4	**Correlation and Regression(for ungrouped data)** Concept of correlation, positive & negative correlation, Karl Pearson's Coefficient of correlation, meaning of regression, Two regression equations, Regression coefficients and properties.	12

References

Sr. No.	Title of the Book	Author/s	Publication
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	**Introduction to Organizational Behavior**	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	**Introduction to HRM**	**Introduction to HRM**- 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	**Procurement**	**HRP**-Concept, Definition, Merits & Demerits, process , influencing factors of HRP **Recruitment**-Concept, Definition, sources of recruitment and their utility in identifying vacancies, methods, E-recruitment, **Selection-** 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	**Training & Development**	**Training & Development-** 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
One project Report : 5 Marks **One assignment : 5 marks** **One Case Study Solution Report : 5 marks** **Internal Examination : 15 marks**	**25% MCQ** **Short notes 35%** **Long answers 40%**
30	**70**

Suggested references

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

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

Unit No.	Unit Title	Contents	Purpose and Skills to be developed
1	**Financial Accounting-**	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
2	**Accounting Transactions and Final Accounts**	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
3.	**Bank Reconciliation Statements**	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

	Computerized Accounting	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

Teaching Methodology

Teaching Hours	Innovative methods to be used	AV Applications	Project	Expected Outcome
10	Appling accounting concepts in real life business Ability to distinguish between accounting tractions 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 tractions	Ability to distinguish between different tractions 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 tractions 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	Appling 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 .		
	30	**70**	

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

Unit No.	Topic	No. of Lecture
1	**1. Ratio, Proportion and Percentage:** Ratio – Definition, Continued Ratio, Inverse Ration, Proportion, Continued Proportion, Direct Proportion, Inverse Proportion, Variation, Inverse Variation, Joint Variation, Percentage, computation of Percentage.	**8**
2	**2. Profit and Loss: -** 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**

3	**3.Interest and Annuity: -** Simple interest, Compound interest, Equated monthly Installments (EMI) by interest of reducing balance and flat interest methods and problems. Ordinary annuity, sinker fund, annuity due, present value and future value of annuity. **Shares and Mutual Funds:-** Concepts of Shares, face value, market value, dividend, brokerage, equity shares, preferential shares, bonus shares, examples and problems, Concept of Mutual Funds, Change in Net Asset Value (NAV), Systematic Investment Plan (SIP), Examples and Problems.	**7** **7**
4	**4.Matrices and Determinant: -** Definition of Matrices, Types of Matrices, Algebra of Matrices, Determinant, Adjoint of Matrix, Inverse of Matrix, System of Linear equations, Solution of System of Linear Equation by adjoint method (upto 3 variables only).	**10**
5	**5. Linear Programming Problem (LPP)** Concept of LPP, Formulation of LPP and solution of LPP by graphical method. **Transportation Problem (T.P.):-** Concept of Transportation Problem, Initial Basic Feasible Solution, North-West Corner Method (NWCM), Least Cost Method (LCM), Vogal's Approximation Method (VAM).	**5** **5**
Total		**48**

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.	**Introduction To RDBMS**	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.	**PL-SQL**	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 mall application using all contents)
3.	**Transaction Management**	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	**Concurrency Control & Recovery System**	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:

Sr. No.	Title of the Book	Author/s	Publication	Place
1	Database Management System	Bipin Desai	Galgotia Publications	New Delhi
2	SQL/PLSQL the programming language of oracle	Ivan Bayross	BPB Publications	New Delhi
3	An Introduction to Database Systems Eighth Edition	C. J.Date, A.Kannan, S.Swamynathan	Pearson Publications	North America
4	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.

Unit No	Topic	No. of Lecture
1	**1. Introduction** 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	**2. Web Design** 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**

3	**3. HTML** 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	**12**
4	**4. Style sheets** 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	**10**
5	**5. JavaScript** 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	**12**
Total		**48**

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
2. www.tutorialspoint.com

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

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.

Unit	Topic	No. of Lectures
1.	**E-Commerce** 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	**4**
2.	**Introduction to New Age Media (Digital) Marketing** 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	**4**
3.	**Creating Initial Digital Marketing Plan** 3.1 Content management 3.2 SWOT analysis: Strengths, Weaknesses, Opportunities, andThreats 3.3 Target group analysis EXERCISE: Define a target group	**4**
4.	**Marketing using Web Sites** 4.1 Web design 4.2 Optimization of Web sites 4.3 MS Expression Web EXERCISE: Creating web sites, MS Expression	**4**
5.	**Search Engine Optimization** 5.1 SEO Optimization 5.2 Writing the SEO content EXERCISE: Writing the SEO content	**4**
6.	**Customer Relationship Management** 6.1 Introduction to CRM 6.2 CRM platform 6.3 CRM models EXERCISE: CRM strategy	**4**

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

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	**Basic Concept and Introduction to Data Structure** 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	**Linear data structures** 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	**Linked List** 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	**Stacks** 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	
5	**Queues** 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	**4**
6	**Trees** 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.	**12**
7	**Graph** 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	**7**
Total		**48**

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

Unit	Topic	No. of lectures
1	**Introduction to System Concepts** 1.1 Definition 1.2 Basic Components 1.3 Elements of the System 1.4 Types of System 1.5 System Characteristics	4
2	**Introduction to Software Engineering** 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	6
3	**Software Development Life Cycle** 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	8
4	**Requirement Engineering** 4.1 Introduction 4.2 Requirement Elicitation 4.3Requirement Elaboration 4.4 Requirement Gathering 4.5 Feasibility study	8

	4.6 Fact Finding Techniques 4.7 SRS Format	
5	**Analysis And Design Tools** 5.1 Decision Tree and Decision Table 5.2 Data Flow Diagrams (DFD) (Up to 2nd 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	**12**
6	**Software Testing** 6.1 Definition 6.2 Software testing Process 6.3 Unit Testing 6.4 Integration Testing 6.5 System Testing	**6**
7	**Software Maintenance and Software Re-Engineering** 7.1 Maintenance definition and types 7.2 Software reengineering 7.3 Reverse Engineering 7.4 Restructuring and forward Engineering.	**4**
Total		**48**

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. 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

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

Unit	Topics	No. of Lectures
1	**AngularJS Core Concepts:** 1.1 What is AngularJS? 1.2 Difference between Javasript 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	**8**
2	**AngularJS Directives and Expressions:** 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	**10**
3	**AngularJS Modules, Controller, View and Scope:** 3.1 Angular Modules 3.2 Angular Controller 3.3 Angular View 3.4 Scope hierarchy	**10**
4	**Filter, Forms and Ajax Filters** 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,	**12**

	form controller ,Using CSS classes, form events , custom model update triggers ,custom validation, $http service , 4.3 Ajax implementation using $http	
5	**Dependency Injection, Services** 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	**8**
Total		**48**

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(Option)

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.

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

	7.1 phpMyAdmin Overview 7.2 Using a MySQL Database 7.3 Reading and Writing Data	
Total		**48**

Reference Books:

1. Php: A Beginner's Guide 1st EditionMcGraw-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 2017by Steven Holzner (Author)

S.Y.B.B.A.(C.A.) Semester – III

Course Code: CA- 305(Option)

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.

Unit	Topic	No. of lectures
1	**INTRODUCTION TO BIG DATA** 1.1 Introduction to Big Data 1.2 Types of Digital Data 1.3 Big Data Analytics 1.4 Application of Big data	5
2	**INTRODUCTION TO DATA SCIENCE** 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	10
3	**INTRODUCTION TO MACHINE LEARNING** 3.1 Basics of Machine Leaning 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	20

	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	
4	**DATA ANALYTICS WITH R/ WEKA MACHINE LEARNING** 4.1 Introduction 4.2 Data Manipulation 4.3 Data Visualization 4.4 Data Analysis	**13**
Total		**48**

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.

Unit	Topic	No. of Lectures
1	**Introduction To Blockchain** 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	12

	1.9.1. Byzantine Fault 1.9.2. Proof of Work 1.9.3. Poof of Stake 1.10. Security 1.10.1.DDos 1.11 Cryptocurrency 1.12.Digital Token	
2.	**How Blockchain Works** 2.1 How Blockchain Works 2.2. Structure of Blockchain 2.3.Block 2.4. Hash 2.5. Blockchain 2.6. Distributed 2.7. Lifecycle of Blockchain 2.8. Smart Contract 2.9. Consensus Algorithm 2.10 Proof of Work 2.11 Proof of Stake 2.12 Practical Byzantine 2.13 Fault Tolerance 2.14 Actors of Blockchain 2.15 Blockchain developer 2.16 Blockchain operator 2.17 Blockchain regulator 2.18 Blockchain user 2.19 Membership service provider 2.20 Building A Small Blockchain Application	**12**
3.	**Introduction to Bitcoin** 3.1 Currency 3.2 Double Spending 3.3 Cryptocurrency 3.4 P2P Payment Gateway 3.5 Wallet 3.6 Mining	**8**
4.	**Ethereum** 4.1.Ethereum network 4.2. EVM 4.3.Transaction fee 4.4.Mist 4.5.Ether, gas 4.6.Solidity - Smart contracts 4.7.Truffle 4.8.Web3 4.9.Design and issue Cryptocurrency 4.10. Mining	**8**

	4.11. DApps 4.12. DAO	
5	**Introduction To Hyperledger Fabric V1.1** 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	**8**
Total		**48**

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 TizianaCimoli, 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 Hazordous 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.

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
1	**Introduction to Computer Network** 1.1Basics of Computer Network 1.1.1Definition 1.1.2Goals 1.1.3Applications, 1.1.4Network Hardware –Broadcast, Point to Point 1.1.5Components of Data Communication 1.2 Network Topologies 1.2.1Mesh 1.2.2 Star, 1.2.3 Bus, 1.2.4Ring 1.3Types of Networks 1.3.1LAN,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	**10**
2	**Network Models** 2.1 OSI Reference Model : Functions of each Layer 2.2 TCP/IP Reference Model,Comparison of OSI and TCP/IP	**8**

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

6	**Network Security** 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	**8**
Total		**48**

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.

Unit	Topic	No. of Lectures
1	**Introduction to C++** 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	2
2	**Beginning with C++** 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	6
3	**Classes and Objects** 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	8
4	**Constructors and Destructors** 4.1 Constructors 4.2 Types of constructor : Default, Parameterized, Copy 4.3 Multiple constructors in a class 4.4 Constructors with default argument	6

	4.5 Dynamic initialization of constructor 4.6 Dynamic constructor 4.7 Destructor	
6	**Inheritance** 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	**6**
7	**Polymorphism** 7.1 Compile TimePolymorphism 7.1.1 Introduction, rules for overloading operators 7.1.2 Functionoverloading 7.1.3 Operator Overloading unary and binary 7.1.4 Operator Overloading using friendfunction 7.1.5 Overloading insertion and extractionoperators 7.1.6 String manipulation using operatoroverloading 7.2 RuntimePolymorphism 7.2.1 this Pointer, pointers to objects, pointer to derived classes 7.2.2 Virtual functions and pure virtualfunctions	**8**
8	**Managing console I/O operations** 8.1 C++ streams and C++ streamclasses 8.2 Unformatted I/O operations 8.3 Formatted console I/Ooperations 8.4 Output formatting usingmanipulators 8.5 User defined manipulators	**3**
9	**Working with Files** 9.1 Stream Classes for File operations 9.2 File operations - Opening, Closing andupdating 9.3 File updating with random access. 9.4 Error handling during Fileoperations 9.5 Command Line arguments	**6**
10	**Templates** 10.1 Introduction 10.2 ClassTemplate and class template with multiple parameters 10.3 FunctionTemplate and function template with multiple parameter 10.4 ExceptionHandlingIntroduction	**3**
Total		**48**

Reference Books:

1) Object Oriented programming with C++ by EBalagurusamy
2) Object Oriented Programming with C++ by RobertLafore
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

Unit	Topic	No. of Lectures
1	**Introduction to Operating System** 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	3
2	**System Structure** 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	3
3	**Process Management** 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 –	4

	- Shared memory system - Message passing systems.	
4	**CPU Scheduling** 4.1 What is scheduling 4.2 Scheduling Concepts – - CPU- I/O Burst Cycle - CPU Scheduler -Preemptive and Non-preemptive scheduling - Dispatcher 4.3 Scheduling criteria 4.4 Scheduling Algorithms – - FCFS - SJF (Preemptive& non-preemptive) - Priority Scheduling (Preemptive& Non- preemptive) - Round Robin Scheduling - Multilevel Queues - Multilevel Feedback queues	**6**
5	**Process Synchronization** 5.1 Introduction 5.2 Critical section problem 5.3 Semaphores – - Concept - Implementation - Deadlock & Starvation - Types of Semaphores 5.4 Classical Problems of synchronization – -Bounded buffer problem - Readers & writers problem - Dining Philosophers problem	**6**
6	**Deadlock** 6.1 Introduction 6.2 Deadlock Characterization 6.3 Necessary Condition 6.4 Deadlock Handling Technique– -Deadlock Prevention - Deadlock Avoidance – - Safe State - Resource allocation graph algorithm - Bankers algorithm - Deadlock Detection - Recovery from Deadlock – -Process Termination -Resource Preemption	**7**

7	**Memory Management** 7.1.Background – -Basic hardware - Address binding - Logical versus physical address space - Dynamic loading - Dynamic linking and shared libraries 7.2 Swapping 7.3 Contiguous Memory Allocation – - Memory mapping and protection -Memory allocation - Fragmentation 7.4 Paging – - Basic Method - Hardware support - Protection - Shared Pages 7.5 Segmentation – - Basic concept - Hardware 7.6 Virtual Memory Management – - Background - Demand paging - Performance of demand paging - Page replacement – - FIFO - OPT - LRU - Second chance page replacement - MFU - LFU	**8**
8	**File System** 8.1 Introduction & File concepts (file attributes, Operations on files) 8.2 Access methods – - Sequential access - Direct access 8.3 File structure – - Allocation methods - Contiguous allocation - Linked Allocation - Indexed Allocation 8.4 Free Space Management – - Bit Vector - Linked List - Grouping	**7**

	- Counting	
9	**I/O System** 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	**4**
Total		**48**

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	**Introduction to Object Oriented Programming in PHP** 1.1 Classes 1.2 Objects 1.3 Introspection 1.4 Serialization 1.5 Inheritance 1.6 Interfaces 1.7 Encapsulation	6
2	**Web Techniques** 2.1 Server information 2.2 Processing forms 2.3 Sticky forms 2.4 Setting response headers	4
3	**XML** 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	**Ajax with PHP** 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	**Introduction to Web Services** 5.1 Definition of web services 5.2 Basic operational model of web services, tools and technologies enabling web services 5.3 Benefits and challenges of using web services. 5.4 Web services Architecture and its characteristics 5.5 Core building blocks of web services 5.6 Standards and technologies available for implementing web services 5.7 Web services communication models 5.8 Basic steps of implementing web services.	10
6	**PHP Framework (Joomla / Druple)** **6.1 Introduction to Joomla/Druple** 6.1.1 Introduction 6.1.2 Joomla/Druple features 6.1.3 How joomla/Drupleworks ? 6.1.4 The platformComponents, Modules and Plugins **6.2 Administering Joomla/Druple** 6.2.1 Presentation Administration 6.2.2 Content Administration 6.2.3 System Administration **6.3 Working with Joomla/Druple** 6.3.1 Adding articles 6.3.2 Adding menus to point to content 6.3.3 Installing new templates 6.3.4 Creating templates 6.3.5 Adding a Module and Component 6.3.6 Modifying the existing templates 6.3.7 Creating templates with web editors 6.3.8 Creating real templates	14

Reference Books

- Php: A Beginner's Guide 1st EditionMcGraw-Hill Osborne Media; 1 edition by VikramVaswani
- Murach's PHP and MySQL (2nd Edition)by Joel Murach and Ray Harris
- PHP: The Complete Reference Paperback – 1 Jul 2017by 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
- www.W3schools.com

S.Y.B.B.A.(C.A.) Semester – IV

Course Code: CA- 404(Option)

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

Unit	Topics	No. of Lectures
1	**Introduction to Node JS** 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	**8**
2	**Node JS Modules** 2.1Functions 2.2 Buffer 2.3 Module 2.4 Module Types 2.5 Core Modules 2.6 Local Modules 2.7 Module.Exports	**10**
3	**Node Package Manager** 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	**6**
4	**Web server**	

	4.1 Creating web server 4.2 Handling http requests 4.3 Sending requests	**6**
5	**File System** 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	**8**
6	**Events** 6.1 EventEmitter class 6.2 Returning event emitter 6.3 Inhering events	**4**
7	**Database connectivity** 7.1 Connection string 7.2 Configuring 7.3 Working with select command 7.4 Updating records 7.5 Deleting records	**6**
Total		**48**

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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BBA(CA) CBCS 2019 Pattern

TYBBA (CA) Sem V Syllabus

Savitribai Phule Pune University
T.Y.B.B.A (C.A.) Semester –V
Course Code: CA-501
Subject Name: Cyber Security

Total Hours : 48 lectures **Total Credits: 03**

Prerequisites: -

- A course on Computer Networks.

Course Objectives:

- To understand the fundamentals of cyber security.
- To understand various categories of Cybercrime, Cyber-attacks on mobile, tools and techniques used in Cybercrime and case studies.
- To have an overview of the Cyber laws and concepts of Cyber forensics.

Course Outcome:-

- Have a good understanding of Cyber Security and the Tools.
- Identify the different types of Cyber Crimes.
- Have a good understanding of Cyber laws
- To develop Cyber forensics awareness.
- Identify attacks, security policies and credit card frauds in mobile and Wireless Computing Era.

Unit	Topic	No of lectures
1	**Chapter 1:- Introduction to Cyber Crime and Cyber Security** 1.1 Introduction 1.2 Cybercrime: Definition and Origin of the Word 1.3 Cybercrime and Information Security 1.4 Who are Cybercriminals? 1.5 Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling,Forgery, Web Jacking, Newsgroup, Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking,OnlineFrauds,Computer Sabotage, Email Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft 1.6 Definition of Cyber Security 1.7 Vulnerability, Threats and Harmful acts 1.8 CIA Triad 1.9 Cyber Security Policy and Domains of Cyber Security Policy	07
2	**Chapter 2 :- Cyber offenses and Cyberstalking** 2.1 Criminals Plan: Categories of Cybercrime Cyber Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of Social Engineering. 2.2 Cyberstalking: Types of Stalkers, Cases Reported on Cyberstalking, Working of Stalking 2.3 Real-Life Incident of Cyber stalking 2.4 Cybercafe and Cybercrimes	10

	2.5 Botnets: The Fuel for Cybercrime, Botnet, Attack Vector 2.6 Cybercrime: Mobile and Wireless Devices – Proliferation - Trends in Mobility 2.7 Credit Card Frauds in Mobile and Wireless Computing Era 2.8 Security Challenges Posed by Mobile Devices 2.9 Authentication Service Security 2.10 Attacks on Mobile/Cell Phones	
3	**Chapter 3:- Tools and Methods Used in Cybercrime** 3.1 Introduction 3.2 Proxy Servers and Anonymizers 3.3 Phishing 3.4 Password Cracking 3.5 Keyloggers and Spywares 3.6 Virus and Worms 3.7 Trojan Horses and Backdoors 3.8 Steganography 3.9 DoS and DDoS Attacks 3.10 SQL Injection	05
4	**Chapter 4 :- Cybercrimes and Cyber security: The Legal Perspectives** 4.1 Introduction 4.2 Cybercrime and the Legal Landscape around the World 4.3 Why Do We Need Cyberlaws: The Indian Context 4.4 The Indian IT Act 4.5 Challenges to Indian Law and Cybercrime Scenario in India 4.6 Consequences of not Addressing the Weakness in Information Technology Act 4.7 Digital Signatures and the Indian IT Act 4.8 Amendments to the Indian IT Act 4.9 Cybercrime and Punishment 4.10 Cyberlaw, Technology and Students: Indian Scenario	07
5	**Chapter 5:- Cyber Forensics** 5.1 Introduction 5.2 Historical background of Cyber forensics 5.3 Digital Forensics Science 5.4 The Need for Computer Forensics 5.5 Cyber Forensics and Digital evidence 5.6 Forensics Analysis of Email 5.7 Digital Forensics Lifecycle 5.8 Challenges in Computer Forensics	06
6	**Chapter 6:- Cybersecurity: Organizational Implications** 6.1 Organizational Implications: Cost of cybercrimes and IPR issues 6.2 Web threats for organizations 6.3 Security and Privacy Implications from Cloud Computing 6.4 Social media marketing 6.5 Social computing and the associated challenges for organizations, Protecting people's privacy in the organization 6.6 Organizational guidelines for Internet usage and safe computing guidelines and computer usage policy 6.7 Incident handling	07

	6.8 Intellectual property in the cyberspace of cyber security.	
7	**Chapter 7:- Cybercrime: Illustrations, Examples and Mini-Cases** 7.1Real-Life Examples 7.2 Mini-Cases 7.3 Illustrations of Financial Frauds in Cyber Domain 7.4 Digital Signature-Related Crime Scenarios 7.5 Digital Forensics Case Illustrations 7.6 Online Scams	06

References Books:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives – Nina Godbole, SunitBelapure, Wiley: April 2011 India Publications Released.
2. Principles of Information Security,-Michael E Whitman, Herbert J Mattord, 3rd Edition, 2011.
3. Computer Security: Principles and Practice -William Stallings and Lawrie Brown, 3rd edition, Pearson, 2015.
4. Cyber Security Essentials- James Graham Richard Howard Ryan Olson

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-502
Subject: Object Oriented Software Engineering

Total Hours: 48 **Total Credits: 03**

Pre Requisite: Students shall have the Basic Knowledge of Software Engineering

OBJECTIVES:

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches.
3. To design with static UML diagrams.
4. To design with the UML dynamic and implementation diagrams.
5. To improve the software design with design patterns.
6. To test the software against its requirements specification.

Outcomes:

1. Students will be able to give Design Specifications for Project.
2. Students will acquire Knowledge in Basic Modeling.
3. Students will acquire Project Management Skills.

Chapter	Course Content	No of lectures
1	**Introduction and basics of Software Modelling** 1.1 Software Life Cycle Models (Revision of SE) 1.2 System Concepts 1.3 Project Organization 1.4 Communication in Project Management 1.5 Risk management in Project Management	4
2	**SRS Documentation** 2.1 SRS Specification 2.2 Requirement Elicitation **2.3** Business Engineering	4
3	**Introduction to UML** 3.1 Concept of UML 3.2 Advantages of UML	2
4	**Object Oriented Concepts and Principles** 4.1 What is Object Orientation? - Introduction , Object , Classes and Instance , Polymorphism, Inheritance 4.2 Object Oriented System Development- Introduction, Function/Data Methods (With Visibility), Object Oriented Analysis, Object Oriented Construction 4.3 Identifying the Elements of an Object Model 4.4 Identifying Classes and Objects 4.5 Specifying the Attributes (With Visibility)	4

	4.6 Defining Operations 4.7 Finalizing the Object Definition	
5	**Structural Modeling** 5.1 Classes 5.2 Relationship 5.3 Common Mechanism 5.4 Class Diagram (Minimum three examples should be covered) 5.5 Advanced Classes 5.6 Advanced Relationship 5.7 Interface 5.8 Types and Roles 5.9 Packages 5.10 Object Diagram (Minimum three examples should be covered)	**10**
6	**Basic Behavioural Modeling** 6.1 Interactions 6.2 Use Cases and Use Case Diagram with stereo types (Minimum three examples should be covered) 6.3 Interaction Diagram (Minimum two examples should be covered) 6.4 Sequence Diagram (Minimum two examples should be covered) 6.5 Activity Diagram (Minimum two examples should be covered) 6.6 State Chart Diagram (Minimum two examples should be covered)	**10**
7	**Architectural Modelling** 7.1 Component 7.2 Components Diagram (Minimum two examples should be covered) 7.3 Deployment Diagram (Minimum two examples should be covered) 7.4 Collaboration Diagram (Minimum two examples should be covered)	**6**
8	**Object Oriented Analysis** 8.1 Iterative Development and the Rational Unified Process 8.2 Inception 8.3 Understanding Requirements 8.4 Use Case Model From Inception to Elaboration 8.5 Elaboration	**4**
9	**Object Oriented Design** 9.1 The Booch Method, The Coad and Yourdon Method and Jacobson Method and Raumbaugh Method 9.2 The Generic Components of the OO Design Model	**4**

	9.3 The System Design Process - Partitioning the Analysis Model, Concurrency and Sub System Allocation, Task Management Component, The Data Management Component, The Resource Management Component, Inter Sub System Communication	
	Total	**48**

Reference Books:

Sr. No.	Title of the Book	Author's Name	Publication
1	The Unified Modeling Language User/Reference Guide,	**Grady Booch, James Rambaugh**	Pearson Education Inc
2	The Unified software development Process	**Ivar Jacobson, Grady Booch, James Rambaugh**	**Pearson Education**
3	**Agile Software development**	**Alistair Cockbair**	**Pearson Education**

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-503
Subject: Core Java

Total Hours : 48 **Total Credits: 03**

Prerequisite:

- Student should know basics of object oriented programming.

Course Objectives:

- To introduce the object oriented programming concepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:

- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

Unit No.	Topic	No. of Lectures	Reference Books
1	**Java Fundamentals** 1.1 Introduction to Java. 1.1 Features of Java 1.2 Basics of Java: - Data types, variable, expression, operators, constant. 1.3 Structure of Java Program. 1.4 Execution Process of java Program. 1.5 JDK Tools. 1.6 Command Line Arguments. 1.7 Array and String: 1.7.1 Single Array & Multidimensional Array 1.7.2 String, String Buffer 1.8 Built In Packages and Classes : 1.8.1 java.util:- Scanner, Date, Math etc. 1.8.2 java.lang	8	1,2
2	**Classes, Objects and Methods** 2.1 Class and Object 2.2 Object reference 2.3 Constructor: Constructor Overloading 2.4 Method: Method Overloading, Recursion, Passing and Returning object form Method 2.5 new operator, this and static keyword, finalize() method 2.6 Nested class, Inner class, and Anonymous inner class	8	1,2

3	**Inheritance, Package and Collection** 3.1 Overview of Inheritance 3.2 inheritance in constructor 3.3 Inheriting Data members and Methods, 3.4 Multilevel Inheritance – method overriding Handle multilevel constructors 3.5 Use of super and final keyword 3.6 Interface: 3.7 Creation and Implementation of an interface, Interface reference 3.8 Interface inheritance 3.9 Dynamic method dispatch 3.10 Abstract class 3.11 Comparison between Abstract Class and interface **3.12** Access control **3.13 Packages** 3.13.1 Packages Concept 3.13.2 Creating user defined packages 3.13.3 Java Built inpackages 3.13.4 Import statement, Static import 3.14 **Collection** 3.14.1 CollectionFramework. 3.14.2 Interfaces: Collection, List, Set 3.14.3 Navigation: Enumeration, Iterator, ListIterator 3.14.4 Classes: LinkedList, ArrayList, Vector, HashSet	10	
4	**File and Exception Handling** **Exception** 4.1 Exception and Error 4.2 Use of try, catch, throw, throws and finally 4.3 Built in Exception 4.4 Custom exception 4.5 Throwable Class. **File Handling** 4.6 Overview of Different Stream (Byte Stream, Character stream) 4.7 Readers and Writers class 4.8 File Class 4.9 File Input Stream , File Output Stream 4.10 Input Stream Reader and Output Stream Writer class 4.11 FileReader and FileWriter class 4.12 Buffered Reader class.	8	1,2,3
5	**Applet, AWT, Event and Swing Programming** **Applet** 5.1 Introduction 5.2 Typesapplet 5.3 Applet Lifecycle 5.3.1 Creatingapplet 5.3.2 Applet tag	14	1,2,3,4

	5.4 AppletClasses 5.4.1 Color 5.4.2 Graphics 5.4.3 Font **AWT** 5.5 Components and container used inAWT 5.6 Layoutmanagers 5.7 Listeners and Adapterclasses 5.8 Event Delegationmodel **Swing** 5.9 Introduction to Swing Componentand Container Classes 5.10Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JTable, JComboBox, Swing Menus, Dialogs,JFileOpen,JColorChooser.		
	Total Lectures	**48**	

Reference Books:

1. Programming with JAVA - EBalgurusamy
2. The Complete Reference – JAVA HerbertSchildt
3. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
4. Java Programming and Object-oriented Application Development, R. A. Johnson, Ceng

T.Y.B.B.A.(C.A.) Semester –V
Course Code: CA-504
Subject: MongoDB

Total Hours: 48 **Total Creidts:03**

Prerequisites:

- Knowledge of database concepts
- Basic understanding of Big Data platforms

Objectives:

1. Understand importance of NoSQL Databases.
2. Learn various MongoDB commands and MongoDB design goals.
3. Design basic and general-purpose database using MongoDB.

Outcomes:

- Learned to work with MongoDB shell and MongoDB tools.
- Able to do Schema design, Data modelling and all sorts of CRUD Operations.
- Learned to optimize query performance.
- Become capable to analyze the data stored in MongoDB.

Unit	Topic	No. of lectures
1	**Introduction to NoSQL Databases** 1.1 Introduction to NoSQL Databases 1.2 Difference between NoSQL and RDBMS 1.3 Need of NoSQL Databases 1.4 Application of NoSQL Databases 1.5 Types of NoSQL Databases 1.6 What is MongoDB? 1.7 Features of MongoDB	5
2	**MongoDB Basics** 2.1 Installing MongoDB 2.2 MongoDB Server and Database, MongoDB tools 2.3 Collection, Documents and Key-Values 2.4 Data Modeling Concepts 2.4.1 Why Data Modeling? Data Modeling Approach 2.4.2 Analogy between RDBMS & MongoDB Data Model, MongoDB Data 2.4.3 Model (Embedding & Linking) 2.4.4 Challenges for Data Modeling in MongoDB 2.4.5 Data Model Examples and Patterns 2.5 Mongo shell Commands to create, delete database, collection & documents 2.6 MongoDB Datatypes 2.7 Inserting and saving documents 2.7.1 Batch Insert 2.7.2 Insert Validation 2.8 MongoDB GUI like compass	12
3	**MongoDB CRUD Operations**	14

	3.1 MongoDB Development Architecture 3.2 MongoDB Production Architecture 3.3 MongoDB CRUD Introduction, MongoDB CRUD Concepts 3.4 MongoDB CRUD Concerns (Read & Write Operations) 3.5 Concern Levels, Journaling 3.6 Cursor Query Optimizations, Query behaviour in MongoDB 3.7 Distributed Read & Write Queries 3.8 MongoDB CRUD Syntax & Queries	
4	**MongoDB Index and Aggregation** 4.1 Index Introduction, Index Concepts, Index Types, Index Properties 4.2 Index Creation and Indexing Reference 4.3 Introduction to Aggregation 4.4 Approach to Aggregation 4.5 Types of Aggregation (Pipeline, MapReduce & Single Purpose) 4.6 Performance Tuning.	**8**
5	MongoDB Administration 5.1 Administration concepts in MongoDB 5.2 Monitoring issues related to Database 5.3 Monitoring at Server, Database, Collection level, and various Monitoring tools related to MongoDB 5.4 Database Profiling, Locks, Memory Usage, No of connections, page fault 5.5 Backup and Recovery Methods for MongoDB 5.6 Export and Import of Data to and from MongoDB 5.7 Run time configuration of MongoDB 5.8 Production notes/ best practices 5.9 Data Managements in MongoDB (Capped Collections/ Expired data from TTL), Hands on Administrative Tasks.	**9**
Total		**48**

Reference books:

1. MongoDB Basicsby Peter Membrey, David Hows, EelcoPlugge
2. MongoDB RecipesWith Data Modeling and Query Building StrategiesbySubhashiniChellappan, DharanitharanGanesan
3. MongoDB Simply In DepthbyAjit Singh, Sultan Ahmad

Subject Code: 504
Subject: Python

Total Hours :- 48 **Total Credits: 03**

Prerequisites:

1. Experience with a high level language (C/C++, Java, MATLAB) is suggested.
2. Prior knowledge of a scriptinglanguage (Perl, UNIX/Linux shells) and Object-Oriented concepts is helpful but not mandatory.

Course Objectives:

1. To learn and understand Python programming basics and paradigm.
2. To learn and understand python looping, control statements and string manipulations.
3. Students should be made familiar with the concepts of GUI controls and designing GUI applications.
4. To learn and know the concepts of file handling, exception handling.

Course Outcomes: On completion of the course, student will be able

1. Define and demonstrate the use of built-in data structures "lists" and "dictionary".
2. Design and implement a program to solve a real world problem.
3. Design and implement GUI application and how to handle exceptions and files.

Unit	Details	Lectures
I	**Unit 1: Introduction to Python** 1.1 History, feature of Python, setting up path, working with python Interpreter, basic syntax, variable and data types, operators 1.2 **Conditional statements**-If, If-Else, nested if-else, Examples. 1.3 **Looping-**For,While,Nested loops, Examples 1.4 **Control Statements**-Break, Continue, Pass. 1.5 **String Manipulation**-Accessing String, Basic Operations, String Slices, Function and Methods, Examples. 1.6 **Lists**-Introduction, accessing list, operations, working with lists, function & methods. 1.7 **Tuple**-Introduction, Accessing tuples, operations working, function & methods, Examples. 1.8 **Dictionaries**-Introduction, Accessing values in dictionaries, working with dictionaries, properties, function, Examples. 1.9 **Functions**-Defining a function, calling a function, types of function, function arguments, anonymous function, global & local variable, Examples.	**16**
II	**Unit 2: Modules and Packages** **2.1Built in Modules** 2.1.1 Importing modules in python program 2.1.2 Working with Random Modules. 2.1.3 E.g. - built-ins, time, date time, calendar, sys, etc **2.2 User Defined functions** 2.2.1Structure of Python Modules **2.3 Packages** 2.3.1 Predefined Packages 2.3.2User defined Packages	**6**
III	**Unit 3: Classes ,Objects and Inheritance** **3.1 Classes and Objects** 3.1.1 Classes as User Defined Data Type 3.1.2 Objects as Instances of Classes 3.1.3 Creating Class and Objects 3.1.4 Creating Objects By Passing Values 3.1.5 Variables & Methods in a Class **3.2 Inheritance** 3.2.1 Single Inheritance 3.2.2 Multilevel Inheritance	**8**

	3.2.3 Multiple Inheritance 3.2.4 Hybrid Inheritance 3.2.5 Hierarchical Inheritance 3.2.6 IS-A Relationship and HAS-A Relationship	
IV	**Unit 4: Exception Handling** 4.1 Python Exception 4.2 Common Exception 4.3 Exception handling in Python (try-except-else) 4.4 The except statement with no exception 4.5 Multiple Exception 4.6 The try-finally clause 4.7 Custom Exception and assert statement	**4**
V	**Unit 5: GUI Programming** 5.1 Introduction 5.2 Tkinter programming 5.4 Tkinter widgets 5.5 Frame 5.6 Button 5.7 Label 5.8 Entry	**10**
VI	**Unit 6: Python Libraries** 6.1 Statistical Analysis- NumPy, SciPy, Pandas, StatsModels 6.2 Data Visualization- Matplotlib, Seaborn, Plotly 6.3 Data Modelling and Machine Learning- Scikit-learn, XGBoost, Eli5 6.4 Deep Learning- TensorFlow, Pytorch, Keras 6.5 Natural Language Processing (NLP)- NLTK, SpaCy, Gensim	**4**

Reference Books:

1.Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010
2.Dive into Python, Mike
3. Learning Python, 4th Edition by Mark Lutz
4. Programming Python, 4th Edition by Mark Lutz
5.Python Programming:An introduction to computer,John Zelle,3rd Edition.

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-V
Subject Code: 505

Subject: (DSE) Project

Total Credits: 04

For the evaluation/ conduction of project separate guidelines will be provided.

T.Y.B.B.A.(C.A.) Sem-V
Subject Code: 506
Subject: Computer Laboratory Based on 503 and 504(2 credits each)

Total Credits: 04

For the conduction of practicals, practical assignments are given in the lab book.

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.)Sem-V (CBCS 2019 Pattern)
Subject Code: CA-507
Subject: Internet of Things (IoT)

Total Hours: 30 **Total Credits: 02**

Prerequisite:

Basic knowledge of Internet, Networking, and Electronics.

Course Objectives:

1. To understand Technical aspects of Internet of things.
2. To describe smart objects and IoT Architecture.
3. To study and compare different Application protocols ofIoT.
4. To understand IoT platform using Arduino Uno.

Course Outcomes: Students will be able

1. To explain key technologies, smart objects, IoT Architecture and security in Internet of Things.
2. To illustrate the role of IoT protocols for efficient network communication.
3. To understand IoT platform such as Arduino Uno.

Unit No.	Contents Theory	No. of Lectures
1	**Fundamentals of IoT** 1.1 Basic Concepts of IoT 1.2 Major components of IoT devices 1.3 IOT Architecture 1.4 Pros & Cons of IOT	03
2	**Communication Technologies** 2.1 Wireless Communication: Bluetooth, ZigBee, WiFi, RF Links 2.2 Wired Communication: Ethernet 2.3 IOT Protocol: MQTT, CoAP, XMPP, OSGi	05
3	**Microcontroller Fundamental and Arduino uno** 3.1 System on Chip & Microcontroller 3.2 Arduino UNO: Introduction to Arduino, Arduino UNO, Arduino Board, The Anatomy of an Arduino Board 3.3 The Development Environment of Arduino Board 3.4 Writing Arduino Software, The Arduino Sketch 3.5 Fundamentals of Arduino Programming 3.6 Trying the code on an Arduino Emulator 3.7 Arduino Libraries 25 Programming & Interfacing 3.8 Application of IoT 3.9 Case studies: Home Automation, Smart Parking, etc.	07
Total		**15**
Practical Please Refer Lab Book		**15**

Reference Books:

1. Learning internet of things by Waher, Peter -Packt Publishing Ltd, 2015
2. "Fundamentals of Wireless Sensor Networks: Theory and Practice" by WaltenegusDargie,

Christian Poellabauer
3. Internet of Things (A Hands-on-Approach) by Vijay Madisetti , ArshdeepBahga
4. Designing the Internet of Things by Adrian McEwen, Hakim Cassimally
5. Internet of Things with Arduino Cookbook by Schwartz, M. - Packt Publishing Ltd.
6. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, 1st Edition, Pearson Education (Cisco Press Indian Reprint)
7. "Internet of Things" by Srinivasa K G, CENGAGE Leaning India, 2017
8. Computer Networks by Tanenbaum, Andrew S - Pearson Education Pte. Ltd., Delhi, 4th Edition
9. Data and Computer Communications; By: Stallings, William - Pearson Education Pte. Ltd., Delhi, 6th Edition

TYBBA (CA) Sem VI Syllabus

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)

Subject Code: CA-601

Subject: Recent Trends in IT

Total Hours: 48 **Total Credits: 3+1=4**

Prerequisites:

1. Basic knowledge of related programming and database concepts.

2. Fundamentals of Mathematical logic & Data structures.

Course Objectives

1. To introduce upcoming trends in Information technology.
2. To study Eco friendly software development concepts.
3. To provide a strong foundation of fundamental concepts in Artificial Intelligence.
4. To evaluate the performance of various data mining task.
5. To understand Data analytics using Spark Programming.

Course Outcomes: On completion of the course, student will be able

1. To discuss the basic concepts AI.
2. To apply basic, intermediate and advanced techniques to mine the data.
3. To provide an overview of the concept of Spark programming.

Unit No.	Contents	No. of Lectures
1	**Introduction to recent trends** 1.1 Artificial Intelligence 1.2 Data Warehouse 1.3 Data Mining 1.4 Spark	02
2	**Artificial Intelligence** 2.1 Introduction& Concept of AI 2.2 Applications of AI 2.3 Artificial Intelligence, Intelligent Systems, Knowledge –based Systems, AI Techniques 2.4 Early work in AI & related fields. 2.5 Defining AI problems as a State Space Search 2.6 Search and Control Strategies 2.7 Problem Characteristics 2.8 AI Problem: Water Jug Problem, Tower of Hanoi, Missionaries & Cannibal Problem	08
3	**AI Search Techniques** 3.1 Blind Search Techniques: BFS, DFS, DLS, Iterative deepening Search, Bidirectional Search, and Uniform cost Search 3.2 Heuristic search techniques: Generate and test, Hill Climbing, Best First search, Constraint Satisfaction, Mean-End Analysis, A*, AO*	08
4	**Data Warehousing** 4.1 Introduction to Data warehouse 4.2 Structure of Data Warehouse 4.3 Advantages & uses of Data Warehouse 4.4 Architecture of Data Warehouse 4.5 Multidimensional data model	08

	4.6 OLAP Vs. OLTP 4.7 OLAP Operations 4.8 Types of OLAP Servers: ROLAP versus MOLAP versus HOLAP	
5	**Data Mining** 5.1 Introduction to Data Mining 5.2 Data mining Task 5.3 Data mining issues 5.4 Data Mining versus Knowledge Discovery in Databases 5.5 Data Mining Verification vs. Discovery 5.6 Data Pre-processing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction 5.7 Accuracy Measures: Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap 5.8 Data Mining Techniques 5.9 Frequent item-sets and Association rule mining: Apriori algorithm, FP tree algorithm 5.10 Graph Mining: Frequent sub-graph mining 5.11 Software for data mining : R, Weka, Sample applications of data mining 5.12 Introduction to Text Mining, Web Mining, Spatial Mining, Temporal Mining	**12**
6	**Spark** 6.1 Introduction to Apache Spark 6.2 Spark Installation 6.3 Apache Spark Architecture 6.4 Components of Spark 6.5 Spark RDDs 6.6 RDD Operations: Transformation & Actions 6.7 Spark SQL and Data Frames 6.8 Introduction to Kafka for Spark Streaming	**10**
Total		**48**

Reference Books:

1. Artificial Intelligence by Elaine Rich, Kevin Knight - Tata McGraw Hill, 2nd Edition
2. Artificial Intelligence: A new Synthesis, Nilsson, Elsevier,ISBN 9788181471901
3. Data Mining Concepts and Techniques, by Jiawei Micheline Kamber, Morgan Kauf Mann Publishers.
4. Advanced Analytics with Spark by Sandy RyzaPublicatio O'REILLY
5. Apache Spark for Data Science Cookbook by Padma Priya Chitturi

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-602
Subject: Software Testing

Total Hours: 48 **Total Credits: 3**

Prerequisite:

1. Students shall have basic Knowledge of Software Engineering.
2. Students shall have basic Knowledge of OOSE.

Objectives:

1. To provide learner with knowledge in Software Testing techniques.
2. To understand how testing methods can be used as an effective tool in providing quality assurance for software.
3. To provide skills to design test case plan for testing software.

Outcomes:

1. Students will be introduced to testing tools.
2. Students will acquire Knowledge of Basic SQA.
3. Students will be able to design basic Test Cases.

Chapter	Course Content	No of lectures
1	**Introduction** 1.1 Introduction, Nature of errors, 1.2 Testing Objectives 1.3 Testing principles 1.4 Testing fundamentals, 1.5 Software reviews, Formal Technical reviews, 1.6 Inspection and walkthrough 1.7 Testing Life Cycle	**10**
2	**Approaches to Testing –Testing Methods** 2.1 White Box Testing and types of white box testing 2.2 Test Case Design 2.3 Black Box Testing and types of black box testing 2.4 Gray Box Testing	**5**
3	**Software Testing Strategies &Software metrics** 3.1 Software Testing Process 3.2 Unit Testing 3.3 Integration- Top-down ,Bottom up 3.4 System Testing 3.5 Acceptance Testing (alpha, Beta testing) 3.6 Validation and Verification 3.7 Big Bang Approach 3.8 Sandwich approach 3.9 Performance Testing 3.10 Regression Testing 3.11 Smoke Testing 3.13 Load Testing	**10**
4	**Software metrics** 4.1 Introduction 4.2 Basic Metrics –size-oriented metric, Function –oriented metric 4.3 Cyclometic Complexity Metrics Examples on Cyclometic Complexity	**10**
5	**Testing for Specialized Environments** 5.1 Testing GUI's 5.2 Testing of Client/Server Architectures 5.3 Testing Documentation and Help Facilities 5.4 Testing for Real-Time Systems	**5**

6	**Testing Tools& Software Quality Assurance (Introduction)** 6.1 JUnit, Apache JMeter, Win runner 6.2 Load runner, Rational Robot 6.3 Quality Concepts, Quality Movement, Background Issues, SQA activities 6.4 Formal approaches to SQA 6.5 Statistical Quality Assurance 6.6 Software Reliability 6.7 The ISO 9000 Quality Standards 6.8 SQA Plan 6.9 Six sigma 6.10 Informal Reviews	**8**
	Total	**48**

Reference Books:

Sr. No.	Title of the Book	Author's Name	Publication
1.	**Software Engineering – A Practitioner's approach**	**Roger S Pressman**	**7th Edition Tata McGraw-Hill**
2.	Effective Methods of Software Testing.	**William E Perry**	Wiley Publishing Inc
3.	**Software Testing Principles and Practices**	**Srinivasan Desikan, Gopalswamy Ramesh**	**Pearson Publication**
4.	**Total Quality Management**	**DaleH. Besterfield,**	**Prentice Hall, 2003**

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-603
Subject: Advanced Java

Total Hours: 48 **Total Credits: 3**

Prerequisite: Students should know basic programming concepts.

Objectives -:

1. To know the concept of Java Programming.
2. To understand how to use programming in day to day applications.

3. To develop programming logic.

Outcomes:

1. Students will know the concepts of JDBC Programming.
2. Students will know the concepts of Multithreading and Socket Programming.
3. Students will know the concepts of Spring and Hibernate.
4. Students will develop the project by using JSP and JDBC.
5. Students will develop applications in Spring and hibernate.

Sr. No	**Topic**	Number Of Lectures
1.	**JDBC** 1.1 Introduction 1.2 JDBC Architecture. 1.3 JDBC Process 1.4 **Working with ResultSet Interface.**	**8**
2	**Multithreading:** 2.1 Introduction to Multithreading. 2.2 Thread creation: Thread Class, Runnable Interface. 2.3 Life cycle of Thread. 2.4 Thread Priority. 2.5 Execution of Thread Application. 2.6 Synchronization and Interthread communication.	**12**
3	**Networking:** 3.1 Overview of Networking. 3.2 Networking Basics: Port Number, Protocols and classes. 3.3 Sockets, Reading from and Writing to a Socket.	**5**
4	**Servlet and JSP** 4.1 Introduction to Servlet 4.2 Types of Servlet: Generic Servlet and Http Servlet 4.3 Life cycle of servlet 4.4 Session Tracking. 4.5 Servlet with database. **JSP** 4.6 Introduction to JSP. 4.7 JSP Life Cycle. 4.8 Components of JSP. 4.9 JSP with Database.	**12**
5	**Spring & Hibernate** **Spring:** 5.1 Introduction 5.2 Applications and Benefits of spring 5.3 Architecture and Environment Setup 5.4 Hello World Example 5.5 Core Spring- IoC Containers, Spring Bean Definition, Scope, Lifecycle **Hibernate** 5.6 Architecture and Environment 5.7 Configuration, Sessions, Persistent Class 5.8 Mapping Files, Mapping Types 5.9 Examples	**11**

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc., ISBN: 0- 7645-7677-1
3. Spring In Action, Craig Walls, Ryan Breidenbach, Manning Publishing Co., ISBN: 1- 932394- 35-4
4. Head First Servlets and JSP: Passing the Sun Certified Web Component Developer Exam -2nd Edition-Bryan Basham, Kathy Sierra, Bert Bates- O'REILLY.

Savitribai Phule Pune University

T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-604
Subject: Android Programming

Total Hours: 48 **Total Credits: 3**

Pre-requisite:

1. Concepts of OOP's.
2. Basic Knowledge About JAVA Programming

Objective:

1. To understand the Android Operating System and develop applications using Google's Android open-source platform.
2. To understand the issues relating to Wireless applications.

Outcome:

1. Student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.
2. Demonstrate their understanding of the fundamentals of Android operating systems
   Demonstrate their skills of using Android software development tools

Unit	Topic	No. of lectures
1	**INTRODUCTION TO Android Programming** 1.1 What is Android? 1.2 History and Versions 1.3 Android Architecture 1.4 Basic Building Blocks 1.5 Android API Levels 1.6 Application Structure 1.7 First Hello World Program	**04**
2	**ACTIVITY, INTENT AND LAYOUT** 2.1 Introduction to Activity 2.2 Activity life cycle 2.3 Introduction to Intent 2.4 Types of Intent(Implicit and Explicit Intent) 2.5 Layout Manager 2.5.1View and View Group 2.5.2 Linear Layout 2.5.3 Relative Layout 2.5.4 Table Layout 2.5.5 Grid Layout 2.5.6 Constraint Layout 2.5.7 Frame Layout 2.5.8 Scroll Layout	**07**
3	**BASIC UI DESIGN** 3.1 Button(Push Button, Check Box, Radio Button, Toggle Button, Image Button) 3.2 Text Fields 3.3 Spinner 3.4 List View 3.5 Toast 3.6 Scroll View 3.6 ProgressBar View 3.7 Auto Complete Text View 3.8 Dialog Box 3.8.1 Alert Dialog. 3.8.2 DatePicker Dialog. 3.8.3 TimePicker Dialog. 3.8.4 Custom Dialog.	**10**
4	**ADAPTER AND MENU** 4.1 Base Adapter 4.2 Array Adapter 4.3 ListView using Adapter 4.4GridView using Adapter 4.5Photo Gallery using Adapter	**05**

	4.6 Using Menu with Views 4.6.1 Option Menu 4.5.2 Context Menu 4.5.3 Popup Menu	
5	**THREADS AND NOTIFICATION** 5.1 Worker thread 5.2 Handlers & Runnable 5.3 AsynTask (in detail) 5.4 Broadcast Receiver 5.5 Services 5.5.1Service life Cycle 5.5.2 Bounded Service 5.5.2 Unbounded Service 5.6 Notification 5.7 Alarm 5.8 Accessing Phone services(Call,SMS)	**06**
6	**CONTENT PROVIDER** 6.1Content Providers 6.2 SQLite Programming 6.3 SQLiteOpenHelper 6.4 SQLiteDatabse 6.5 Cursor 6.6 Searching for content 6.7 Adding, changing, and removing content 6.8 Building and executing queries 6.9 Android JSON	**08**
7	**LOCATION BASED SERVICES AND GOOGLE MAP** **7.1** Display Google Maps 7.1.1 Creating the project 7.1.2 Obtaining the Maps API Key 7.1.3 Displaying the Map 7.1.4 Displaying the Zoom Control 7.1.5 Changing Views 7.1.6 Navigating to a specific location 7.1.7 Adding Markers 7.1.8 Getting the location that was touched 7.1.9 Geocoding and Reverse Geocoding 7.2. Getting Location Data 7.3. Monitoring a Location	**08**
	Total Lectures	**48**

Reference Books:

1. Beginning Android4 Application Development, By Wei-Meng Lee WILEY India Edition WROX Publication
2. Professional Android 4 Application Development, By Reto Meier WROX Publication
3. The official site for Android developers - https://developer.android.com

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Sem-VI (CBCS 2019 Pattern)
Subject Code: CA-604
Subject: Dot Net Framework

Total Hours: 48 **Total Credits: 3**

Course Prerequisites:

Student should have basic knowledge of:

- Visual Basic
- HTML
- Object Oriented concepts
- Ms-Access, Mysql, SQL Server

Course Objectives:

- To learn Microsoft framework architecture.
- Understand development of windows application.
- To learn data access mechanism.
- Create and consume libraries.
- Create a web application.
- To develop the website and application.

Course Outcome:

- Use the features of Dot Net Framework along with the features of VB, C# and ASP
- Design and develop window based and web based .NET applications.
- Design and develop a Website.
- Design and Implement database connectivity using ADO.NET for VB, C# and ASP.

Sr.No	Chapter Name	No.of Lectures
1	**Introduction to DOT NET FRAMEWORK** 1.1 What is Framework? 1.2 Architecture of Dot Net Framework 1.2.1 Common Language Runtime 1.2.2 Common Type System(CTS) 1.2.3 Common Language Specification(CLS) 1.2.3 JIT Compilers 1.2.3 Base Class Library 1.3 IDE (Integrated Development Environment) 1.4 Event Driven Programming	5
2	**Introduction to VB.Net** 2.1 Basics of VB.Net 2.1.1 Operators 2.1.2 Data Types 2.1.3 Control Structures 2.2Build Windows Applications 2.2.1 Controls: Form, TextBox, Button, Label, CheckBox, ListBox, ComboBox, RadioButton, DateTimePicker, MonthCalender, Timer, Progressbar,Scrollbar, PictureBox, ImageBox, ImageList, TreeView, ListView, Toolbar, StatusBar, Datagridview 2.2.2 Menus and PopUp Menu 2.2.3 Predefined Dialog controls: Color,Save,File,Open, Font 2.2.4 DialogBox - InputBox(), MessageBox, MsgBox()	11
3	**Introduction to C#** 3.1 Language Fundamentals 3.1.1 Data type and Control Constructs 3.1.2 Value and Reference Types,Boxing 3.1.3 Arrays 3.1.4 String class and its various operations 3.1.5 Functions 3.2 Object Oriented Concepts 3.2.1 Defining classes and Objects	12

	3.2.2 Access modifiers 3.2.3 Constructors 3.2.4 Inheritance 3.2.5 Interface 3.2.6 Abstract Class 3.2.7 Method Overloading and Overriding 3.2.8 Delegates	
4	**Introduction to ASP.NET** 4.1 What isASP.NET? 4.2 ASP.NET Page Life Cycle 4.3 Architecture ofASP.NET 4.4 Forms, WebPages, HTML forms, 4.5 Request & Response in Non-ASP.NET pages 4.6 Using ASP.NET Server Controls 4.7 Overview of Control structures 4.8 Functions 4.9 HTML events 4.9.1 ASP.NET Web control events 4.9.2 Event driven programming and postback 4.10 Introduction to Web forms 4.10.1 Web Controls 4.10.2 Server Controls 4.10.3 Client Controls 4.10.4 Navigation Controls 4.10.5 Validations 4.10.6 Master Page 4.10.7 State Management Techniques	10
5	**Architecture of Ado.Net** 5.1 Basics of Ado.net 5.1.1Connection Object 5.1.2Command Object 5.1.3Dataset 5.1.4Data Table 5.1.5Data Reader Object 5.1.6Data Adapter Object 5.2 Datagridview& Data Binding: Insert, Update, Delete records 5.3 Navigation Using Data Source	10
Total		48

Reference Books:

- Beginning Visual C#, WroxPublication
- **BeginningASP.NET3.5,WroxPublication**
- **ProgrammingASP.NET3.5byJesseLiberty,DanMaharry,DanHurwitz,O'Reilly**
- Programming Microsoft Visual Basic.NET – Francesco Balena
- The Complete Reference -Visual Basic .NET – Jefrey R. Shapiro
- ADO.NET Examples and Best Practices for C# Programmers, By Peter D, Blackburn, William
- VB.NET database programming with ADO.NET -Anne Prince and Doug Lowe

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester-VI
Subject: Project
Course Code : DSE– 605
Total Credits: 04

For the evaluation / conduction of project separate guidelines will be provided.

T.Y.B.B.A.(C.A.) Semester-VI
Subject: Computer Laboratory Based on 603 and 604(2 credits each)
Course Code: 606
Total Credits: 04

For the conduction of practical's, Practical Assignments are given in the Lab book.

Savitribai Phule Pune University
T.Y.B.B.A.(C.A.) Semester-VI
Subject: Soft Skill
Course Code : CA – 607

Total Hours: 30 **Credit:02**

Prerequisite:

1. Basic Writing Skills in English including grammar.
2. Basic knowledge in communication and a good understanding of English.
3. Ready to adhere the new techniques.

Objectives:

1. It helps participants to communicate effectively and to carry themselves confidently.
2. They also learn how to identify and overcome the barriers in interpersonal relationships.

3. To improve oral and written communication, teamwork, leadership, problem-solving and decision-making skills, to gain best results.
4. This course is useful for landing a great job, building a career and also finding employment as soft skills trainers.

Outcomes:

1. Understand the significance and essence of a wide range of soft skills
2. Learn how to apply soft skills in a wide range of routine social and professional settings.
3. Learn how to employ soft skills to improve interpersonal relationships.
4. Learn how to employ soft skills to enhance employability and ensure workplace and career success.

Unit	Topics	No. of Lectures
1	**Introduction to Soft Skills** 1.1 An Introduction to Soft skill - 1.1.1 Definition and Significance of Soft Skills 1.1.2 Soft skill Process 1.1.3 Uses of Soft Skill Development.	02
2	**Communication Skills** 2.1 Introduction - Components of communication process, Communication process , Effective communication process. 2.2 Types of communication – 2.2.1 Verbal Communication – • Punctuation • Meaning & opposites , vocabulary • Real Life conversations 2.2.2 Non – Verbal Communication - • Facial Expression , Posture , Gesture , Eye contact • appearance (dress code), Body Language, listening skills • essential formal writing skills	04
3	**Skills Development** 3.1 Interview Skills – Interviewer and Interviewee – in-depth perspectives. Before, During and After the Interview. Tips for Success. 3.2 Presentation Skills - Types, Content, Audience Analysis, Essential Tips Before, During and After, Overcoming Nervousness. 3.3 Etiquette and Manners - Social and Business 3.4 Time Management - Concept, Essentials, Tips 3.5 Personality Development - Meaning, Nature, Features,	05

	Stages, Models, Learning Skills, Adaptability Skills.	
4	**Skill Implementation** 4.1 Resume writing – 4.1.1 How to write your resume. • Contact details. • Opening statement. • List of key skills. • List of technical/software skills. • Personal attributes/career overview. • Educational qualifications. • Employment history /volunteering/work placements. • References/referees. 4.1.2 Types of resume 4.2 Group Discussion - Importance, Planning, Elements, and Skills assessed, Effectively disagreeing, Initiating, Summarizing and Attaining the Objective. 4.3 Teamwork and Leadership Skills - Concept of Teams, Building effective teams, Concept of Leadership and honing Leadership skills , A Good Leader, Leaders and Managers , Types of Leaders , Leadership Behaviour.	04
Total		15
Practical Please Refer Lab Book		15

Reference Books :

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGraw Hill India, 2012.
2. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.
3. Soft skills Training – A workbook to develop skills for employment by Fredrick H. Wentz .
4. Personality Development and Soft skills, Oxford University Press by Barun K. Mitra
5. The Time Trap : the Classic book on Time Management by R. Alec Mackenzie