PSG College of Arts & Science

An Epitome of Quality Learning

B.Voc.
NETWORKING & MOBILE APPLICATION

2019 - 2022

PSG College of Arts & Science

Coimbatore - 641014

DEPARTMENT OF COMPUTER SCIENCE

B.Voc (Networking & Mobile Application Development)

VISION

To provide adequate Networking and Mobile Application Development skills requiredthat would incorporate specific job roles along with broad based general education.

MISSION

To ensure the learners have adequate skills, make them work-ready and enhance the employability of the graduate students.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: Demonstrate ability to adapt to a rapidly changing environment by having learned and applied new skills and new competencies**.**

PEO 2: Acquire the spirit of compassion, kinship and commitment forNational Harmony.

PEO 3: Progressively adopt and learn continuously through ICT modules.

PEO 4: Possess awareness and skills for lifelong learning and career development.

PEO 5: Incorporates the requirements of industries in a flexible manner which develops holistic and well – groomed graduates thus meeting the emerging needs of the Industry.

PROGRAMME OUTCOMES

PO 1: Become knowledgeable in the subject of Computer Applications and applythe principles of the same to the needs of the Employer / Institution/own Business or Enterprise.

PO 2: Gain Analytical skills in the field/area of Computer Applications.

PO 3: Understand and appreciate professional ethics, community living and Nation Building Initiatives.

PO 4: Acquire the knowledge of the latest networking and mobile technologies and future trends.

PO 5: Synthesize principles and theories of Networking and Mobile Applications to different computing paradigms.

PO 6: Develop professional skills that prepare the students for employment and for life-long learning in specific areas of Networking, Mobile Applications and related fields.

PO 7: Bridge the potential skill gap identified between the Institution and Industry.

PO 8: Provide vertical mobility to students

PROGRAMME SPECIFIC OUTCOME

PSO 1: Apply the knowledge of Networking and Mobile Application Development in the domain of Banking, Insurance, Health, Robotics, Environment and Biology

PSO 2: Solve the complex problems in the field of Networking and Mobile Application Development with anunderstanding of the societal, legal and cultural impacts of the solution.

PSO 3: Identify core networking and mobile application development concepts and the roles they serve; and given requirements and constraints, design an IT infrastructure including devices, mobile applications, topologies, protocols, systems software, management and security.

PSO 4: Form a part of member in a team with right attitudes.

B.Voc (Networking & Mobile Application Development)

SCHEME OF EXAMINATIONS

(For students admitted in June 2019 & onwards)

Code No.	Subject	Exam Duration (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
First Semester						
	Part –I					
18LAU01	Tamil-I/Hindi-I/French-I	3	25	75	100	3(G)
	Part –II					
18EU01	Communicative English-I Interpersonal Communication	3	25	75	100	3(G)
	Part –III					
19NMB01	**Core Course :** C Programming	3	25	75	100	**4(S)**
19NMB02	**Core Course :** Operating System Concepts	3	25	75	100	**4(S)**
19NMB03	**Interdisciplinary Course:** Statistical Data Analytics **(ST)**	3	25	75	100	6(G)
19NMB04	**Core Course :** Lab-I (Linux and System Assembly Lab)	3	40	60	100	**3(S)**
19NMB05	**Core Course :** Lab-II (C Programming Lab)	3	40	60	100	**3(S)**
19NMB06	**Core Course :** Lab-III (Multimedia Lab)	3	40	60	100	**2(S)**
19NMB07	Lab-IV (Communication Skills-I)	-	100	-	100	**2(S)**
Second Semester						**Credits: 12 G + 18 S**
	Part –I					
18LAU02	Tamil-II/Hindi-II/French-II	3	25	75	100	3(G)
	Part –II					
18EU02	Communicative English-II Interpersonal Communication	3	25	75	100	3(G)
	Part –III					
19NMB08	**Core Course :** Object Oriented Programming using Java	3	25	75	100	**4(S)**
19NMB09	**Core Course :** Data Communication and Networking	3	25	75	100	**4(S)**
19NMB10	**Core Course:** Data Structures	3	25	75	100	**3(S)**
19NMB11	**Interdisciplinary Course:** Mathematical Structures **(MA)**	3	25	75	100	4(G)
19NMB12	**Core Course :** Lab-V (Java Programming Lab)	3	40	60	100	**2(S)**
19NMB13	**Core Course :**Lab-VI (Network Programming Lab)	3	40	60	100	**2(S)**
19NMB14	**Core Course :**Lab-VII (Data Structures Lab)	3	40	60	100	**2(S)**

19NMB15	Lab-VIII (Communication Skills-II)	-	100	-	100	**1(S)**
	Part –IV					
18AECU01	**Ability Enhancement Compulsory Course– I**:Value Education	-	100	-	100	2(G)

Credits: 12 G + 18 S

 # Student should undergo a Basic Network training for 10 days in College Computer labs for understanding Installation & basic networking.

Code No.	Subject	Exam Duration (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
Third Semester						
	Part –III					
19NMB16	**Core Course :** Database Management Systems	3	25	75	100	3(G)
19NMB17	**Interdisciplinary Course:**E-Commerce & E-Business	3	25	75	100	4(G)
19NMB18	**Core Course :** Wireless Networking	3	25	75	100	**4(S)**
19NMB19	**Core Course :** Cloud Computing	3	25	75	100	3(G)
19NMB20	**Core Course :** Java Server Programming	3	25	75	100	**4(S)**
19NMB21	**Core Course :** Lab IX (RDBMS and SQLite Lab)	3	40	60	100	**3(S)**
19NMB22	**Core Course :** Lab-X (UI Design Lab)	3	40	60	100	**3(S)**
19NMB23	**Core Course :** Lab- XI (Java Server Programming Lab)	3	40	60	100	**4(S)**
	Part –IV					
18AECU02	**Ability Enhancement Compulsory Course –II** Environmental Studies	-	100	-	100	2(G)
	# Industrial Training to be carried out for 10 days during vacation					
	Fourth Semester			**Credits: 12 G + 18 S**		
	Part –III					
19NMB24	**Core Course :** Python Programming	3	25	75	100	**4(S)**
19NMB25	**Core Course :** Mobile Application Development using Android	-	100	-	100	**4(S)**
19NMB26	**Core Course :** C# and .Net Programming	3	25	75	100	4(G)
19NMB27	**Core Course :** Embedded System	3	25	75	100	3(G)
19NMB28	**Interdisciplinary Course:** Entrepreneurship Development	3	25	75	100	3(G)
19NMB29	**Core Course :** LabXII- (Python Programming Lab)	3	40	60	100	**3(S)**

19NMB30	**Core Course :** LabXIII – (Mobile Application Development using Android Lab)	3	40	60	100	**3(S)**
19NMB31	**Core Course :** Lab XIV – (C# and .Net Lab)	3	40	60	100	**3(S)**
19NMB32	**Core Course :** Industrial Training Presentation	-	100	-	100	**1(S)**
	Part –IV					
18SECU01	**Skill Enhancement Course – I** Information Security	-	100	-	100	2(G)

Credits: 12 G + 18 S

***Minor Project to be carried out in vacation. The review and viva voce examination will be conducted in the next semester.**

Code No.	Subject	Exam Duration (Hrs)	Max. Marks			Credit Points
			CA	CE	Total	
Fifth Semester						
	Part III					
19NMB33	**Core Course :** Routing and Switching	-	100	-	100	**4(S)**
19NMB34	**Core Course :** Web Technology	3	25	75	100	4(G)
19NMB35	**Core Course :**Privacy and Security	3	25	75	100	**4(S)**
19NMB36A/ 19NMB36B	**Discipline Specific ElectiveCourse I** – Distributed Computing / Data Mining	3	25	75	100	4(G)
19NMB37	**Core Course :** Lab -XV(Java Web Services lab)	3	40	60	100	**4(S)**
19NMB38	**Core Course :** Lab -XVI (Privacy and Security Lab)	3	40	60	100	**4(S)**
19NMB39	Minor Project	-	40	60	100	**2(S)**
	Part IV					
18GECEDC	**Generic Elective Course** – EDC	-	100	-	100	2(G)
18SECU02	**Skill Enhancement Course-II** Online Test - [General Awareness]	11/2	-	100	100	2(G)
Sixth Semester						**Credits: 12 G + 18 S**
	Part III					
19NMB40	**Core Course :** Free and Open Source Software	3	25	75	100	5(G)

19NMB41	**Core Course :** Network Components	3	25	75	100	**5(S)**
19NMB42	**Core Course :** iOS Programming	3	25	75	100	4(G)
19NMB43A/ 19NMB43B	**Discipline Specific ElectiveCourse –II** Cyber Forensics / Social Networking	3	25	75	100	**4(S)**
19NMB44	**Core Course :**Lab - XVII (Network Components Lab)	3	40	60	100	3(G)
19NMB45	**Core Course :** Lab - XVIII(iOS Programming Lab)	3	40	60	100	**3(S)**
19NMB46	**Core Course :**Major Project Work	-	80	120	200	**6(S)**

Credits : 12 G + 18 S

 # weekly 6 hours student should go to an Industry for a major project work

S.No	Part V	No. of Papers	Credit Points	Semester No.
1	**NCCC-Non CGPA Credit Course:(a)NCC/NSS/Sports/Dept. Activity-** Extension Activity [EA]	-	2	I to VI
2	**NCCC- Non CGPA Credit Course-(b)** Career Oriented Programme (Add-on Course) / Women's Studies / Extra Paper / Certificate or Diploma course in Yoga for Youth Empowerment	-	2	I to VI
3	**NCCC- Non CGPA Credit Course-(c)** Anyone **on-line course –MOOC's subjects***	1	4	I to VI
	TOTAL CREDITS		**188**	

Compulsory Components to be completed by the students		
S.No	**Component**	**To be Completed during the semester**
1	Placement Training	IV
2	Any two of the Certificate Courses offered by the Department / CCNA Certification / any ONE recognized certificate course	I – V

Course Code & Title	19NMB01 C PROGRAMMING		
Class	I – B.Voc (Networking & Mobile Application Development)	Semester I	Total Hrs: 60
Course Objectives	The Course aims • To inculcate programming skills and the fundamentals of C Language. • To impart the knowledge about the pointers, arrays, control statements and I/O Statements. • To study the advantage of user defined functions and program structure. • To understand the file types and file operations.		

SYLLABUS

UNIT	Content	No. of Hours
I	**Introduction:** The C Character Set – Identifiers and Keywords. Data Types – Constants – Tokens - Variables and Arrays – Declarations – Expressions – Statements – Symbolic Constants. **Operators and expressions:** Arithmetic Operators – Unary Operators – Relational and Logical Operators – Assignment Operators – The Conditional Operator – Library Functions.	12
II	**Input and output statements:** Single Character Input- getchar Function– Single Character Output – putchar Function – Entering Input Data- scanf Function – Writing Output Data – printf Function– Gets and Puts Function – Interactive Programming. **Control statement:** If statement – If else. **Looping:** For – While – do While – nested looping	12
III	**Functions:** Defining a Function – Accessing a Function – Function Prototypes – Passing Arguments to a Function – Recursion. **Program structure:** Storage Classes – Atomic Variables – Global Variables- Static Variables. **Arrays:** Defining an Array –Processing an array - Passing Arrays to Functions – Multidimensional Arrays.	12
IV	**Strings:** Defining a String – NULL Character – Initialization of Strings – Reading and Writing a String – Processing a String – Searching and Sorting of Strings. **Pointers:** Pointer Declarations – Passing Pointers to a Function – Dynamic Memory Allocation and Array of Pointers. **Structures and unions:** Definition of Structures – Processing a structure – Structure within structure User- Defined Data Types – Structures and Pointers – Passing Structures to Functions – Unions.	12
V	**File handling:** Opening and Closing a File – Reading and Writing a Data File – Processing a Data File – Unformatted Data Files - Concepts of Binary Files. **Low level programming:** Register Variables – Bitwise Operations – Bit Fields. **Additional features of C:** Enumerations – Command Line Parameters.	12

References	**Text Book:** **1.** Byron Gottfried**,** "Programming with C", McGraw Hill Education (India) Pvt Ltd., Third Edition, 2013. **Reference Books:** **1.** YashavantKanetkar "Let us C", BPB Publications, 9th Revised & Updated edition, Tata McGraw Hill, 2013. **2.** Venugopal K.R, Sudeep R.P, "Programming with C", Tata McGraw Hill, 2000.	
Course Outcomes	**On completion of the course, student should be able to :** **CO1**: Read, understand and trace the execution of program written in C Language. **CO2**: Implement program with pointer, array, structures and files. **CO3**: Choose the data representation format based on the requirement of the Problem. **CO4**: Analyze and construct files and manipulate them.	

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CAS
Since - 1947

Course Code & Title	19NMB02 OPERATING SYSTEM CONCEPTS		
Class	I – B.Voc(Networking & Mobile Application Development)	Semester I	Total Hrs: 60
Course Objectives	The Course aims • To understand the basic concepts and functions of operating systems. • To understand the concept of Deadlocks. • To analyze various memory management schemes. • To be familiar with I/O management and File systems.		

SYLLABUS

UNIT	Content	No. of Hours
I	**OPERATING SYSTEM OVERVIEW:** Operating System Objectives and Functions –The Evolution of Operating System. **PROCESS DESCRIPTION AND CONTROL:** What is Process – Process States – Process Description – Process Control.	12
II	**CONCURRENCY: DEADLOCK AND STARVATION:** Principles Of Deadlock – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – An Integrated Deadlock Strategy.	12
III	**MEMORY MANAGEMENT:** Memory Management Requirements – Memory Partitioning – Paging – Segmentation – Security Issues.	12
IV	**I/O MANAGEMENT AND DISK SCHEDULING:** I/O Devices – Organization of the I/O Function – I/O Buffering – Disk scheduling – RAID – Disk Cache.	12
V	**FILE MANAGEMENT:** Overview – File Organization and Access – B-Trees – File Directories – File Sharing – Record Blocking – Secondary Storage Management – File System Security.	12
References	**TEXT BOOK:** 1. William Stallings, Operating Systems, Pearson Education Inc., Seventh Edition, 2014. **REFERENCE BOOK:** **1.** Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley and Sons Inc., Ninth Edition, 2012..	
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Assess the requirement for process control by the OS. **CO2:** Understand Deadlock, Deadlock prevention and avoidance algorithms. **CO3:** Compare and contrast various memory management schemes. **CO4:** Analyze the Performance issues involved in magnetic disk access. **CO5:** Understand the functionality of file systems.	

Course Code & Title	19NMB03 STATISTICAL DATA ANALYTICS		
Class	I B.Voc Networking and Mobile Application Development	Semester	I

Course Objectives:

The Course aims to

- Provide students with the foundation of Statistical analysis mostly used in data analytics.
- Enable students for using statistical techniques and methods for grouping, tabular and graphical display, analysis and interpretation of statistical data.
- Provide understanding on statistical concepts which includes measures of location, measure of variation and their relative measures.
- Understand the relationship between the variables using correlation and regression and also to make predictions.
- Use theorems and laws of probability and apply the concepts of probability distributions to business related problems.
- Develop hypothesis testing methodology for accepting and rejecting null hypothesis about population parameters.

SYLLABUS

UNIT	CONTENT	No.of Hours
I	Introduction to Statistics – Uses of Statistics – Qualitative and Quantitative data. Presentation Techniques – Diagrams and Graphs. Measures of Central Tendency: Mean, Median, and Mode – Simple problems. Measures of Dispersion: Range, Standard deviation and their relative measures – Simple Problems.	14
II	Correlation- Scatter diagram method - Karl Pearson's co-efficient of correlation – Spearman's Rank co-efficient of correlation - Simple Problems. Regression Analysis: Definition – Uses - regression lines- regression equations- properties (statement only) - Simple Problems.	14
III	Time series – Definition – Application – Methods of measuring trend by Moving averages and least square – Methods of measuring seasonal variations - Simple average and Ratio-to-moving average methods . Concept of Probability – Addition and Multiplication theorems (without proof) – Definition of Conditional Probability – Baye's theorem (without proof) – Binomial, Poisson and Normal distributions – their properties – Simple problems.	18
IV	Test of significance: General procedure for testing the significance – Large sample tests - single proportion, two proportions, single mean, and two means. Small sample tests: t-test – single mean and two means (Independent and dependent samples) - Simple problems.	15
V	F-test for testing two variances – ANOVA – one-way classification. Chi-square test: Definition – uses – applications of chi square test - Pearson's test of goodness of fit. Contingency table – Testing the independence of attributes – Simple problems.	14

Note: 80% Problems and 20% Theory.

References:

Text Books:

1. "Schaum's Outline of Statistics" by Murray J. Spiegel and Larry J. Stephens, McGraw-Hill Education; 5 edition, 2014.
2. "Statistical methods" by SP Gupta, Sultan Chand & Sons New Delhi 2014.
3. "Business Statistics" by P.R. Vittal, Margham Publications, 2001.

Reference Books:

1. "Statistical Methods of Analysis", by Chin Long Chiang, Amazon Asia-Pacific Holdings Private Limited, 2003.
2. "Fundamentals of Mathematical Statistics", by Veerarajan T, Yesdee Publications, 2017.
3. "Statistics for Management", by T N Srivastava & Shailaja Rego - McGraw-Hill Companies, 2010.

Course Outcomes:

On completion of the course, students will be able to:

- Explain the logic and appropriate applications of statistical analyses
- Explain basic statistical concepts such as statistical series, tabular and graphical representation of data, measures of central tendency and dispersion.
- Predict relevant relationship between variables using correlation and regression analysis.
- Appreciate the use of probability concepts, discrete and continuous probability distributions and apply them in business related problems.
- Apply suitable test of significance for making decisions in hypothesis testing.
- Based on the acquired knowledge to interpret the meaning of the calculated statistical indicators.

Since - 1947

Course Code & Title	19NMB04 LAB -I (LINUX AND SYSTEM ASSEMBLY LAB)	
Class	I – B.Voc(Networking & Mobile Application Development)	Semester – I
Course Objectives	The Course aims • To develop basic skills in Linux commands, shell scripting and system assembly. • To create and manage files and directories. • To learn fundamentals of shell scripting and shell programming.	

SYLLABUS

Content
1. Linux Command to manipulate directories. 2. Linux commands to work with files. 3. Linux commands to work with hidden files. 4. Linux commands to find all empty files and directories. 5. a) Linux commands to extract information from files. b) Linux command to list the status of running process along with process id. 6. Write a shell script that accept a file name starting and ending line numbers as arguments and display all the lines between given line number. 7. Write a shell script that delete all lines containing a specified word. 8. Write a shell script that displays a list of all the files in the current directory. 9. Write a shell script that computes the gross salary of a employee according to the following a) if basic salary is <1500 then HRA 10% of the basic and DA =90% of the basic. b) if basic salary is >=1500 then HRA 500 and DA =98% of the basic . The basic salary is entered interactively through the key board. 10. Write a shell script that receives any number of file names as arguments and checks if every argument supplied is a file or a directory and reports accordingly, whenever the argument is a file or directory. 11. Write a shell script to implement menu driven program to display list of users who are currently working in the system, copying files (cp command), rename a file, list of files in the directory and quit option.(Hint: use case structure) 12. Implement an interactive and effective student progress monitoring system 13. a. Study various cards used in system viz. display card, LAN Card etc., b. Remove, Study and Replace hard disk, CD Drive. 14. a. Observe various cables and connectors used in networking. b. Trouble shoot the components of computer like printer, monitor, drives and memory etc., 15. Assemble a PC.
Course Outcomes	After successful completion of this course, the students should be able to **CO1:** Design, develop and host a user friendly website. **CO2:**Implement interactive webpage using HTML and CSS. **CO3:**Effectively install and format OS.

Course Code & Title	19NMB05 LAB – II (C PROGRAMMING LAB)	
Class	I –B.Voc(Networking & Mobile Application Development)	Semester - I
Course Objectives	The Course aims • To Introduce to the field of programming using C language. • To enhance their analyzing and problem solving skills in writing program. • To give hands-on experience with the concepts. • To make the students program effectively with arrays, pointers, structures and files.	

SYLLABUS

Content
1. Students Mark Sheet preparation. **2.** a) Program to generate Fibonacci series. b) Program to find the number of vowels, consonants, digits and white spaces in a given string. **3.** Convert decimal to binary and binary to decimal using menu. **4.** a) Write a C program to make simple Calculator using Switch Case. b) Reverse a string using recursion. (without using build-in function). **5.** Program to find the smallest and largest element in array & reverse an array element. **6.** Write a program that prompts the user to input the X-Y coordinate of a point in a Cartesian plan. The program should then output a message indicating whether the point is the origin, is located on the X-(or Y-) axis, or appears in a particular quadrant. For example: (0, 0) is the origin (4, 0) is on the X-axis (0,-3) is on the Y-axis (-2, 3) is in the second quadrant. For example: (0, 0) is the origin (4, 0) is on the X-axis (0,-3) is on the Y-axis (-2, 3) is in the second quadrant. **7.** Write a program to implement the concept of string functions. **8.** Write a C program to find Binary Addition and Binary Subtraction. **9.** Use a single-subscripted array to solve the following problem. A company pays its salespeople on a commission basis. For example, a salesperson who grosses $5000 in sales per week receives $200 plus 9 percent of $5000, for a total of $650. Determine how many of the sales people earned salaries in each of the following ranges a) 200-299 b) 300-399 c) 400-499 d) 500-599 e) 600-699 f) 700-799 g) 800-899 h) 900-999 i) 1000 and over. **10.** Write a C program to input an integer array and separate odd and even integer arrays. **11.** Find the Length of a string using Pointers. **12.** Prepare an Electricity Bill and mark sheet using Structure. **13.** Write a program in C to create and store information in a text file. **14.** Write a C program to compare the content of two files using command line argument. **15.** a)Find the sum of given numbers using Command line arguments. b) C program to Display its own source code using Macro.

Course Outcomes	**On completion of the course, student should be able to :** **CO1:** Write the structured programming using C Language. **CO2:** Choose the right data representations based on the requirements of the problem. **CO3:** Construct programs that demonstrate effective use of C features including arrays, structures, pointers and files **CO4:** Create programs for real time applications.

Course Code & Title	19NMB06 LAB - III(MULTIMEDIA LAB)	
Class	I – B.Voc(Networking & Mobile Application Development)	Semester – I
Course Objectives	The Course aims • To learn how to develop various animations using Flash and Photoshop. • To know, what are the various Tools in Flash and Photoshop used for designing in Multimedia. • To learn how to create Frames and Forms • To make students to develop applications using Multimedia.	

SYLLABUS

Content
1. Creating various Shapes and Drawings in Photoshop. 2. a) Image Editing b) Change color of an Object and Merging of Images. 3. Change a Shape to another shape 4. Draw Bird with various Flash Tools and make it to fly with key frame Animations 5. a) Smoothening of sharp Edges b) Inserting text on Images. 6. Animate a ball with a help of a Guide line Animation. (path Animation) 7. Filters and Layers. 8. Creating Button and Frames. 9. Create an Animation which represents a growing moon. 10. Create a 3D Rotation of a Box with the help of Shape Animation. 11. Draw a Fan with Blades with proper Animations. 12. Create Morphing between two Images in FLASH 13. Creation of a Login Form. 14. Import Pictures from Photoshop and Interlink them. 15. Implement a simple Game using Flash Script.

Course Outcomes	On completion of the course, students should be able to **CO1:** Understand and Apply various concepts related to Animation. **CO2:** Design diversified Animations using Flash and Photoshop. **CO3:** Implement Animations with Filters and Layers. **CO4:** Apply the concept of Morphing. **CO5:** Create a Game using Flash Script

Course Code & Title	19NMB08 OBJECT ORIENTED PROGRAMMING USING JAVA		
Class	I – B.VOC (Networking & Mobile Application Development)	Semester	Total Hours: 60
Course Objectives	The Course aims • To understand the Object Oriented Programming concept. • To work with files and handle exceptions. • To understand JDBC connectivity. • To develop interactive user interface using Java swing and Networking.		

SYLLABUS

UNIT	Content	No. of Hours
I	**AN OVERVIEW OF JAVA :**object-oriented programming - Lexical issues - Java class libraries **CLASSES** : Class Fundamentals – Declaring objects – Assigning object reference variables – methods – Constructors – this keyword – Garbage collection – finalize() method – A stack class. **STRING HANDLING :**The string constructors - String length - Special string operations - Character extraction - String comparison - Searching strings - Modifying a string - String buffer. **INHERITANCE :** Inheritance basis – Using super – Creating a multilevel hierarchy – When constructors are called – Method overriding – Dynamic method dispatch – Using abstract classes – Using final with Inheritance – The object class.	12
II	**PACKAGES & INTERFACES:** Packages, Access protection – Importing packages – Interfaces. **EXCEPTION HANDLING:** Exception handling fundamentals - Exception types - Uncaught exceptions - Using try and catch - Multiple catch clauses - Nested try statements - throw - throws - finally - Java's built in exceptions – Creating your own exception subclasses – Using exceptions. **MULTITHREADED PROGRAMMING:** The java threads model - thread priorities - Synchronization – Interthread communication –	12

	Suspending, Resuming and Stopping threads.	
III	**INPUT/OUTPUT**: Files - Stream Classes - The Byte streams - The character streams - Using stream I/O. **THE COLLECTIONS FRAMEWORK:** Collections Overview : The Collections Interfaces-The List Interface-The Set Interface – The Queue Interface. The Collection Classes: The ArrayList Class-The LinkedList Class-The TreeSet class- The Priority QueueClass-The EnumSet Class	**12**
IV	**APPLET CLASS –** Applet Basics – Applet Architecture – An Applet Skeleton – Simple Applet Display Methods – Requesting Repainting – Using the status window - The HTML Applet tag – Passing parameters to applets. **EVENT HANDLING –** The event handling mechanisms – The delegation event model – Event classes – Sources of events – Events listener interfaces – Using the delegation event model – Adapter classes – Inner classes.	**12**
V	**SWING –** JApplet – Icons and Labels – Text Fields – Buttons – Combo Boxes – Tabbed Panes – Tables. **NETWORKING:**Networking Basics-Socket Overview-Client/Server-Reserved Sockets-Proxy Servers-Internet Addressing	**12**
References	**TEXT BOOK:** 1. Herbert Schildt "The Complete Reference JAVA ™2", Mc-Graw Hill Limited, 8th Edition, 2011. (Unit I,II& IV,V) 2. Kogent Learning Solutions, "Java 6 Programming Black Book",Dreamtech Press 6th Edition. (Unit III) **REFERENCE BOOK:** 1. Patrick Naughton, Herbert Schildt, "Java 2: The Complete Reference", Mc Graw Hill Limited, 7th Edition.	
Course Out comes	**On completion of the course, students should be able to** **CO1:** Understand and design the solution to a problem using Object Oriented Programming Concept. **CO2:** Understand and implement the features of Java including exception handling, multithreading and file handling. **CO3:** Implement database connectivity using JDBC. **CO4:** Develop an effective API using swing and Java Networking.	

Course Code & Title	19NMB09 DATA COMMUNICATION AND NETWORKING		
Class	I – B.Voc(Networking & Mobile Application Development)	Semester -II	Total Hours: 60
Course Objectives	The Course aims ● To understand the basic concept of Networks and the seven layers of OSI model. ● To understand and configure basic network using guided and unguided media. ● To know about how computers and terminals actually communicate with each other. ● To learn TCP/IP, UDP and other Internet Protocols.		

SYLLABUS

UNIT	Content	No. of Hours
I	**DATA COMMUNICATIONS AND NETWORKS:** Data Communications - Networks - Internet - Protocols and Standards. **NETWORK MODELS:** Layered Tasks - OSI Model - Layers in the OSI Model - TCP/IP Protocol Suite – Addressing. **PHYSICAL LAYER AND MEDIA: DATA AND SIGNALS -** Analog and Digital -Periodic Analog Signals- Digital Signals-Transmission impairment-Data Rate Limits-Performance.	12
II	**DIGITAL TRANSMISSION:** Digital-to-Digital Conversion - Analog-to-Digital Conversion - Transmission Modes. **ANALOG TRANSMISSION:** Digital-to-Analog Conversion - Analog-to-Analog Conversion. **BANDWIDTH UTILIZATION:** Multiplexing. **TRANSMISSION MEDIA:** Guided Media - Unguided Media.	12
III	**DATA LINK LAYER:** Error Correction and Detection - Block Coding - Linear Block codes - Cyclic Codes - Checksum. **DATA LINK CONTROL:** Framing - Flow and Error Control - Protocols- Noiseless channels - Noisy channels - Point-to-Point Protocol. **MULTIPLE ACCESS:** Random Access Aloha - Controlled Access - Channelization. **WIRED LAN:** Ethernet - IEEE Standards - Standard Ethernet - Fast Ethernet - Gigabit Ethernet. **WIRELESS LAN:** IEEE 802.11 - Bluetooth	12

IV	**NETWORK LAYER: LOGICAL ADDRESSING -** IPv4 Addresses - IPv6 Addresses. **NETWORK LAYER: INTERNET PROTOCOL:** Internetworking - IPv4 -IPv6 - Transition from IPv4 to IPv6. **NETWORK LAYER: ADDRESS MAPPING, ERROR REPORTING AND MULTICASTING:** Address Mapping - ICMP - IGMP - ICMPv6. **DELIVERY,FORWARDING AND ROUTING:**Delivery-Forwarding-Unicast Routing Protocols-Multicast Routing Protocols.	**12**
V	**TRANSPORT LAYER:** Process-to-Process Delivery - UDP - TCP . **APPLICATION LAYER: DNS -** Remote Logging - Electronic Mail - File Transfer -HTTP - SNMP **Remote Logging, Electronic Mail, and File Transfer:** Remote Logging – Electronic Mail – File Transfer. **WWW and HTTP:** Architecture - Web Documents – HTTP.	**12**
References	**Text Books:** 1**.** Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw Hill Education Private Limited, Fifth Edition. **Reference Books:** 1.Andrew S. Tanenbaum , "Computer Networks", PHI, Fourth Edition.. 2. William Stallings, "Data and Computer Communications", Pearson, Tenth Edition.	
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Understand the categories of networks. **CO2**: Able to differentiate Analog and Digital Data and signals. **CO3:** Able to compare and contrast the data transmission media. **CO4:** Analyze the requirement of error detection and correction techniques. **CO5:** Analyze the features and operations of various application layer protocols such as HTTP, DNS and SNMP.	

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Course Code & Title	19NMB10 DATA STRUCTURES		
Class	I – B.Voc(Networking & Mobile Application Development)	Semester : II	Hours : 45
Course Objectives	• To understand the Basic Techniques of Algorithm analysis. • To learn how the choice of data structures, algorithm and design methods impacts the performance of programs. • To learn efficient searching and sorting techniques. • To understand the concepts of data structures such as Stacks, Queues and Linked list. • To know how to solve problems using data structures such as binary trees, heaps, binary search trees and writing programs for these solutions.		

SYLLABUS

UNIT	Content	No. of Hours
I	**Basic Terminology:** Data structure, Time and space complexity – Array – Structures – Pointers – Matrices - Sparse matrices - Application – String processing.	9
II	**Sorting:** Bubble sort - Insertion sort - Selection sort - Merge sort - Radix sort - Quick sort - Time and Space complexity. **Searching:** Binary search - Sequential search - Hashing.	9
III	**Linked List:** Linked list - Dynamic memory allocation – Representation - Insertion, deletion and searching - Traversing in a list - Doubly linked list.	9
IV	**Stack:** Stack – Linked stack – Application – Expression - Infix-Prefix-Postfix Conversion & Evaluation - Recursion. **Queue :** Queue - Linked queue - Circular queue – Dequeue - Priority queue - Application.	9
V	**Trees:** Binary trees-Traversal, BST-traversing, Insertion and deletion of nodes - AVL Search Trees introduction – Application of all trees - Heap sort.	9
References	**Text Books:** **1**. Seymour Lipschutz – Schaum Series: "Theory and Problems of Data Structures", TMH, New Delhi, special edition 2013. **Reference Books:** 1.E.Balagurusamy-"Data Structures Using C"TMH,New Delhi,2013. 2.A.K.Sharma, "Data structures using C", Second Edition, Pearson Education,2013.	

Course Outcomes	**CO1:** Apply the knowledge of data structure concepts and the various algorithms while designing and developing software. **CO2**:Analyze the complexity and correctness of the new algorithms. **CO3:** Choose the appropriate data structure and algorithm design method for a specified application. **CO4:**. Apply and implement learned algorithm design techniques and data structures to solve problems. **CO5:** Apply algorithmic problems including Tree traversals,

Course Code & Title	**19NMB11** **Mathematical Structures**		
Class	B.Voc. Networking & Mobile Application Development	**Semester**	II
Course Objectives	The Course aims • to introduce the ideas about matrices, • to learn about the concept of interpolation, • to introduce Numerical techniques of differentiation and integration, • to know about network construction using CPM and PERT, • to introduce the basic concepts of queuing theory.		

SYLLABUS

UNIT	Content	No. of Hours
I	**Matrices:** Rank of matrices – Consistency and inconsistency – Inverse of a matrix – Eigen values and Eigen vectors-Cayley – Hamilton theorem.	**9 hours**
II	**Numerical methods:** Difference table – Interpolation – Newton's Forward Interpolation formula – Newton's Backward Interpolation Formula – Construction of polynomials.	**9 hours**
III	**Numerical Differentiation:** Newton's Forward and Newton's Backward formula to compute the Derivatives. **Numerical Integration:** The Trapezoidal rule – Simpson's $1/3^{rd}$ and $3/8^{th}$ rule	**10 hours**
IV	**Scheduling by PERT and CPM**: Network Construction – Critical path Method – Project evaluation and Review Technique.	**10 hours**
V	**Queueing Theory:** Introduction – Queueing System – Elements of a Queueing System – Characteristics of a Queueing System – Deterministic queueing system – Classification of Queueing Models – Definition of Transient and Steady States – Poisson Queueing Systems – (M/M/1):(∞/FIFO) – (M/M/1):(∞/SIRO) – (M/M/1):(N/FIFO)Models (Simple Problems).	**10 hours**
References	**Text Books:** 1. S. Narayanan and T.K. ManickavachagamPillai,"**Ancillary Mathematics Volume-I"**, S. Viswanathan (Printers & Publishers) Pvt Ltd, Reprint 2015 **Unit – I: Chapter III (Sections 3.2 to 3.4)** 2. Dr. M.K. Venkataraman "**Numerical methods in Science and Engineering**" The National Publishing Company , Reprint July 2013. **Unit – II:Chapter VI(Sections : 6.1 to 6.5)(Problems only)** **Unit – III: Chapter IX((Sections: 9.1 to 9.3, 9.8, 9.10)(Problems only)** 3. Kanti swarup, P.K.Gupta,Manmohan, **"Operations Research'',** Sultan S.Chand &sons Educational Publishers, New Delhi. Reprint 2016. **Unit – IV: Sections 25.1 to 25.8** **Unit – V: Sections 21.1 to 21.5, 21.7 to 21.9.**	

Course Outcomes	**On completion of the course, students should be able to** **CO1:** find Rank of a matrix and Solve simultaneous linear algebraic equation, **CO2:** predict the behavior of the functions and at particular instances **CO3:** apply various methods of numerical Differentiation and Integration, when the behavior of the exact function is not known, **CO4**: analyse network construction for real life problems, **CO5**: expose the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

Course Code & Title	**19NMB12 LAB – V(JAVA PROGRAMMING LAB)**	
Class	**I – B.Voc(Networking & Mobile Application Development)**	**Semester - II**
Course Objectives	The Course aims • To implement programs in Java and to solve the problems. • To understand basic data types and control structures in Java. • To understand arrays, pointers, functions, packages, file handling and string handling in Java. • To make students to manage classes and objects in a variety of situations, using i/o, string, threads and net APIs.	

SYLLABUS

Content
1. Implement the following: a. Write a Java program to print the sum and product of digits of an Integer and reverse the Integer. b. Write a Java program to convert any number to character number format from 0 to 9(Ex:i/p:1,o/p:one) 2. Write a Java program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int). 3.Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed. 4. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average. 5. Write a program to calculate bonus for different departments using method overriding. 6. Write Java program for the following matrix operations: a. Addition of two diagonal elements of matrix b. Summation of two matrices c. Transpose of a matrix d. Input the elements of matrices from user. 7. Write a Java program that implements function overloading. 8. Write a Java to implementmultiple inheritance using interfaces. 9. Write a Program that reads on a file and display the information that whether the file exists or not, to display the information about the file and find the type of file whether readable, writable and the length of byte 10. Write a Java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.

11. Write a Java program to display the following graphics in an applet window.

a. Rectangles b. Circles c. Ellipses d. Arcs e. Polygons

12. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage() prints the information about the error occurring causes.

13. Write a program for the following string operations:

a. Compare two strings.

b. Concatenate two strings.

c. Compute length of a string.

14. Write a program to create multiple copies of object using java collection classes.

15. Write a program to implement mouse events.

Course Outcomes	**On completion of the course, students should be able to** **CO1:** Understand and Apply Object oriented features and Java concepts. **CO2:** Write diversified solutions using Java language. **CO3:** Implement programs with arrays, pointers, functions, file handling and string handling. **CO4:** Apply the concept of applet and implement exception handling. **CO5: A**ccess data from a database with java program.

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Course Code & Title	**19NMB13 LAB – VI (NETWORK PROGRAMMING LAB)**	
Class	**I – B.Voc(Networking & Mobile Application Development)**	**Semester-II**
Course Objectives	The course aims ● To get familiar with the basic network connection and administration commands. ● To analyze the traffic flow and the contents of protocol frames. ● To implement client-server socket programs. ● To learn about Error Correction and Detection algorithms. ● To execute online applications. ● To Design reliable servers using both TCP and UDP sockets.	

SYLLABUS

S.No	Content
1	Implement the following: a)Prepare different type of Network cables, cross-wired cable and straight through cable using crimping tool and punching tool. b)Testing LAN connection using tester. c)Server Installation.
2	Implement the following: a) Creation of active directory and Domain. b) Creation of user profile and group policy c) Classify IP addresses, Setup subnet & super net addresses in Network IPs.
3	Implement basic network commands and Privileged Mode commands.
4	Create a login banner to be displayed for a user prior to login to a device.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Design network and evaluate network administration commands. **CO2:** Analyze the packet contents of different protocols. **CO3:** Implement the socket programming for client server architecture. **CO4**: Analyze routing algorithm. **CO5:** Develop online applications.

Course Code & Title	19NMB14 LAB VII (DATA STRUCTURES LAB)	
Class	I – B.Voc(Networking & Mobile Application Development)	Semester - II
Course Objectives	• Develop skills to design and analyze simple linear and non linear data structures. • Strengthen the ability to identify and apply the suitable data structure for the given real world problem • Gain knowledge in practical applications of data structures • Have ability to write computer programs to solve specific problems.	

SYLLABUS

Content	
1a. Sort the employee names of a concern using bubble sort. b. Implement insertion sort technique in an array. 2. Sort an array using quick sort 3. Search an element in an array using binary search. 4. Sort an array using merge sort. 5. Demonstrate the selection sort results for each pass of an array element. 6. Implement the linked list operations and count the number of nodes. 7. Implement queue operations using linked list. 8. Solve tower of Hanoi problem using stack. 9. Stimulate infix to prefix conversion. 10. Find the Smallest and Largest Elements using BST traversal.	
Course Outcomes	**CO1:** Illustrate the behavior of data structures. **CO2:** Analyze and determine the appropriate data structure for a problem **CO3:** Apply the necessary algorithms to solve the problems

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Course Code & Title	19NMB16 DATABASE MANAGEMENT SYSTEMS		
Class	II B.Voc Networking and Mobile Application	Semester - III	Hours:36
Course Objectives	**This course aims** • To learn the basics about the Databases and their structures. • To learn Various Constraints that can be applied to Databases. • To understand Basics of Structured Query Language, Normalization and PL/SQL. • To learn Relational Databases, Cursor, Stored Functions, and Stored Procedures • To learn Basic concepts of Trigger.		

SYLLABUS

UNIT	CONTENT	No. of Hours
I	**INTRODUCTION:** Database system Applications -Purpose of Database Systems- View of Data- Database Languages -Database design- Database engine -Database and application Architecture- Database Users and Administrators. **RELATIONAL DATABASES:** Structure of Relational Databases - Database Schema -Key -Relational Query Languages – Relational Algebra.	7
II	**DATABASE DESIGN:** Overview of design process- The Entity-Relationship Model, Complex Attributes, Mapping Cardinalities, Primary Key-Removing Redundant Attributes in Entity Sets - Reducing E-R Diagrams to Relational Schemas. **RELATIONAL DATABASE DESIGN**: Features of Good Relational Designs - Decomposition Using Functional Dependencies- Normal Forms.	7
III	**INTERACTIVE SQL:** Invoking SQL * plus Data manipulation in Database Management Systems – Oracle Data Types – Two Dimension Matrix Creation, Insertion of data into tables, Updating the contents of a table – Deletion operations, The many faces of the Select command - Modifying the structure of the tables – Removing/Deleting/Dropping tables -Data constraints Computations in expression Logical operators - Range searching – Pattern matching - Oracle functions – Grouping data from tables in SQL - Manipulating dates in SQL Operators – Joins - Sub queries.	8
IV	**USING THE UNION, INTERSECT AND MINUS CLAUSE:** Indexes –Views –Sequences - Granting permissions - Revoking the permissions given - Creation of reports in SQL* plus.	8

	PL/SQL: Introduction - Execution Environment - PL/SQL syntax - Understand the PL/SQL structure- **ORACLE TRANSACTIONS**: Commit - Rollback Save point- Cursors.	
V	**STORED PROCEDURES:** Introduction -Creating Stored Procedures - An application using a Procedure Deleting a Stored Procedure. **STORED FUNCTIONS:** Introduction- Advantages of Functions - Creating a Stored Function - An application using a Function-Deleting a Stored Function. **DATABASE TRIGGERS:** Types of Triggers -Creating Triggers -Deleting Triggers.	**6**

References	**TEXT BOOKS:** 1. Silberschatz A, Korth H F, S.Sudarshan "Database System Concepts", McGrawHill Publishing Company, Seventh Edition, 2020 (Unit I & II) 2. Ivan BayRoss, "Commercial Application Development Using ORACLE Developer 2000", BPB Publication, New Delhi, 2007 (Unit III, IV & V) **REFERENCE BOOKS:** 1. Ramez Elmasri, Shamkant *B.*Navathe, "Fundamentals of Database Systems", Pearson Education, Fifth Edition, 2008. 2. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill Education, 2003.
Course Outcomes	**On completion of the course, students should be able to** **CO1**: Understand the terms related to database design and the objectives of data and information management. **CO2**: Understand the database development process and relational database management system. **CO3:** Design ER-models to represent simple database application scenarios. **CO4**: Attain a good practical understanding of the SQL, PL/SQL, Procedure, Function and Trigger. **CO5**: Able to develop structured query language (SQL) queries to create, read, update, and delete relational database data.

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Course Code	**19NMB17**		
Title	**Interdisciplinary Course: E-Commerce & E-Business**		
Programme	**B.Voc (Networking and Mobile Application)**	**Semester**	**III**
Course Objectives	**The Course aims to** • Understand the basics of e-Commerce and e-Business. • Outline the applications of EDI in business. • Comprehend the basics of e-Banking and classify the different Electronic Payment Mechanisms. • Understand the concepts of networks and network security. • List the various e-Security Issues		

SYLLABUS

UNIT	Content	No. of Hours
I	**Introduction** e-Commerce - Definition –e-Business and e-Commerce – e-Business Strategies - Force fueling e-Commerce – e-Commerce framework - e-Commerce Applications – Types of e-commerce –Advantages and Disadvantages.	8
II	**Electronic Data Interchange** Electronic Data Interchange (EDI) – EDI Applications in Business - Document Management – EDI Library - Interactive Marketing Process on the Internet – Consumer Oriented e-Commerce Applications- Mercantile Process Model: Consumer's perspective and Merchant's perspective. Email Marketing (Mailchimp) – Affiliate Marketing using Amazon.	10
III	**Networks and Network Security** Network: Types of Networks – Internet - Internet Service Provider (ISP) – Internet topology and its types (Concepts only) Middleware – Intranet – Extranet – Virtual Private Network. Network Security - Firewall – Types of Firewall – Cryptography - Digital Signature – Digital Certificates – Digital Envelope – Secure Socket Layer – Biometrics.	8
IV	**E-Banking and Electronic Payment System** Electronic Banking: Traditional Banking Vs E-Banking-Facets of E-Banking -E-Banking transactions - Models for E-banking-	10

	advantages of E-Banking-Constraints in E-Banking. Electronic payment Systems – E-cash, E- cheques, E-wallets, credit cards, smart cards and debit cards – Legal risks of e- payment system.	
V	**Mobile Computing and E-Security** Mobile Computing – Functions – Framework – Mobile Computing technologies – Wireless broadband (WIMAX) – Wireless spectrum – Wireless Application protocol – Wireless Delivery Technology and Switching Methods – Wireless technology – GSM , GPRS, CDMA, EDGE , UMTS. E-Security –Emerging Security Issues – Risks involved with e-Commerce – Protecting e-Commerce System – Common e-Commerce Security Tools – Client Server Network Security – Data and Message Security.	**12**
References	**Text Book** 1. Dr.Pandey U S, "*E.Commerce and M.Commerce Technologies"*, 2nd Ed., S.Chand & Company Pvt Ltd, New Delhi, 2014. 2. Ravi Kalakota, "*Frontiers of E-Commerce*", Pearson Education, New Delhi, 2013. **Reference Books** 1. Raja Raman, "*Essentials of E.Commerce*", PHI Learning Limited, New Delhi, 2010. 2. Zheng Qin, Yang Chang," *E.Commerce Strategy*", Zhezang University Press, Springer Publication, China, 2014	
Course Outcomes	On completion of the Course, students will be able to: • Apply the basic concepts of e-Commerce • Evaluate the EDI applications in business. • Compare the Electronic Payment Mechanisms. • Apply the networking concepts and prevent the networks. • Categorize the various e-Security Issues and its Management Systems.	

Course Code & Title	19NMB18 WIRELESS NETWORKING		
Class	II B.Voc Networking and Mobile Application	Semester - III	Hours:48
Course Objectives	**This course aims to** • Study the working principles of wireless LAN, MAN, WAN and its standards. • Understand the evolving wireless technologies and standards. • Understand various protocols and services. • Introduce the students to advanced network concepts, with emphasis on wireless technologies. • To build working knowledge on various telephone and satellite networks.		

SYLLABUS

UNIT	Content	No. of Hours
I	**Introduction:** Wireless comes of Age-The Cellular Revolution-The Global Cellular Network – Broadband - Future Trends. Communication Networks: LAN, MAN and WAN – Switching Techniques – Circuit Switching – Packet Switching – Asynchronous Transfer Mode. **Spread Spectrum:** The Concept of Spread Spectrum – Frequency Hopping Spread Spectrum – Direct Sequence Spread Spectrum – Code Division Multiple Access – Generation of Spreading Sequences.	10
II	**Satellite Communications:** Satellite Parameters and Configurations – Capacity Allocation – Frequency Division – Capacity Allocation – Time Division. **Cellular Wireless Networks:** Principles of Cellular Networks – First Generation Analog – Second Generation TDMA – Second Generation CDMA – Third Generation Systems.	10
III	**Cordless Systems and Wireless Local Loop:** Cordless Systems – Wireless Local Loop – WiMAX and IEEE 802.16 Broadband Wireless Access Standards. **Mobile IP and Wireless Access Protocol:** Mobile IP – Wireless Application Protocol.	9
IV	**Wireless LAN Technology:** Overview – Infrared LANs – Spread Spectrum LANs – Narrowband Microwave LANs. Wi-Fi and the IEEE 802.11. **Wireless LAN Standard:** IEEE 802 Protocol Architecture - IEEE 802.11 Architecture and services - IEEE 802.11 Medium Access Control.	10
V	**Wi-Fi and the IEEE 802.11 Wireless LAN Standard:** IEEE 802.11 Physical Layer – Other IEEE 802.11 Standards. **Bluetooth and IEEE 802.15:** Overview – Radio and Baseband Specification- Link Manager Protocol- Logical Link Control and Adaptation Protocol- IEEE 802.15 501.	9

References	**TEXT BOOK:** 1. William Stallings, "Wireless Communications & Networks", Second Edition, Prentice Hall 2005 **REFERENCE BOOKS:** 1. Michael Miller, "Wireless Network", Dorling Kindersley Publishers, First Edition, 2014. 2. Vijay K. Garg, "Wireless Communication & Networks" , Morgan Kaufmann Publishers (Imprint of Elsevier) 2009.	
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Explain latest wireless technologies and trends in the communication field. **CO2**: Demonstrate advanced knowledge of networking and wireless networking **CO3:** Compare different solutions for communications at each network layer **CO4:** Demonstrate understanding of protocols used in wireless communications **CO5:**Demonstrate knowledge of programming for wireless network communications	

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Course Code & Title	19NMB19 CLOUD COMPUTING		
Class	II B.Voc Networking and Mobile Application	Semester - III	Hours:36
Course Objectives	**This Course aims to** • Understand the concept of cloud computing. • Familiarize the evolution of cloud from the existing technologies. • Provide knowledge on the Virtualization in Cloud • Be familiar with the Security Issues and challenges in Cloud computing and Web Services in Cloud		

SYLLABUS

UNIT	Content	No. of Hours
I	**Cloud computing – An Overview:** Introduction –History of cloud computing –Characteristics of cloud – Cloud computing model –Issues and Challenges for Cloud Computing – Advantages and Disadvantages of cloud computing – Security, Privacy and trust –Threats to Cloud Computing. **Cloud Computing Architecture:** Introduction - Cloud Architecture – Cloud computing models – Deployment models – Identity as a service	6
II	**Virtualization in Cloud:** Introduction - Virtualization – Implementation of Virtualization - Virtualization support at the OS level – Middleware Support for Virtualization – Advantages of Virtualization – Application Virtualization - Virtualization implementation techniques – Hardware virtualization – Types of Virtualization – Load Balancing in Cloud Computing.	6
III	**Security Issues and challenges in Cloud computing**: Introduction -Security challenges in Cloud computing – Information Security in Cloud computing – Security, Privacy and Trust. **Security Management**: Introduction – Security reference architecture –Security Issues in cloud computing – Classification of security issues – Types of Attackers.	8
IV	**Web Services: Introduction** – Amazon Web Services – AWS: Components and Services – Working of EC2 – Benefits of EC2 – Microsoft Azure – Introducing Windows Azure – Cloud Services Provided by Azure – Azure Virtual Machines – Azure Storage – Azure Virtual Networks – Azure SQL Database – Azure Mobile Services – Google App Engine – **Data Security and Privacy** – Introduction – Data Security –Data Confidentiality – Data Integrity – Data Availability –Privacy – Challenges to privacy – Data Life-Cycle – Key Privacy Concerns in the Cloud – Responsibility of protecting Privacy – Transformation to Privacy Risk Management – Privacy by Design.	8
V	**Cloud Computing Applications –** Introduction – Business Applications – Benefits – Cloud Applications for Small Business - Finance and Banking Application – Challenges - Best Practices When Adopting Cloud - Benefits of Adopting Cloud – Legal and Compliance Issues – Reason for Adopting Cloud	8

	by Financial and Banking Services -Cloud Computing in Education – Current Education System – Implementation of Cloud Technology in Education System - Benefits of Cloud Computing for Education – Services Available to Educational Institutions – Risks of Cloud Computing – Change in Education System using Cloud Computing - **Standards in Cloud Computing**: Introduction-Standardization activities – Challenges – Fields of standardization - Standards in Cloud Computing Environments – Standardization Organizations in Cloud Computing.	

References	**TEXT BOOK:** 1. V.K.Pachghare, "Cloud Computing" , PHI, 2016. **REFERENCE BOOKS:** 1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, "Mastering Cloud Computing", Tata Mcgraw Hill, 2013. 2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing – A Practical Approach", Tata Mcgraw Hill, 2009. 3. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012	
Course Outcomes	**On completion of the course, students should be able to** **CO1**: Articulate the main concepts and key technologies of cloud computing. **CO2:** Understand and use the architecture of compute and storage cloud, service and delivery models. **CO3**: Explain the core issues of cloud computing such as Virtualization, resource management and security. **CO4:** Explore on various web services and Cloud Computing applications.	

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Course Code & Title	19NMB20 JAVA SERVER PROGRAMMING		
Class	II B.Voc Networking and Mobile Application	Semester - III	48 Hours
Course Objectives	**This Course aims** • To provide the necessary knowledge to design and develop dynamic, database-driven application using JSP. • To gain knowledge on simple JSPs that use Java code in declarations, expressions and scriptlets. • To learn the fundamentals of Java Server Pages and their relationship to servlets and J2EE. • To know the various uses of XML in JSP applications.		

SYLLABUS

UNIT	Content	No. of Hours
I	**JSP Application Basics :** Introducing Java Server Pages – HTTP and Servlet Basics – JSP Overview : The Problem with Servlets – The Anatomy of a JSP Page – JSP Processing – JSP Application Design with MVC **Setting Up the JSP Environment** : Installing the Java Software Development Kit – Installing the Tomcat Server – Testing Tomcat	9
II	**JSP Application Development**: Generating Dynamic Content – Using JavaBeans Components in JSP Pages – Using Custom Tag Libraries and the JSP Standard Tag Library- Bean - Declaring a Bean in a JSP Page – Reading Bean Properties – Setting Bean Properties. **Using Custom Tag Libraries and the JSP Standard Tag Library:**Custom Tag Library – Installation – Declaration – Using Actions from a Tag Library **Processing Input and Output**: Reading Request Parameter Values – Validating the user Input – Formatting HTML Output.	10
III	**Error Handling and Debugging:** Dealing with Syntax Errors – Debugging a JSP Application – Dealing with Runtime Errors. **Accessing a Database :** Accessing a Database from a JSP Page – Validating Complex Input without a Bean - Using Transactions – Application – Specific Database Actions	9
IV	**Working with XML Data** : Generating an XML Response – Transforming XML into HTML – Transforming XML into a Device-Dependent Format - Processing XML Data. **Using Scripting Elements :** Using Page Directive Scripting Attributes – Implicit JSP Scripting Objects – Using Scriptlets – Using Expressions – Using Declarations – Mixing Action Elements and Scripting elements - Dealing with Scripting Syntax Errors.	10

V	**JSP in J2EE and JSP Component Development** : **Web Application Models :** The JAVA2 enterprise Edition Model – The MVC Design Model – Scalability**.** **Combining JSP and Servlets:** Servlets, Filters and Listeners – Picking the Right Component Type for Each Task – Initializing Shared Resources Using a Listener – Access control using a Filter – Centralized Request Processing using a Servlet – Using a Common JSP Error page.	**10**

References	**TEXT BOOK:** 1. Hans Bergsten, "Java Server Pages", O'Reilly Third Edition, Shroff Publishers & Distributors Pvt.Ltd, 2007. **REFERENCE BOOKS:** 1. Vivek Chopra, Jon Eaves, Rupert Jones, Sing Li, John T.Bell, "Beginning Java Server Pages", Wiley Dreamtech Edition,Reprint 2007. 2. Ivan Bayross, sharanam Shah, Cynthia Bayross and Vaishali Shah, "Java Server Programming for Professions", Shroff Publishers & Distributors Pvt.Ltd, 2007.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Design and develop dynamic, database-driven application using JSP. **CO2:** Integrate java and server side scripting languages to develop web applications. **CO3:** Demonstrate advanced concepts of JSP with database connectivity. **CO4:** Implement the concepts of XML for building enterprise applications. **CO5:** Develop a small web application project independently.

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Course Code & Title	19NMB21 Lab – IX (RDBMS and SQLite LAB)	
Class	II B.Voc Networking and Mobile Application	Semester -III
Course Objectives	This Course aims • To understand and apply the data definition and data manipulation commands. • To understand the techniques in developing databases for real time applications. • To develop applications for implementing triggers, functions and stored procedures. • To be familiar with PL/SQL commands. • To learn for integrating applications using SQLite - DB Technology.	

SYLLABUS

S.No	Content
1	Create a database and perform DDL commands Create (with constraints), alter, drop, rename and truncate using SQL and SQLite.
2	Write queries using the following statements: Select, Update, Insert from already existing table.
3	Write queries using the following statements: Sub queries, Group by statement, Order by statement.
4	Execute the date and library functions in SQL.
5	Create two tables named sales and orders. Combine the records in two tables using joins.
6	Creation of Report for Mark Sheet Preparation.
7	Implement PL/SQL program for Bonus calculation.
8	Create a cursor to select the five highest paid employees from the employee table.
9	Prepare an employee payroll of a company using Stored Functions.
10	Implement Trigger for student data.
Course Outcomes	**On completion of the course, students will be able to** **CO1:** Implement programs using relational database systems. **CO2:** Understand and use the data definition and data manipulation Commands. **CO3:** Demonstrate various constraints, joins and views. **CO4:** Implement cursors, triggers and functions essential for the application. **CO5**: Construct programs in PL/SQL with real time applications. **CO6:** Able to connect variety of applications using SQL and SQLite databases.

Course Code & Title	19NMB22 Lab – X (UI DESIGN LAB)	
Class	II B.Voc Networking and Mobile Application	Semester -III
Course Objectives	This course aims • To enable the student to gain knowledge about basic HTML Tags. • To provide knowledge in creation of Frames. • To provide knowledge in creation of form controls and embedding CSS in HTML document. • Create WebPages using lists, headers, tables, images. • To enable the student to develop a web page.	

SYLLABUS

S.No	Content
1	Create a webpage with HTML describing your department. Use Paragraph and list tags. Also apply font styling like italics, underline and use header tags.
2	Design a mark sheet and display all your marks with subjects in a tabular format.
3	Create a webpage with images and include the attributes such as src, alt, height, width, align, link etc.,
4	Design a signup form using various form controls
5	Create a webpage which display a hyperlink for each subject in your current semester. When the user clicks a link, it should open the respective subject's page.
6	Implement the frames concept. Divide the webpage into 2 parts using frames. Left frame should display the hyperlinks and when the user clicks a link, corresponding page should be loaded into the right frame.
7	Design a webpage using CSS (External and Internal)which includes the following: (a) Use different font styles (in the style definition you define how each selector should work. Then, in the body of your pages, you refer to these selectors to activate the styles). (b) Set background images for the page.
8	Write CSS code to implement the following : (a) Colour the text of a paragraph where RGB value is (51, 204, 0). (b) Put a background image called BKG.GIF behind a single word "TEXT" written with a font size of 39 pixels.
9	Use CSS to write the text string "Cascading Style Sheet" dark red in color and in small caps an in a size that approximately covers 50% of the page width. The text should be a hyperlink pointing to a file STYLE.HTM, but without any underline. The style sheet should remain in an external file.
10	(i) Add the HTML5 semantic elements: header, footer, and section to your "index.html" file (ii) Modify/add to the CSS to attractively arrange these elements. (iii) Copy the two external CSS style sheets, i.e., "small-device.css" and "large-device.css". Add the two .css files in the same directory where index.html is.

Course Outcomes	**On completion of the course, students should be able to** **CO1:** Create static web sites with hyperlinks. **CO2:** Design and develop basic web pages using HTML and CSS. **CO3**: Use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following current professional and/or industry standards. **CO4:** Design web page for Real time application.

Course Code & Title	19NMB23 LAB – XI (JAVA SERVER PROGRAMMING LAB)	
Class	II B.Voc Networking and Mobile Application	Semester -III
Course Objectives	This Course aims • To introduce the JSP and Servlets • To gain knowledge on creating Web page Applications. • To explain the use of directives on JSPs and outline the principal directives. • To deploy a logical Web application in a Web server • To understand the role of JDBC in Java persistence code, and use JDBC for persistence in servlet applications.	

SYLLABUS

S.No	Content
1	Write a JSP Program to Upload a File into a Server and to print current date & Time.
2	Write a JSP Servlet program to handle HTML data in Servlet.
3	Write a JSP Prpgram to illustrate the doGet() and doPost() Methods.
4	Write a JSP Program to autowebpage refresh and to count number of visitors on the corresponding webpage.
5	Write a JSP Program to demonstrate Session Tracking.
6	Demonstrate the JSP Attribute Tags
7	Create a JSP Program to demonstrate the use of Http Session.
8	Write a Java Servlet Program to Validate a Username and Password for a Login form
9	Write a JSP program to Create a database with Username, password, email, phonenumber and to select a record from a database.
10	Demonstrate the expression tags and implicit object using the JSP Code for any one of the following: i. Bus Reservation System ii. Online Money Transaction for Shopping Cart iii. E-Visa Processing System

Course Outcomes	**On completion of the course, students should be able to** **CO1**: Create various applications using the JSP Tags, Scriplets and Java Beans. **CO2:** Implement Session Management and Database Connectivity. **CO3:** Create a Simple Webaplication Design. **CO4:** Deploy a logical Web application in a Web server.

Course Code & Title	19NMB24 PYTHON PROGRAMMING		
Class	II B.Voc Networking and Mobile Application	Semester - IV	Total Hrs:48
Course Objectives	This Course aims • To know and understand the basics of Python programming and decision statements • To able to understand the control statements and functions • To learn the concepts of strings and lists • To use Python data structures – lists, tuples, dictionaries and sets • To understand the concept of file handling		

SYLLABUS

Unit	Content	No. of Hours
I	**Introduction:** History of Python – Executing Python Programs – Commenting in Python – Internal Working of Python - Python Character Set – Token – Python Core Data Type – print() Function – Assigning Value to a Variable – Multiple Assignments – input() Function – eval() Function – Formatting Numbers and Strings – Python Inbuilt Functions – Decision Statements - Loop Control Statements.	9
II	**Functions:** Introduction – Syntax and Basics of Function – Use of a Function – Parameters and Arguments in a Function – Local and Global Scope of a variable – return Statement – Recursive Functions – Lambda function.	9
III	**Strings:** Introduction – str class – Basic Inbuilt Python Functions for String – Traversing String with for and while Loop – Immutable Strings – The String Operators – String Operations. **Lists:** Introduction – Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing - List Slicing with Step Size – Python Inbuilt Functions for Lists – List Operator – List Comprehensions – List methods – List and Strings – Splitting a String in List – Passing list to a function – Returning list from a function.	10
IV	**Object-Oriented Programming: Class, Objects and Inheritance**: Defining Classes – Self-parameter and Adding Methods to a Class – Display Class Attributes and Methods – Special Class Attributes – Accessibility – Passing an Object as Parameter to a Method – Method Overloading in Python – Operator Overloading – Inheritance – Types of Inheritance – Using super() – Method Overriding. **Tuples :** Creating Tuples - tuple() Function - Inbuilt Functions for Tuples - Indexing and Slicing - Operations on Tuples - Passing Variable Length Arguments to Tuples - Lists and Tuples - Sort Tuples - Traverse Tuples from a List - zip() Function - Inverse zip(*) Function. **Sets:** Creating Sets - Set in and not in Operator - Python Set Class - Set Operations.	10

V	**Dictionaries:** Need of Dictionaries - Basics of Dictionaries - Creating a Dictionary - Adding and Replacing Values - Retrieving Values - Formatting Dictionaries - Deleting Items - Comparing Two Dictionaries - Methods of Dictionary Class - Traversing Dictionaries - Nested Dictionaries - Traversing Nested Dictionaries. **File Handling:** Introduction – Need of File Handling – Text Input and Output – seek( ) Function – Binary Files.	10
References	**TEXT BOOK:** 1.Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with PYTHON", McGraw Hill Education (India) Private Limited, First Edition, 2018. **REFERENCE BOOKS:** 1.Allen Downey, Jeffrey Elkner, Chrish Meyers, "How to Think like a Computer Scientist- Learning with Python", Dreamtech Press, Reprint Edition 2016. 2.Timothy A, Budd, "Exploring Python". McGraw Hill Education (India) Private Limited, Tenth Reprint, 2017. 3.Peter Norton et al., "Beginning Python", Wiley &Dreamtech Press, 2006	
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Develop solutions to simple computational problems. **CO2:** Write and execute simple Python programs. **CO3:** Decompose a Python program into functions. **CO4:** Represent compound data using Python lists, tuples and dictionaries. **CO5:** Apply file concepts using file handling.	

Since - 1947

Course Code & Title	19NMB25 MOBILE APPLICATION DEVELOPMENT USING ANDROID		
Class	**II B.Voc Networking and Mobile Application**	**Semester -IV**	**Hours : 48**
Course Objectives	**This Course aims** • To learn configuring and developing applications for mobile devices • To provide knowledge on how to apply the tools required to develop an android application. • To understand the concept of activities, intents, menus and content provider in android • To know the various application designs with animation and graphics. .		

SYLLABUS

UNIT	CONTENT	No. of Hours
I	**FUNDAMENTALS OF JAVA FOR ANDROID APLLICATION DEVELOPMENT. GETTING AN OVERVIEW OF ANDROID:** Introduction Android – Discussing about Android applications – The manifest file - Downloading and installing Android – Exploring the development environment – Developing and executing the first android application.	**9**
II	**USING ACTIVITIES, FRAGMENTS AND INTENTS IN ANDROID:** **Working with Activities** - Creating an activity - Starting an activity - Managing the lifecycle of an activity - Applying themes and styles to an activity – Displaying dialog in the activity – Hiding the title of the activity. **Using Intents** – Exploring intent objects – Exploring intent resolution – Exploring intent filters – Exploring intent filter collision - Obtaining results from intent - Passing data using an intent object. **Fragments** – Fragment implementation – Finding fragments – Adding, removing and replacing fragments – Finding activity using fragment - Using the intent object to invoke built-in application.	**9**
III	**WORKING WITH THE USER INTERFACE USING VIEW AND VIEW GROUPS:** **Working with View Groups** - The Linear Layout - The Relative Layout - The Scroll View layout - The Table Layout- The Frame Layout. **Working with Views** : Using the Text View - Using Edit Text view - Using the Button view - Using the Radio Button view - Using the Check Box view - Using the Image Button view - Using the Toggle Button view - Using the Rating Bar view. Binding data with the adapter view class – Designing the auto text complete view – Implementing screen orientation – Designing the views programmatically – Handling UI events – Specialized fragments – Creating menus.	**10**

IV	**HANDLING PICTURES AND MENUS WITH VIEWS:** Working with image views – Designing context menu for image view – Using the analog clock and digital clock views – Embedding web browser in an activity- Notifying the user. **INTRODUCING THE DATA STORAGE OPTIONS:** Using preferences –Using the internal storage – Using the external storage – Using the SQLite database – Working with content providers.	**10**
V	**EMAILING AND NETWORKING IN ANDROID:** Building an application to send email – Networking in android – Checking network availability. **WORKING WITH LOCATION SERVICES AND MAPS:** Working with Google maps – Working with Gecoding and Reverse Gecoding. **WORKING WITH GRAPHICS AND ANIMATION:** Working with graphics – Using Drawable object – Using the ShapeDrawable object – Working with the NinePatchDrawable graphics – Understanding the concept of Hardware acceleration- Working with animations.	**10**
References	**TEXT BOOK:** 1. Pradeep Kothari, Android application development (with KitKat Support) Black Book, dreamtech press, 2014 **REFERENCE BOOKS:** 1. Wallace Jackson, Android Applications for Absolutes Beginners, Apress, 3rd Edition,2014. 2. W. Frank Ableson, RobiSen, Chris King, "Android in Action", Manning Publications, 2nd Edition, 2011. 3. Shawn Van Every, 'Pro Android Media: Developing Graphics, Music, Video, andRich Media Apps for Smartphones and Tablets ', Apress Publisher, 2016.	
Course Outcomes	**On completion of the course, students should be able to** **CO1:**Understand the concept of android development platform and how to configure and create android applications **CO2:**Create an activity, intents, different event handling methods and menus **CO3:** Work with views, view groups and content provider**.** **CO4:** Embed the graphics and animation in developing android application. **CO5:** Create android applications and explore them.	

Course Code & Title	19NMB26 C# AND .NET PROGRAMMING		
Class	II B.Voc Networking and Mobile Application	Semester - IV	Hours : 48
Course Objectives	**This Course aims** • To Understand the .Net Frame work. • To understand the Fundamental concepts of C#. • To Build an Understanding of the Basic Controls of ASP.NET and Website Fundamentals. • To understand ADO.Net connectivity		

SYLLABUS

UNIT	Content	No. of Hours
I	**Introduction to C#:-** The .Net Framework Class Library **– Basic Programming Techniques :-** Namespaces and Types – Comments, Regions and Readability -Variables – Expression and Statements- Flow Control with Selection Statements – Iteration Statements. **Abstracting Ideas with Classes and Structs:-**Defining Classes – Overloading. **Extensibility and Polymorphism:-**Association Through Composition and Aggregation – Inheritance and Polymorphism – Replacing Methods in Derived Classes. **Dealing with Errors : -** When and How to Fail – Returning Error Values – Exceptions.	11
II	**Arrays and Lists:-**Arrays – Lists – Collection and Polymorphism. **Strings:-** What is a String – The String and Chars Types – Literal Strings and Chars – Formatting Data for Output – Accessing Characters by Index – Strings are Immutable – Getting a Range of Characters – Composing Strings – Manipulating Text – Finding and Replacing Content – All Sorts of "Empty" Strings – Trimming Whitespace – Checking Character Types – Encoding Characters.	9
III	**The. NET Framework:-** Common Language Infrastructure (CLI) and Common LanguageRuntime (CLR) - Common Type System (CTS) - Portions of the CLI - Modules and Assemblies - Application Domains - Common Language Specification (CLS) - Intermediate Language (IL) and Just-In-Time (JIT) Compilation. **Windows Forms I: Developing Desktop Applications:-**Creating a Form - Handling Form Events - Relationships Between Forms. **Windows Forms II: Controls, Common Dialog Boxes, and Menus:-** Common Controls and Components - Control Events - Form and Control Layout - Common Dialog Boxes – Menus - Creating a Control.	10
IV	**ASP.NET and Web Forms: Developing Browser-Based Applications:-**Creating a Web Form - Handling Page Events - More About Server Controls - Adding Validation - Using Directives to Modify Web Page Compilation - ASP.NET Objects: Interacting with the Framework - Discovering Browser Capabilities - Maintaining State - Web-Application Security - Designing Custom Controls. **Web Services:-**Creating a Web Service - Testing a Web Service with a Browser - Web-Service Descriptions - Consuming a Web Service - Web-Service Discovery - Limitations of Web Services.	9

V	**ADO.NET: Developing Database Applications:-**Connecting to a SQL Server Database - Connecting to an OLE DB Data Source - Reading Data into a DataSet - Relations Between DataTables in a DataSet - The DataSet's XML Capabilities - Binding a DataSet to a Windows Forms DataGrid - Binding a DataSet to a Web Forms DataGrid - Typed DataSets - Reading Data Using a DataReader - Executing Stored ProceduresThrough a SqlCommand Object.	**9**
References	**TEXT BOOKS:** 1.Jesse Liberty, Ian Griffiths, Matthew Adams" Programming C# 4.0", O'Reilly Media Inc . Sixth Edition 2010.(Unit I ,II) 2. Dave Grundgeiger, "Programming Visual Basic .NET", O'Reilly First Edition January 2002(Unit III –V) **REFERENCE BOOKS:** 1. Vikas Gupta, ".NET Programming Course Kit – Covering C# .NET Framework VB.NET and Asp.NET", Kogent Solutions Inc 2014. 2.MesbahAhamed, Chris Garrett, JerennyFaridoth Chair Payne, "ASP.NET Programming A Developer Guide", Dreamtech Press 2002. 3. David Sceppa, "Microsoft ADO.NET", Microsoft Press 2005.	
Course Outcomes	**On completion of the course, students should be able to** **CO1:**.Understand the Fundamental principles of .Net Framework **CO2:** Understanding the Basic Concepts of C#. **CO3:** Be Familiar with Designing , writing and testing C# programs. **CO4:**Understand the Basic Controls, Web Site Fundamentals and Data Access using Asp.net. **CO5:** Be Familiar with the Database Connectivity.	

Since - 1947

Course Code & Title	19NMB27 EMBEDDED SYSTEM		
Class	II – BVoc Networking and Mobile Application	Semester - IV	Total Hours: 36
Course Objectives	**The Course aims** • To understand the key concepts of embedded systems. • To understand the different components of microcontroller. • To familiar with the programming environment used to develop embedded systems. • To understand the life cycle of embedded systems.		

SYLLABUS

UNIT	Content	No. of Hours
I	**INTRODUCTION:** Embedded System-Embedded Systems Vs General Computing Systems and Systems-History of Embedded Systems-Classification-Major Application Areas-Purpose of Embedded Systems-Wearable Devices-The Innovative bonding of lifestyle with Embedded Technologies.	6
II	**CORE OF EMBEDDED SYSTEM**: Embedded Categories: General purpose and Domain Specific Processors, Application Specific Integrated Circuits, Programmable Logic Devices-Commercial off-the shelf Components-Memory-Sensors and Actuators- Embedded Firm ware-Other System Components - PCB and Passive components.	8
III	**CHARACTERISTICS AND QUALITY ATTRIBUTES OF EMBEDDED SYSTEMS**: Characteristics- Quality Attributes of Embedded Systems. **EMBEDDED SYSTEMS-APPLICATION AND DOMAIN SPECIFIC:** Washing Machine-Application Specific Embedded System-Automotive -Domain Specific Embedded System.	6
IV	**DESIGNING EMBEDDED SYSTEMS WITH 8 BIT MICROCONTROLLER 8051:** Factors to be considered in Selecting Controller- Designing with 8051 : 8051 Architecture - The Memory Organization - Registers. **PROGRAMMING THE 8051 MICROCONTROLLER:** Different Addressing Mode Supported by 8051. **HARDWARE SOFTWARE CO-DESIGN AND PROGRAM MODELLING:** Fundamentals Issues in Hardware Software Co-Design-Computational Models-Introduction to UML-Hardware Software Trade-offs.	8
V	**EMBEDDED PRODUCT DEVELOPMENT LIFE CYCLE:** EDLC - Objectives of EDLC -Different phases of EDLC-EDLC Approaches. **TRENDS IN EMBEDDED INDUSTRY**: Processor trends in embedded system-Embedded OS trends-Development language trends-Open standards, Framework and alliances-Bottlenecks-Development Platform trends-Cloud, Internet of Things and Embedded Systems.	8
References	**Text Book:** 1. Shibu K V "Introduction to Embedded Systems" Second Edition, Tata McGraw-Hill Publications,2017. **Reference Books:** 1. Rajkamal, "Embedded Systems- Architecture Programming and	

	Design" Third Edition, Tata McGraw-Hill publications,2014. 2. Peckol "Embedded System Design" John wiley & Sons, 2010	
Course Outcomes	**On completion of the course, the Students should able to** **CO1:** Understand the key concepts of embedded systems. **CO2:** Understand the different components of microcontroller. **CO3:** Become familiar with the programming environment used to develop embedded systems **CO4:** Understand the life cycle of embedded systems.	

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Course Code & Title	19NMB28 ENTREPRENEURSHIP DEVELOPMENT		
Class	II B Voc (Networking and Mobile Application)	Semester	IV
Course Objectives	**The Course aims** • to enable the students understand the concept of entrepreneurship • to support students in exploring the ideas for a new business. • to impart knowledge about EDP. • to enhance students' understanding in institutions supporting the entrepreneurs. • to enable students gain insight into managing business projects and preparation of a project report.		

SYLLABUS

UNIT	Content	No. of Hours
I	Entrepreneur – Definition – Entrepreneurial Competencies – Types – Functions of Entrepreneur - Entrepreneurship – Meaning – Characteristics – Functions – Factors influencing entrepreneurship – Barriers to entrepreneurship – Role of entrepreneurship in economic development.	8
II	Innovation and Creativity in entrepreneurship – Entrepreneurial motivation – Idea Generation Techniques: SCAMPER, Brainstorming, Attribute listing, Brain writing and mind mapping – Identification of Business Opportunity.	7
III	Entrepreneurship Development Program (EDP) – Need for EDP – Objectives – Phases of EDP – Course contents and curriculum of EDP – Evaluation of EDP.	7
IV	Institutional Support to Entrepreneurs – Central level institutions and State level institutions – Institutional finance to Entrepreneurs – Funding options.	7
V	Concept of a Project – Characteristics of a project – Project classification – Project Life Cycle – Project Identification – Project formulation – Project report – Content of a project report – Project Appraisal.	7
References	**TEXT BOOK:** 1. Khanka. S S, Entrepreneurial Development, Sultan Chand and Company Limited, Delhi, 2017, Fourth edition. **REFERENCE BOOKS:** 1. Sangeetha Sharma, Entrepreneurship Development, PHI Learning Private Limited, Delhi, 2016, First Edition. 2. Gordon E and Natarajan K, Entrepreneurship Development, Himalaya Publishing House, Mumbai, 2017, Sixth revised edition.	
Course Outcomes	**On completion of the course, students should be able to** **CO1:** build knowledge on the basic concept of Entrepreneurship. **CO2:** become familiar with business ideas. **CO3:** enrich their understanding on EDP. **CO4:** gain insight in institutions supporting the entrepreneurs. **CO5:** understand project management and preparation of a project report.	

Course Code Course Code & Title	19NMB29 LAB – XII (PYTHON PROGRAMMING LAB)	
Class	II-B.Voc Networking and Mobile Application	Semester - IV
Course Objectives	**This Course aims** • To understand the basic concepts of Python. • To learn how to use conditions and loops. • To understand the concept of functions and strings. • To analyze and solve the problem using compound data. • To gain knowledge about class and files.	

SYLLABUS

S.No	Content
1	a) Develop a Python program to print the Employee pay slip using eval() function. b) Write a Python program to find the difference between the ASCII code of the any lower case letter and its corresponding uppercase letter.
2	a) Write a Python Program to demonstrate the uses of various python built-in functions. b) Write a program to print the number of days in a month.
3	a) Generate prime numbers using Charles Babbage function. b) Read a distance in meter and a time in seconds through keyboard. Write a Python program to calculate the speed of a car in meter/second.
4	a) Create a function eval_exp(base,exp) which computes the exponent of any number. b) Write a function calc(x1,y1,x2,y2) to calculate the distance between two points represented by point(x1,y1) and (x2,y2).
5	Implement the string operations using string slicing functions.
6	Write a program to strip unwanted character from a string.
7	Consider the list with mixed type of elements, such as L1=[1,'x',4,6,90, "apple", 'a', o,4]. Create another list using comprehension which consists of only the integer element present within the list L1.
8	a) Write a function reverse(Lst) to reverse the elements of a list. b) Write a program to assign grades to students and display all the grades using keys() and get() method of a dictionary.
9	a) Write a program to demonstrate the use of super(). b) Write a Python program to perform arithmetic operations on complex numbers using method overloading.
10	Write a program to add the content of a file numbers.txt and display the sum of all numbers present in a file.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Write diversified solution using Python language. **CO2:** Solve problems using control statements. **CO3:** Develop programs using Tuples, Lists and Dictionaries. **CO4:** Implement program using file handling operations.

Course Code & Title	19NMB30 LAB – XIII (MOBILE APPLICATION DEVELOPMENT USING ANDROID LAB)	
Class	II B.Voc Networking and Mobile Application	Semester - IV
Course Objectives	**This Course aims** • To impart the basic concepts of Android Programming • To learn and create the Activities and various user interfaces such as textbox, labels, ListBox,ComboBox, CheckBox and RadioButton with Toast messages. • To create simple android application for arithmetic calculations • To create an application for contact manager and working with SQLite database	

SYLLABUS

S.No	Content
1	Write the steps for installation and configuration of android in Windows OS.
2	Write a program to demonstrate usage of two textbox(EditText), Label(Textview) and Button widgets in android and perform addition of two numbers.
3	Write a program and demonstrate the graphical layout orientation.
4	Write a program to demonstrate usage of ListBox,ComboBox , Snipperswith Toast(MessageBox).
5	Write a program to demonstrate usage of TextArea, CheckBox, RadioButtonwith Toast.
6	Write a program and calculate the simple interest and compound interest using its API controls.
7	Implement an application that creates an alert upon receiving messages.
8	Write a program to demonstrate usage of Graphics and Animation.
9	Develop an application that makes use of notification manager.
10	Develop a mobile application to send an email.
Course Outcomes	**On completion of the course, students should be able to** **CO1**: Configure and install android. **CO2**: Use of various controls like textboxes and buttons in android. **CO3**: Develop a simple program using API controls. **CO4**: Design an application using database connectivity.

Course Code & Title	19NMB31 LAB XIV (C# AND .Net LAB)	
Class	II BVoc Networking and Mobile Application	Semester - IV
Course Objectives	**This Course aims** • To design, write and test Simple C# and ASP.net programs. • To gain Knowledge in classes, objects and strings. • To build a web site using master pages • To understand the fundamentals on how to create a Web Application using Database Connectivity. • To create and validate the web pages using ASP.Net	

SYLLABUS

S.No	Content
1	Create a C# program a) Find the number of even numbers within a specified range. b)Sorting an array list either in a ascending / descending Order
2	Write a program in C# to implement the concept of polymorphism.
3	Write a program in C# to implement Exception Handling
4	Write a program in C# to implement program for String Handling
5	Write a program in ASP.Net to implement basic controls.
6	Design a Simple Web Form in ASP.Net
7	Implement validation controls for a web page using ASP.Net program
8	Design a simple web site that makes use of Master Pages.
9	Create a website for any Web application using ASP.Net using Database
10	Create a simple E-Commerce website and validate it.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Apply good programming design methods for program development. **CO2:** Design, write and test C# programs. **CO3** :Understanding the Web Forms and Validation Controls of ASP.Net **CO4:** Create Web Application with Data Base Connectivity **CO5:** Able to Develop the Web Application using master pages.

Revised Guidelines for Basic Network Training (For Students admitted from 2020-21 & onwards)

- Each Student should undergo 10 hours training on the basic networking and OS installation.
- Report should be prepared on the training and the same is to be submitted to the department.

Course Code & Title	20NMB09 DATA COMMUNICATION AND NETWORKING (For students admitted from 2020 - 2021 & onwards)		
Class	I – B.Voc(Networking & Mobile Application Development)	Semester -II	Total Hours: 48
Course Objectives	The Course aims • To understand the basic concept of Networks and the seven layers of OSImodel. • To understand and configure basic network using guided and unguidedmedia. • To know about how computers and terminals actually communicate with eachother. • To learn TCP/IP, UDP and other InternetProtocols.		

SYLLABUS

UNIT	Content	No. of Hours
I	**DATA COMMUNICATIONS AND NETWORKS:** Data Communications - Networks - Internet - Protocols and Standards. **NETWORK MODELS:** Layered Tasks - OSI Model - Layers in the OSI Model - TCP/IP Protocol Suite – Addressing.	8
II	**PHYSICAL LAYER AND MEDIA: DATA AND SIGNALS** - Analog and Digital - Periodic AnalogSignals-Digital Signals- Transmission impairment-Data Rate Limits- Performance. **BANDWIDTH UTILIZATION:** Multiplexing. **TRANSMISSION MEDIA:** Guided Media - Unguided Media.	9
III	**DATA LINK LAYER:** Error Correction and Detection: Introduction - Block Coding - Linear Block codes- Cyclic Codes: Cyclic redundancy check. **DATA LINK CONTROL:** Framing - Flow and Error Control - Protocols- Noiseless channels - Noisy channels – HDLC - Point-to-Point Protocol. **WIRED LAN:** Ethernet - IEEE Standards - Standard Ethernet - Fast Ethernet - Gigabit Ethernet. **WIRELESS LAN:** IEEE 802.11 – Bluetooth.	11
IV	**NETWORK LAYER: LOGICAL ADDRESSING** - IPv4 Addresses - IPv6 Addresses. **INTERNET PROTOCOL:** Internetworking - IPv4 -IPv6 - Transition from IPv4 to IPv6. **ADDRESS MAPPING, ERROR REPORTING AND MULTICASTING:** Address Mapping- ICMP - IGMP - ICMPv6. **DELIVERY,FORWARDING AND ROUTING:** Delivery-Forwarding.	10
V	**TRANSPORT LAYER:** Process-to-Process Delivery - UDP - TCP. **APPLICATION LAYER: DOMAIN NAME SYSTEM:** Name Space-Domain Name Space- Distribution of Name Space – DNS in the Internet. **WWW and HTTP:** Architecture - Web Documents – HTTP.	10

References	**Text Books:** 1**.** Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw Hill Education Private Limited, Fourth Edition. **Reference Books:** 1. Andrew S. Tanenbaum , "Computer Networks", PHI, FourthEdition.. William Stallings, "Data and Computer Communications", Pearson, TenthEdition.
Course Outcomes	**On completion of the course, students should be able to** **CO1:** Understand the categories of networks. **CO2**: Able to differentiate Analog and Digital Data and signals. **CO3:** Able to compare and contrast the data transmission media. **CO4:** Analyze the requirement of error detection and correction techniques. **CO5:** Analyze the features and operations of various application layer protocols such as HTTP and DNS.