



Progressive Education Society's

**Modern College Of Arts, Science
and
Commerce, Ganeshkhind, Pune -
411 016
(Autonomous)**

Syllabus for

S. Y. B.B.A(CA)

NEP

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) Based on Credit System is implemented w.e.f. the academic year 2022-2023 , Second Year B.B.A.(CA) is implemented w.e.f. 2023-2024 , Third Year B.B.A.(CA) will be w.e.f. 2024-2025.

Programme Objectives:

BBA (CA) Graduate's will be able to

Po1: The BBA (CA) Programme provides sound academic base to develop an advanced career in Computer Application with various Management and Business skills.

Po2: This course focus on conceptual grounding of computer usage as well as its practical Business Application.

Po3: BBA (CA) inculcates basic programming ability amongst students which can help them to become a good programmer.

Po4: This course nurtures good Soft Skills and Managerial Skill in the students which create noble IT Professionals.

Po5: Students get excellent exposure to learn the process of Software development in the Vth and VIth semester by developing their own projects which helps them in campus placement.

Suggested internal assessment tools for courses:

The concerned teacher shall announce the units for which internal assessment will take place. A teacher may choose one of the methods given below for the assessment.

1. Library notes
2. Students Seminar
3. Short Quizzes / MCQ Test
4. Home Assignments
5. Tutorials/ Practical
6. Oral test
7. Research Project
8. Group Discussion
9. Open Book Test
10. Written Test
11. PPT presentation
12. Industrial Visit

13. Viva

Teaching Methodology:

1. Classroom Teaching
2. Guest Lectures
3. Group Discussions
4. Surveys
5. Power Point Presentations
6. Visit to Industries
7. Research Papers & Projects
8. E-content

Subject List

SYBBA(CA) Sem III

Sr no	Course Type	Course(Subject) code	Course(Subject) Title	Credit	Weightage for Internal Marks	Weightage For External Marks	Weightage for practical	Total Marks
1	Major 1	BBA23101	Object oriented programming using C++	2	20	30	-	50
2	Major 2	BBA23102	Big Data Analytics	2	20	30	-	50
3	Major 3	BBA23104	Computer lab based on BBA23101& BBA23102	2	-	-	50	50
4	IKS	BBA23103	Vedic Maths	2	20	30	-	50
5	Minor 1	BBA23207	Digital Marketing	4	40	60	-	100
			OR					
5	Minor 1	BBA23207	International Economics and Business	4	40	60	-	100
6	OE1/ OE2	BBA23308	Arts /Science	2	20	30	-	50
7	VSC	BBA23405	Java Script programming	2	20	30	-	50
8	FP	BBA23606	Field Project	2	20	30	-	50
9	AEC	BBA23509	English	2	20	30	-	50
10	CC	BBA23610	NSS/NCC/Sports	2	20	30	-	50
11	SEC	-	-					
12	VEC	-	-					
			Total Credit	22				550

Subject List

SYBBA(CA) Sem IV

Sr no	Course Type	Course(Subject) code	Course(Subject) Title	Credit	Weightage for Internal Marks	Weightage For External Marks	Weightage for practical	Total Marks
1	Major 1	BBA24101	Data Structure using C++	2	20	30	-	50
2	Major 2	BBA24102	Node JS	2	20	30	-	50
3	Major 3	BBA24104	Computer lab based on BBA24101& BBA24102	2	20	30	-	50
4	Major 4	BBA24103	Computer Network	2	20	30	-	50
5	Minor 1	BBA24606	Entrepreneurship Essentials	4	40	60	-	100
			OR					
5	Minor 1	BBA24606	International trends and finance	4	40	60	-	100
6	OE1/ OE2	BBA24307	Arts /Science	2	20	30	-	50
7	FP	BBA24605	Innovative Application Design	2	20	30	-	50
8	SEC	BBA24408	Operating System	2	20	30	-	50
9	AEC	BBA24509	English	2	20	30	-	50
10	CC	BBA24610	NSS/NCC/Sports	2	20	30	-	50
11	VEC	-	-					
12	VSC	-	-					
			Total Credit	22				550

Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous)
Ganeskhind, Pune-16
Syllabus for B.B.A (CA) (CBCS 2024 Pattern)
Subject Name -: Object Oriented Concepts Through CPP
Subject code -:23-BBACA242 Semester -:IV
Semester I
SEC Course

Total Contact Hours: -30

Total Credits: - 2

. Course Objectives :

- To understand the basic programming and OOPs concepts
- To Design C++ programs

Course Outcomes:-

- Students will understand OOPs concepts
- Students apply functions and pointers concepts in C++ program

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 1.5 Overview of OOP principles- encapsulation, inheritance and data binding polymorphism, abstraction	2
2	Beginning with C++ 2.1 Data type and Keywords 2.2 Declaration of variables, dynamic initialization of variables, reference variable 2.2.1 Scope resolution operator 2.2.2 Memory management operators 2.3 Manipulators 2.4 Functions: 2.4.1 Function prototyping, call by reference and return by reference 2.4.2 Inline functions 2.5 Default arguments	6
3	Classes , Objects and Constructors 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 3.10 Constructors	11

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Subject Name -: Object Oriented Concepts Through CPP
Subject code -:23-BBACA242 Semester -:IV
Semester I
SEC Course

	3.11 Types of constructor : Default, Parameterized, Copy 3.12 Multiple constructors in a class 3.13 Constructors with default argument 3.14 Dynamic initialization of constructor 3.15 Dynamic constructorDestructor	
4	Inheritance and Polymorphism 4.1 4.1 Introduction 4.2 Defining Base class and Derived class 4.3 Types of Inheritance 4.4 Virtual Base Class 4.5 Abstract class 4.6 Constructors in derived class 4.7 Static and Dynamic binding 4.8 Compile Time Polymorphism 4.8.1 Introduction, rules for overloading operators 4.8.2 Functionoverloading 4.8.3 Operator Overloading unary and binary 4.8.4 Operator Overloading using friendfunction 4.8.5 Overloading insertion and extractionoperators 4.8.6 String manipulation using operator overloading 4.9 Runtime Polymorphism 4.9.1 this Pointer, pointers to objects, pointer to derived classes 4.9.2 Virtual functions and pure virtual functions	11
Total :		30

References:

Sr.No.	Title Of the Book	Author's
1	Object Oriented programming with C++	E Balagurusamy
2	Object Oriented Programming with C++	RobertLafore
3	The Complete Reference C++	Herbert Schildt

4. WWW.W3school.com

Subject Code: BBA23102

Subject: Big Data Analytics (2 Credit Course)

Total Lectures = 30

Course Objectives:-

1. 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.

Course Outcomes:-

1. Student will learn to perform data gathering of large data from a range of data sources.
2. Student will learn to analyze existing Big Data datasets and implementations, taking Practicality, and usefulness metrics into consideration

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	3
2	INTRODUCTION TO STATISTICAL CONCEPTS 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	4
3	INTRODUCTION TO Python PROGRAMING 3.1 Basics of R Programming 3.2 Interaction /Features of Python 3.3 Installation of Python 3.4 Basic Computations in Python 3.5 Objects, Attributes 3.6 Data Types in Python with application 3.6.1 Vector 3.6.2 List 3.6.3 Matrices 3.6.4 Data Frame, Functions of Data Frame 3.7 Control Structures in Python	18

	3.8 String and functions in Python 3.9 Examples 3.10 Introduction of Machine Learning with reference to Python Programming 3.10.1 Types of Machine learning	
4	DATA ANALYTICS WITH PYTHON 4.1 Introduction 4.2 Data Manipulation 4.3 Data Visualization 4.4 Data Analysis	5
Total no of lectures		30

Reference Books:

1. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRCpress (2013)
3. Mark Lutz, Programming Python, O'Reilly, 4th Edition, 010
4. Dive into Python, Mike
5. Programming Python, 4th Edition by Mark Lutz

Subject Code: BBA23104

Subject: Computer lab based on BBA24101 & BBA24102 (2 Credit)

(Total Practical= 30 P (15x2hrs. for each course)

Course Objectives:-

- 1) To identify concepts of various data models used.
- 2) To understand the uses of operators, functions, input/output methods.

Course Outcomes:-

- 1) Students will be able to create error free applications giving desired results.
- 2) Students will be able to analyze problem statements and problem solving methodology.

Sr. No.	Assignment Name	No of Practical's
1	Beginning with C++	4
2	Operators and Functions in C++	4
3	Classes and Objects	5
4	Constructors and Destructors	5
5	Inheritance	6
6	Polymorphism	6
Total		30

Sr. No.	Assignment Name	No. of lectures
1	Basic Python Programming	5
2	Decision making and loop control structures	4
3	String and Function in Python Programming	6
4	Vector and List in Python Programming	3
5	Array and Matrices in Python Programming	4
6	Data Analysis	4
7	Data Visualization	4
Total		30

Subject Code: - BBACA23207

Subject Name -: Digital Marketing (4 Credit Course)

Total Lectures = 60

Course Objectives:-

1. 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.

Course Outcomes:-

1. Student will understand the concept of digital marketing and its real-world iterations
2. Student will articulate innovative insights of digital marketing enabling a competitive edge

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 Digital Display Marketing	4
2.	Introduction to New Age Media (Digital) Marketing 2.1 Types of Digital Marketing -Affiliate Marketing(Niche Product List, Amazon Affiliate Program, Flipkart Affiliate Program, Posting on social Media, Google Trends) 2.2 Overview of Internet Marketing ,Social Media Marketing, Mobile Marketing 2.3 Digital vs. Real Marketing 2.4 Digital Marketing Channels	4
3.	Creating Initial Digital Marketing Plan 3.1 Content management 3.2 SWOT analysis: Strengths, Weaknesses, Opportunities, and Threats. 3.3 Freelancing(Introduction about Freelancing, Branch in Freelancing- Designing, Video Making,Writing,Programming,Fun and Life Stylish, Social media Marketing, Business 3.4 Target group analysis EXERCISE: Define a target group	10
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	6
5.	Search Engine Optimization 5.1 SEO Optimization 5.2 Writing the SEO content EXERCISE: Writing the SEO content	6
6.	Customer Relationship Management 6.1 Introduction to CRM 6.2 CRM platform 6.3 CRM models EXERCISE: CRM strategy	6
7.	Social Media Marketing 7.1 Social Networking (Facebook, LinkedIn, Twitter, etc.) Social Media (Blogging, Video Sharing - YouTube, Photo sharing – Instagram, Podcasts)	20

	<p>7.2 Web analytics - levels</p> <p>7.3 Modes of Social Media Marketing-</p> <p>7.3.1 Creating a Facebook page Visual identity of a Facebook page , Types of publications, Facebook Ads , Creating Facebook Ads , Ads Visibility</p> <p>1. Creating Content For Facebook and Social Media</p> <ul style="list-style-type: none"> • Why Content is the Foundation of SMW? • Psychology of Social Sharing • Building Content that is Inherently Shareable <p>7.3.2 Business opportunities and Instagram options Optimization of Instagram profiles , Integrating Instagram with a Web Site and other social networks , Keeping up with posts</p> <p>7.3.3 Business tools on LinkedIn Creating campaigns on LinkedIn , Analyzing visitation on LinkedIn</p> <p>7.3.4 Creating business accounts on YouTube YouTube , Advertising , YouTube Analytics</p> <p>7.3.5 LinkedIn as a Marketing Platform</p> <p>7.3.6 Twitter and Snapchat Marketing</p> <p>7.4 Digital Marketing tools: Google Ads, Facebook Ads, Google Analytic, Zapier, Google Keyword Planner</p> <p>EXERCISE: Social Media Marketing plan.</p> <p>EXERCISE: Making a Facebook page and Google Ads, Google Analytics</p>	
8.	<p>Digital Marketing Budgeting</p> <p>8.1 Resource planning</p> <p>8.2 Cost estimating</p> <p>8.3 Cost budgeting</p> <p>8.4 Cost control</p> <p>EXERCISE: Marketing Planning & Marketing Research, Digital Marketing' with real time practical perspective like Database extraction</p>	4
Total		60

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 – Avinash Kaushik

Progressive Education Society's
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Syllabus for B.B.A (CA)

Semester :- Subject Code: -
Subject Name -: JavaScript

Total Contact Hours: -30

Total Credits: - 2

Prerequisite: HTML, CSS

Course Objectives: -

1. Understand JavaScript fundamentals.
2. Learn asynchronous programming and DOM manipulation.
3. Build interactive web applications.

Course Outcomes:

- CO 1.:Proficiency in core JavaScript concepts including variables, functions, and control structures.
CO 2.: Competence in asynchronous programming and dynamic DOM manipulation for interactive web development.

Unit No.	Contents	Lectures
1.	Introduction to Javascript: 1.1. Overview of Javascript 1.2. Object Orientation and Javascript 1.2.1. Javascript Objects 1.2.2. General Syntax Characteristics 1.3. Datatypes and Variables 1.3.1. JS Datatypes 1.3.2. JS Variables 1.4. Primitives, Operation and Expressions 1.4.1 Primitive Types 1.4.2 Numeric and String Literals 1.4.3 Declaring Variables 1.4.4 Numeric Operators 1.4.5 The Number Object 1.4.6 The string Concatenation Operators 1.4.7 String Properties and Method 1.4.8 The typeof operator	7
2.	Control Structures and Functions 2.1 Control Expression 2.2 Selection Statements 2.3 Switch Statement 2.4 Loop Statements 2.5 JS Functions	6
3	Asynchronous JavaScript 3.1 HTML DOM 3.2 JS Callback	7

	3.3 JS Promises 3.4 JS Async/Await 3.5 JS object 3.5.1 Math Object 3.5.2 Date Object 3.5.3 RegExp 3.6 Windows Object 3.7 JS Events 3.8 Web API	
4	Array in Java Script 4.1 Keywords 4.1.1 The Let Keyword 4.1.2 The Const Keyword 4.2 Arrow Functions 4.3 Spread Operator 4.4 For/of Loop 4.5 JavaScript Map, Filter, Reduce 4.6 JavaScript Rest Parameter 4.7 String Methods 4.7.1 String.includes() 4.7.2 String.startsWith() 4.7.3 String.endsWith() 4.8 Array methods 4.8.1 Array entries () 4.8.2 Array.from() 4.8.3 Array keys() 4.8.4 Array find() 4.8.5 Array findIndex()	10

References:-

1. HTML and Javascript- Ivan Bayross
2. Mastering HTML, CSS & Javascript Web Publishing
3. Javascript- The Definitive Guide- David Fianagan

www.w3schools.com

www.javatpoint/javascript.com

Subject Code: BBA23606

Subject: Field Project(02 credit course)

Total Lectures = 30

Course Objective :-

- 1) To gain project management skill.
- 2) To develop skill at conveying activities and achievements.

Course Outcome :-

- 1) Student will get hands on experience in specific computer language.
- 2) Student will get exposure to solve various real time problems in society.

Guidelines:

- Students should work in a team of maximum 2 students.
- Students can choose a project topic without any restriction on technology or domain.
- The student group will work independently throughout the project work including: problem identification, information searching, literature study, design and analysis, implementation, testing, and the final reporting.
- Project guide must conduct project presentations (minimum 4) to monitor the progress of the project groups.
- At the end of the project, the group should prepare a report which should conform to international academic standards. The report should follow the style in academic journals and books, with clear elements such as: abstract, background, aim, design and implementation, testing, conclusion and full references, Tables and figures should be numbered and referenced to in the report.
- The final project presentation with demonstration (UE) will be evaluated by the project guide (appointed by the college) and one external examiner (appointed by the University).

Evaluation guidelines:

CIE (20 marks)			ESE (30 marks)		
First presentation	Second presentation	Documentation	Project Logic/Presentation	Documentation	Viva
5	5	10	10	10	10

Recommended Documentation contents:

Abstract

Introduction

- motivation
- problem statement
- purpose/objective and goals
- literature survey
- project scope and limitations

System analysis

- Existing systems
- scope and limitations of existing systems
- project perspective, features
- stakeholders

-Requirement analysis - Functional requirements, performance requirements, security requirements etc.

System Design

- Design constraints
- System Model: DFD
- Data Model
- User interfaces

Implementation details

-Software/hardware specifications

Outputs and Reports Testing

Test Plan, Black Box Testing or Data Validation Test Cases, White Box Testing or Functional Validation Test cases and results

Conclusion and Recommendations

Future Scope

Bibliography and References

SEM IV

Subject Code-BBA24101

Subject Name: Data Structures using CPP (2 Credit Course)

Total Lectures=30

Course Objectives:-

- To write and execute programs in C++ to solve problems using data structures such as arrays, linked lists, stacks, queues.

Course Outcomes:-

- Student will increase the ability to identify the appropriate data structure for given problem.
- Student will able to design and analyze the time and space complexity of algorithm or program.

Unit	Topic	No. of Lectures
1	Introduction 1.1 Types of Data structures 1.2 Abstract Data Types (ADT) 1.3 Pointers and Dynamic Memory Allocation 1.4 Algorithm- Definition and characteristics, Space Complexity -Time Complexity -Asymptotic Notation	4
2	Arrays and Structures 2.1 Introduction to Arrays - array representation 2.2 Polynomial - Polynomial Representation - Evaluation of Polynomial - Addition of Polynomial 2.3 Introduction to Structures, Self Referential Structure	3
3	Sorting Techniques 3.1 Sorting algorithms with efficiency - Bubble sort, Insertion sort, Merge sort, Quick Sort, Selection Sort 3.2 Searching techniques –Linear Search, Binary search	8
4	Linked Lists 4.1 Introduction to Linked List 4.2 Implementation of Linked List – Static & Dynamic representation, 4.3 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)	6
5	Stacks and Queue 5.1 Introduction 5.2 Representation- Static & Dynamic 5.2 Primitive Operations on stack 5.4 Application of Stack 5.5 Conversion of Infix, prefix, postfix , Evaluation of postfix andprefix 5.6 Queue	9

	5.6.1 Introduction and Representation - Static & Dynamic 5.6.2 Primitive operation on queue 5.6.3 Circular queue, priority queue ,Concept of doubly ended queue 5.6.4 Applications of Queues	
	Total No. of lectures	30

Reference Books:-

- 1.Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and .Mount, Wiley student edition, John Wiley and Sons.
- 3.Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

Subject Code: BBA24102

Subject:- NodeJS (2 Credit Course)

Total Lectures = 30

Course Objectives:-

1. To Understand the JavaScript and technical concepts behind Node JS
2. Recognize Structure a Node application in modules
3. To Understand and use the Event Emitter

Course Outcomes:-

- Student will understand Node.js architecture and core concepts.
- Student will learn the Node.js module system.
- Student will practice and Debugging Node.js.

Unit	Topics	No. of Lectures
1	Introduction to Node JS 1.2 Introduction 1.3 What is Node JS? 1.4 Advantages of Node JS 1.5 Traditional Web Server Model 1.6 Node.js Process Model	4
2	Node JS Modules 2.1 Functions 2.2 Buffer 2.3 Module 2.4 Module Types 2.5 Core Modules 2.6 Local Modules 2.7 Module. Exports 2.8 Node Package Manager 2.8.1 What is NPM?	6
3	Web server 3.1 Creating web server 3.2 Handling http requests 3.3 Sending requests	6

4	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	7
5	Events 6.1 Event Emitter class 6.2 Returning event emitter 6.3 Inhering events 6.4 Introduction to Database connectivity	7
Total		30

Reference Books:

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

Subject Code: BBA24104

Subject : Computer lab based on BBA24101& BBA24102 (2 Credit)

(Total Practical= 30 P (30x2hrs. for each course))

Course Objectives:-

- 3) To identify concepts of various data models used.
- 4) To understand the uses of operators, functions, input/output methods.

Course Outcomes:-

- 3) Students will be able to create error free applications giving desired results.
- 4) Students will be able to analyze problem statements and problem solving methodology.

Sr. No.	Assignment Name	No. of lectures
1	Array	4
2	Sorting Techniques (Non-Recursive)	3
3	Sorting Techniques (Recursive)	4
4	Searching Techniques	4
5	Linked List	3
6	Stack	4
7	Queue	8
Total		30

Sr. No.	Assignment Name	No of Practical's
1	Node.js web server, modules & npm	7
2	File system	6
3	Events in node.js	8
4	Node.js with database	9
Total		30

Subject Code: BBA24103

Subject: Computer Networks (2 Credit Course)

Total Lectures = 30

Course 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.

Course Outcomes:-

1. Student will gain familiarity with common networking & Application Protocols.
2. Student will understand fundamental concepts in Routing, Addressing & working of Transport Protocol.

Unit	Topic	No. of Lectures
1	Computer Network Basics 1.1 Basics of Computer Network: Definition , Goals ,Applications, Network Hardware – 1) Broadcast, 2) Point to Point, Components of Data Communication 1.2 Network Topologies, Types and Communication : Mesh , Star, Bus,Ring , LAN, MAN, WAN, Internetwork, Wireless Network, Simplex, Half Duplex, Full Duplex 1.3 Server Based LANs & Peer-to-Peer LANs 1.4 Protocols and Standards 1.5 Network Software :Protocol Hierarchies, Layers, Peers, Interfaces, Design Issues of the Layers, Connection Oriented and Connectionless Service	8
2	Network Models 2.1 OSI Reference Model : Functions of each Layer, Working of Physical layer and Transmission layer. TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Model 2.2 TCP/IP Protocol Suite 2.3 Addressing 2.4.1Physical Adresses 2.3.2 Logical Addresses 2.3.3 Port Addresses, 2.3.4 Specific Addresses 2.4 IP Addressing 2.5.1 Classfull Addressing 2.5.2 Classless Addressing	8

3	Transmission Media 3.1 Introduction, Types of Transmission Media 3.2 Guided Media: 3.2.1 Twisted Pair Cable- Physical Structure, Categories, Connectors & Applications 3.2.2 Coaxial Cable – Physical Structure, Standards, Connectors & Applications 3.2.3 Fiber Optic Cable- Physical Structure, Propagation Modes, Connectors & Applications 3.3 Unguided Media: Electromagnetic Spectrum for Wireless Communication 3.3.2 Propagation Modes Ground, Sky, Line-of-Sight 3.3.3 Wireless Transmission: Radio Waves, Microwaves, Infrared	8
4	Wired, Wireless LAN and Network devices 4.1 Introduction to IEEE Standards 4.2 Wireless LAN 4.2.1 IEEE 802.11 Architecture 4.2.2 Bluetooth Architecture (Piconet, Scatternet) 4.3 Network devices 4.3.1 Active and Passive Hubs 4.3.2 Repeaters 4.3.2 Bridges- Types of Bridges 4.3.4 Switches , Routers and Gateways	4
5	Basics Network Security 5.1 Definition of cryptography 5.2 Encryption, decryption 5.3 Public Keys, Private Keys, Symmetric and Asymmetric Keys	2
Total No. of lectures		30

Reference Books:

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

Subject Code:

Subject:- Operating System (2 Credit Course)

Total Lectures = 30

Course 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

Course Outcomes:-

- Student will describe, contrast and compare differing structures for operating System
- Student will understand different operating system structures and operations

Unit	Topic	No. of Lectures
1	Operating System and Process 1.1 What is operating system 1.2 Computer system architecture 1.3 Types of OS 1.4 Virtual Machines – Introduction, Benefits 1.5 User operating system Interface 1.6 System Calls– 1.6.1 Process or job control 1.6.2 Device Management 1.6.3 File Management 1.6.4 System Program 1.7 Process Concept – 1.7.1 The process 1.7.2 Process states 1.7.3 Process control block 1.8 Process Scheduling – 1.8.1 Scheduling queues 1.8.2 Schedulers 1.8.3 Context Switch	9

2	CPU(Process) Scheduling 2.1 What is scheduling 2.2 Scheduling Concepts – <ul style="list-style-type: none"> - CPU- I/O Burst Cycle - CPU Scheduler - Preemptive and Non-preemptive scheduling - Dispatcher 2.3 Scheduling criteria 2.4 Scheduling Algorithms – <ul style="list-style-type: none"> - FCFS - SJF (Preemptive& non-preemptive) - Priority Scheduling (Preemptive& Non- preemptive) - Round Robin Scheduling <ul style="list-style-type: none"> - Multilevel Queues Multilevel Feedback queues 2.5- Algorithm evaluation	7
3	Deadlock 3.1 Introduction 3.2 Deadlock Characterization 3.3 Necessary Condition 3.4 Deadlock Handling Technique– <ul style="list-style-type: none"> - Deadlock Prevention - Deadlock Avoidance – - Safe State - Resource allocation graph algorithm - Introduction Bankers algorithm - Process Termination <ul style="list-style-type: none"> Resource Preemption 	8
4	Mobile Operating Systems 4.1 Introduction 4.2 Features <ul style="list-style-type: none"> - Special Constraints and Requirements of Mobile Operating System - Special Service Requirements - ARM & Intel architectures – Power management - Mobile OS architectures – Underlying OS, kernel structure & native --- level programming, Runtime issues, Approaches to power management - Commercial Mobile Operating Systems - Windows Mobile, iPhone OS (iOS), Android - A Comparative Study of Mobile Operating Systems (Palm OS, Android, Symbian OS, Blackberry OS, Apple iOS) 	8
Total No. of lectures		30

Reference Books:-

1. Operating System Concepts - Silberchatz, Galvin, Gagne (8th Edition).
2. Operating Systems : Principles and Design – Pabitra Pal Choudhary(PHI Learning Private Limited)
3. Source wikipedia, Mobile operating systems, General books, LLC,2010
4. Operating System Concepts, Avi Silberschatz, Peter Galvin, Greg Gagne, Student Edition, Wiley Asia

Subject Code: BBA23605

Subject: Innovative Application Design (02 credit Course)

Course Objective :-

- To gain project management skill.
- To develop skill at conveying activities and achievements.

Course Outcome :-

- Student will get hands on experience in specific computer language.
- Student will get exposure to solve various real time problems in society.

Guidelines:

- Students should work in a team of maximum 2 students.
- Students can choose a project topic without any restriction on technology or domain.
- The student group will work independently throughout the project work including: problem identification, information searching, literature study, design and analysis, implementation, testing, and the final reporting.
- Project guide must conduct project presentations (minimum 4) to monitor the progress of the project groups.
- At the end of the project, the group should prepare a report which should conform to international academic standards. The report should follow the style in academic journals and books, with clear elements such as: abstract, background, aim, design and implementation, testing, conclusion and full references, Tables and figures should be numbered and referenced to in the report.
- The final project presentation with demonstration (UE) will be evaluated by the project guide (appointed by the college) and one external examiner (appointed by the University).

Evaluation guidelines:

CIE (20 marks)			ESE (30 marks)		
First presentation	Second presentation	Documentation	Project Logic/Presentation	Documentation	Viva
5	5	10	10	10	10

Recommended Documentation contents:

Abstract

Introduction

- motivation
- problem statement
- purpose/objective and goals
- literature survey
- project scope and limitations

System analysis

- Existing systems
- scope and limitations of existing systems
- project perspective, features
- stakeholders
- Requirement analysis - Functional requirements, performance requirements, security requirements etc.

System Design

- Design constraints
- System Model: DFD
- Data Model
- User interfaces

Implementation details

- Software/hardware specifications

Outputs and Reports Testing

Test Plan, Black Box Testing or Data Validation Test Cases, White Box Testing or Functional Validation Test cases and results

Conclusion and Recommendations

Future Scope

Bibliography and References