MANGALORE UNIVERSITY

Revised Curriculum Structure and Scheme of Examinations of

B.A. (Data Processing) Degree Programme

Choice Based Credit System (2019-20 onwards)

MANGALORE UNIVERSITY
B.A. (Data Processing) Degree Programme Curriculum Structure and Scheme of Examinations

T- Theory **P** - Practical, **CC**- Co-Curricular, **EC** – Extra-curricular

I / II/III/IV Semesters

	Courses	No. of Courses T/P	Instruction hrs/week	Duration of Exam(hrs)	Marks			Credits
					IA	Exam	Total	
Group 1	2 Optional subjects	2T	2 x 6	2 x 3	2 x 30	2 x 120	2 x 150	2 x 3 =6
	Data Processing course	**1T**	**1 x 4**	**1 x 3**	**1 x 20**	**1 x 80**	**1 x 100**	**1 x 2 =2**
		1P	**1 x 3**	**1 x 3**	**1 x 10**	**1 x 40**	**1 x 50**	**1 x1 =1**
Group 2	One course from 4 Electives	1T	1 x 2	1 x 2	1 x 10	1 x 40	1 x 50	1x1 =1
Group 3	2 Languages	2L	2 x 4	2 x 3	2 x 20	2 x 80	2 x 100	2 x 2 =4
	Elective Foundation	1T	1 x 2	1 x 2	1 x 10	1 x 40	1 x50	1x1 =1
Group 4	CC & EC	1T	1 x 2	1 x 2	1 x 50	-	1 x50	1x1=1
					Total Semester Credits			16

i) Discipline Supportive   ii). Expanded scope. iii) Skill Development iv) Another Discipline/Domain

V /VI Semester

	Courses	**No. of Courses T/P**	**Instruction hrs/week**	**Duration of Exam(hrs)**	**Marks**			**Credits**
					IA	**Exam**	**Total**	
Group 1	2 Optional Courses	2 Optional without Practical						
		2T	2 x 5	2 x 3	2 x 30	2 x 120	2 x 150	2 x 3 =6
		2T	2 x 5	2 x 3	2 x 30	2 x 120	2 x 150	2 x 3 =6
	Data Processing	**1 Optional with Practical**						
		2T	**2 x 3**	**2 x 3**	**2 x 20**	**2 x 80**	**2 x 100**	**2 x 2 =4**
		2P	**2 x 2**	**2 x 3**	**2 x 10**	**2 x 40**	**2 x 50**	**2 x 1 =2**
					Total Semester Credits			18

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I Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks	Marks and Credit		
					I.A	Exam	Total	Credits
1	BASDPC131	Information Technology	04	03	20	80	100	2
	BASDPP132	Office Automation Lab	03	03	10	40	50	1
2	BASDPCE133	Elective-I: **Discipline Supportive** E1: Open Source Software	**2**	**2**	**10**	**40**	**50**	**1**
Total			09				200	4

II Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks	Marks and Credit		
					I.A	Exam	Total	Credits
1	BASDPC181	DTP	04	03	20	80	100	2
	BASDPP182	DTP Lab	03	03	10	40	50	1
2	BASDPCE183	Elective-II: **Expanded Scope.** E1: Data Mining with R	**2**	**2**	**10**	**40**	**50**	**1**
Total			09				200	4

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III Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks	Marks and Credit		
					I.A	Exam	Total	Credits
1	BASDPC231	PC Hardware Essentials	04	03	20	80	100	2
	BASDPP232	Hardware Lab	03	03	10	40	50	1
2	BASDPCE233	**Elective-III: Skill Development** E1: Python Programming	**2**	**2**	**10**	**40**	**50**	**1**
		Total	09				200	4

IV Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks	Marks and Credit		
					I.A	Exam	Total	Credits
1	BADPC281	Introduction to Data Analysis	04	03	20	80	100	2
	BADPP282	Data Analysis Lab	03	03	10	40	50	1
2	BASDPOE283 BASDPOE284	**Elective-IV: Another Discipline/Domain** E1: Internet Technologies E2: IT Fundamentals	**2**	**2**	**10**	**40**	**50**	**1**
		Total	09				200	4

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V Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks I.A	Exam	Total	Credits
1	BASDPC331	Networking Essentials	03	03	20	80	100	2
	BASDPC332	Web Design	03	03	20	80	100	2
	BASDPP333	Networks Lab	02	03	10	40	50	1
	BADPP334	Web Design Lab	02	03	10	40	50	1
	Total		10				300	6

VI Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks I.A	Exam	Total	Credits
1	BASDPC381	Operating System	03	03	20	80	100	2
	BASDPC382	Problem Solving with C	03	03	20	80	100	2
	BASDPP383	OS Lab	02	03	10	40	50	1
	BASDPP384	C Lab	02	03	10	40	50	1
	Total		10				300	6

Total Marks: 1400 ,   Total number of Credits: 28

Common Scheme of Practical Examinations for I -VI Semesters

The practical examination in the concerned subject specified in the I Semester to IV Semester shall be conducted for 40 marks. There shall be two main components: problem solving and viva-voce components. There shall be two main problems from the single domain/multiple domain subjects chosen for practical components. And Viva- Voce component shall have to access both the problem solving/Analytical skill and the programming skills.

Sl.No.	Details		Allocated Marks for one Problem	2 Problems
I.	**Problem Solving Components:**			
	i.	Problem solving with Programs Detail Descriptions	**05**	**10**
	ii.	Compiling Code and Debugging	**05**	**10**
	iii.	Execution and Testing	**05**	**10**
	iv.	Record	**--**	**05**
II.	**Viva- Voce Examination:**			
	ii	Viva - Voce (Question and Answer)	**--**	**05**
	Total Marks			**40**

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I Semester

Group	Course Code	Course Title	Hrs. per week Theory Practical.	Duration of Exams Theory/ Practical.	Marks and Credit			
					I.A	Exam	Total	Credits
1	BASDPC131	Information Technology	04	03	20	80	100	2
	BASDPP132	Office Automation Lab	03	03	10	40	50	1
2	BASDPCE133	Elective-I: **Discipline Supportive** E1: Open Source Software	**2**	**2**	**10**	**40**	**50**	**1**
		Total	09				200	4

GROUP-I **COURSE-I**	**BASDPC 131: Information Technology**	**48 hours**

Theory/Week: 4 hrs   **I.A: 20**
Credits: 2   **Exam: 80**

Course Objectives:
- To make the students understand and learn the basics of computer for its effective use in day to day life.

Course Outcomes:
- Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution
- Be able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- Be able to effectively integrate IT based solutions into the user environment
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UNIT-I   12 Hrs.

Introduction to Computers: Introduction, Characteristics computers, Evolution computers Generation of Computers, Classification of computers, the computer system, Application of computers. **Number system:** Introduction, Number system, Conversion between number bases, Arithmetic system, signed and unsigned numbers, concept of overflow, Binary coding. **Computer Architecture:** Introduction, Central processing unit, main memory unit, interconnection of units, cache, communication between various units of a computer system. **Primary memory:** Introduction, memory representation, memory hierarchy, Random access memory, Types of RAM, Read-only memory, Types of ROM.

UNIT-II   12 Hrs.

Secondary Storage: Introduction, classification, magnetic tape, magnetic disk, Optical disk, Magneto-optical disk, Memory stick, Universal serial bus, Mass storage devices. **Input devices**: Introduction, Types of input devices, Optical character recognition, Optical Mark Recognition, Magnetic ink character recognition, Bar code reader, **Output devices**: Introduction, Types of output, Classification of output devices, Terminals.

UNIT-III   12 Hrs.

Computer Program: Introduction, algorithm, flowchart. **Computer languages**: Introduction, Evolution of programming languages, classification of programming languages, generation of programming languages, Features of a good programming language, selection of a programming language. **Computer software:** Introduction, software definition, relationship between software and hardware, software categories, terminology software **Network basics:** Computer networks, Network topologies, Network devices.

UNIT-IV   12 Hrs.

Internet basics: Introduction, Evolution, Basic internet terms, getting connected to internet, internet Applications, **Working with Application Software, Productivity software:** Word processing program, Spreadsheet program, presentation program, **Database and DBMS:** working with database, RDBMS.

Text Books:
1. ITL Education Solutions Limited, **Introduction to Information Technology**, Pearson Education India; 2 edition, 2012.
2. Peter Norton, **Introduction to Computers**, 7th edition, Tata McGraw Hill Publication, 2017 (Unit - IV).

Reference Books:
1. S.S. Shrivastava, **MS-Office,** Laxmi Publications; First edition (2015)
2. Dinesh Maidasani, **Learning Computer Fundamentals, MS Office and Internet & Web Technology**, Laxmi Publications; Third edition (2015)
3. Vikas Gupta, **Comdex Linux and Open Office Course Kit: Revised and Upgraded,** Dreamtech Press (2010)

Practical-I	**BASDPP 132: OFFICE AUTOMATION LAB**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Exercises in MS-Office package	**I.A: 10** **Exam: 40**

GROUP-II
COURSE-I
Theory/Week: 2 Hrs
Credits: 1

BASDPCE 133-E1: Open Source Software

24 hours
I.A: 10
Exam: 40

Course Objectives:
Help students

- Understand concepts, strategies, and methodologies related to open source software development.
- Understand the business, economy, societal and intellectual property issues of open source software.

Course outcomes:
Upon successful completion of the course the student will be able to:

- Be familiar with open source software products and development tools currently available on the market.
- Be able to utilize open source software for developing a variety of software applications, particularly Web applications.

UNIT-I **12 Hrs.**

The philosophy of OSS, commercial software vs OSS, free software vs freeware. The Linux operating system, GPL, LGPL and other licenses

UNIT-II **12 Hrs.**
Category of OSS Application Software, Study of Commercial Application software vs OSS, Open Office, GAMBAS, GIMP etc. Software Development Using Open Source and Free Software Licenses: Introduction, Models of Open Source and Free Software Development, Forking, Choosing an Open Source or Free Software License, Drafting Open Source Licenses

Text Books:
1. Andrew St. Laurent, **Understanding Open Source and Free Software Licensing** – O'Reilly Media, 2004

Reference Books:

1. P. Rizwan Ahmed, **Open Source software**, Margham Publications, 2015
2. Ashish Gavande, **Understanding Free and Open Source,** 2017

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II Semester B.A.

Group	Course Code	Course Title	Hours of Instructions/Week.	Duration of Exams Theory/ Practical.	I.A	Exam	Total	Credits
1	BASDPC181	DTP	04	03	20	80	100	2
	BASDPP182	DTP Lab	03	03	10	40	50	1
2	BASDPCE183	Elective-II: **Expanded Scope.** E1: Data Mining with R	**2**	**2**	**10**	**40**	**50**	**1**
	Total		09				200	4

| GROUP-I
COURSE-II | **BASDPC 181: Desktop Publishing** | 48 hours |

Theory/Week: 4 Hrs **I.A: 20**
Credits: 2 **Exam: 80**

Course Objectives:
- Use strategies to obtain and evaluate print and digital information from a variety of electronic resources and in a variety of electronic formats.
- Identify the tasks and use appropriate software and documentation to create specific projects in desktop publishing
- Create and present publication project using and describing the principles and skills necessary for its creation.
- Evaluate projects according to criteria defined in technology application standards for desktop publishing

Course Outcomes:
- Gain basic understanding of the field of desktop publishing
- Acquire skills of preparing projects for publication which include layout and design
- Learn both the technical and aesthetic aspects of text, image manipulation and integration
- Learn using design as a means of communication, along with using tools to implement effective design strategies

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UNIT-I **12 Hrs.**

Introduction to InDesign: Introduction to the Workspace • Getting to Know InDesign • Setting Up a Document and Working with Pages • Working with Objects • Flowing Text • Editing Text • Working with Typography • Working with Color • Working with Styles • Importing and Modifying Graphics • Creating Tables • Working with Transparency • Printing and Exporting • Creating Adobe PDF Documents with Form Fields • Exporting for E-Readers • Working with Long Document

UNIT-II **12 Hrs.**

Introduction to CorelDraw: Getting started with Corel Draw, Features of Corel Draw, Corel Draw Interface, Tool Box, Moving from Adobe Illustrator to Corel Draw Common Tasks, Drawing and Coloring Introduction Selecting Objects Creating Basic Shapes Reshaping Objects Organising objects Applying color fills and Outlines

UNIT-III **12 Hrs.**

Working with text and Images: Mastering with Text Introduction Text Tool Artistic and paragraph text Formatting Text Embedding Objects into text Wrapping Text around Object Linking Text to Objects • Applying Effects Introduction Power of Blends Distortion Contour Effects Envelopes Lens effects Transparency Creating Depth Effects Power Clips • Working with Bitmap Commands Introduction Working with Bitmaps

UNIT-IV **12 Hrs.**

Introduction to Photoshop: Zoom and navigate through a photo. Crop, straighten horizon lines and rotate., Adjust the image for levels and color. Change modes from RGB to grayscale and create duotones, Dodge and burn specific areas of a photo, Use selection tools to further adjust and enhance the image, Use the clone tool to repair and manipulate the image, Use filters to change the image in artistic and unreal ways

Text Books:
1. Ramesh Bangia, **Learning Desk Top Publishing (DTP)**, Khanna Book Publishing Co. (P) Ltd.; 1 edition, 2016.
2. . Satish Jain, **BPB DTP Course**, BPB, 2014

Reference Books:
1. Kogent Learning Solutions Inc., **InDesign CS6 in Simple Steps**, Dreamtech Press,2012
2. Kogent Learning Solutions Inc., **CorelDRAW X7 in Simple Steps**, Dreamtech Press, 2014.
3. Kogent Learning Solutions Inc., **Photoshop CS6 in Simple Steps**, Dreamtech Press, 2012

Practical-II	**BASDPP 182: DTP Lab**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Lab Exercises in Design, CorelDraw, Photoshop	**I.A: 10** **Exam: 40**

GROUP-II
COURSE-II   **BASDPCE 183-E1: Data Mining with R**   **24 hours**
Theory/Week: 2   **I.A: 10**
Hrs, Credits: 1   **Exam: 40**

Course Objectives:
Help students
- Learn the basic concepts of R: the data frame and data manipulation
- Discover powerful tools for data preparation and data cleansing
- Visually find patterns in data
- Work with complex data sets and understand how to process data sets
- Get to know how object-oriented programming is done in R
- Explore graphs and the statistical measure in graphs

Course outcomes:
Upon successful completion of the course the student will gain:
- Ability to identify the characteristics of datasets
- Ability to select and implement data mining techniques in R suitable for the applications under consideration.
- Ability to recognize and implement various ways of selecting suitable model parameter for different machine learning techniques.
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UNIT-I	12 Hrs.

Introduction to Data Mining and R: A brief introduction to Data Mining, Main tasks and objectives, Illustrative case studies, A brief introduction to R and RStudio, Basic concepts of the R language. Data Munging: Presentation of the first case study, Importing data into R, Data summarization, Examples and exercises in R. Data Visualization and Reporting: Data visualization, Examples and exercises in R, Reporting, Dynamic reports and presentations in R using knitr

UNIT-II	12 Hrs.

Predictive Analytics: Introduction to predictive modelling, Classification and regression tasks, Evaluation metrics, Linear discriminants and linear regression, classification and regression trees, Support vector machines, Ensembles and Random forests, Model evaluation strategies, Reliability of estimates Model Evaluation and Selection: Experimental methods for performance estimation, Cross validation, Holdout, Bootstrap, The performance Estimation package, Illustrations in R, Statistical significance of the observed differences, Illustrative case studies and hands on practice

Text Books:
1. G. K. Gupta, **Introduction to Data Mining with Case Studies**, 3rd Edition, PHI Yanchang Zhao,2016
2. Yonghua Cen, **Data Mining Applications with R**, 1st Edition, Academic Press, 2013
3. Pang-Ning Tan, Michael Steinbach,Vipin Kumar, **Introduction to Data Mining**, Pearson, 2013

Reference Books:
1. M Ramakrishna Murthy, **Introduction to Data Mining and Soft Computing Techniques,** Laxmi Publications Pvt Ltd, 2017.
2. Paul Teetor, **R Cookbook: Proven Recipes for Data Analysis, Statistics, and Graphics**, O'reilly Cookbooks, 2011
3. Garrett Grolemund, Hadley Wickham, **Hands-On Programming with R: Write Your Own Functions and Simulations**, 1st Edition, O'reilly **,** 2014

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III Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks I.A	Exam	Total	Credits
1	BASDPC231	PC Hardware Essentials	04	03	20	80	100	2
	BASDPP232	Hardware Lab	03	03	10	40	50	1
2	BASDPCE233	**Elective-III: Skill Development** E1: Python Programming	**2**	**2**	**10**	**40**	**50**	**1**
		Total	09				200	4

GROUP-I
COURSE-III   **BASDPC 231: PC Hardware Essentials**   **48 hours**
Theory/Week: 4 Hrs   **I.A: 20**
Credits: 2   **Exam: 80**

Course Objectives:

CO1: Introduce various PC components & technologies updated with latest information and current developments

CO2: Demonstrate basic skills to assemble/setup a Personal computer

CO3: Explain methods for diagnosing and isolating faulty components, troubleshooting and repairing skills

CO4: Illustrate use of maintenance tools in Windows

CO5: Summarize ways to optimize system performance

Course Outcomes:

Upon completion of the course students will be able to:

Co1: Identify the main components of PC.

Co2: Know about motherboards and the various technologies connected with motherboard

Co3: Have an idea about the processor generations upto current CPU families.

Co4: Familiarize themselves with terms that are directly related to processors such as: caching, multi-threading, Dual-core technology, multi-processing,

Co5: Familiarize themselves with PC memories such as RAM, ROM and their variants.

Co6: Learn how to prepare a HDD for storing data, installing Windows OS and various programs.

Co7: Know about Video technologies directly connected to PCs such as CRT monitors, TFT, LED and others

Co8: Familiarize themselves with the various tools available in Windows or other sources in PC troubleshooting and maintenance

Co9: Explain the purpose of safe working conditions and procedures

UNIT-I

12 Hrs.

Introduction: Computers through Generations, Basic computer hardware structure, hardware and software, different types of computers, features of computer system,

Disassembling computers: Safety information, Front panel view, Rear panel view, Disassembling computers. **Motherboards**: Features, components, form factor, Processor support, Motherboard controller, Memory support, graphics support, BIOS, IDE and SATA connectors, Power supply connectors, external device interfaces, Audio system, LAN system, buses and expansion slots, speaker and battery, front panel headers, system board jumpers and LEDs, I/O Addresses and interrupts, management features, selection of motherboards, using modem cards, using graphics cards, External Interfaces and connectors, troubleshooting and maintenance of motherboards, motherboard: common problems and solutions [Note: Include current information in all respects while teaching topics]

UNIT-II   **12 Hrs.**

Processing Unit: Features, developmental stages of CPU, multiple core processors, Processor architecture, specifications, installing and uninstalling CPU, CPU overheating issues, Processor: common problems and solutions, Graphics Processing Units Memory and storage: Features, types, working, memory map, installing and uninstalling, maintenance and troubleshooting, Memory: common problems and solutions   Storage devices: Hard disks-details, working, features, installation, selection, specifications, partitioning and formatting, maintenance and troubleshooting, Hard disk: common problems and solutions

UNIT-III   12 Hrs.

Solid State devices: Installing, Optical storage devices features, working, installing, specifications for Multi drives, disc burning software, maintenance and troubleshooting, common problems and solutions Blu-ray discs, external storage devices **Computer Power supply** units, features, types, installing, specification, maintenance and troubleshooting **UPS:** Working, types, features, specifications, UPS batteries Computer Monitors: Features, CRT monitors, working, LCD monitors, specifications for TFT monitors, LED monitors and Touch screens, Keyboard and Mouse: Types, features of keyboards, keyboard interfaces, different types of mouse, working, features, interfaces, common problems and solutions.

UNIT-IV   12 Hrs.

Assembling and configuring computers: caution and safety, setting up the cabinet, installing Power supply unit, installing CPU, installing heat sink and cooling fan, installing memory, mounting motherboard, installing hard disk, installing optical drive, connecting motherboard power supply cables, connecting to front panel, connecting mouse, keyboard and mouse, switching on the computer, configuring BIOS, installing OS, installing device drivers, installing add on cards. Troubleshooting and maintenance: safety and precautions, configuring using BIOS, POST, devices and drivers, working with windows registry, computer system common problems and solutions

Text Books:
James K. L, Computer Hardware: Installation, Interfacing, Troubleshooting and Maintenance, PHI Learning, 2013.

Reference Books:
1. Vikas Gupta **Comdex Hardware and Networking Course Kit: Revised & Upgraded,** Dreamtech Press, 2014.
2. Snehal Rane Sunita Velapure, **Computer Hardware and Maintenance,** 2014.
3. B N Bennoach, **How to Build a Computer: Building Your Own PC - The Easy, Step-By-Step Guide to Building the Ultimate, Custom Made PC**, www.bnpublishing.com, 2006

Practical-III	BASDPP 232: Hardware Lab	36 hours
Practical/Week: 3 Hrs **Credits: 1**	Lab Exercises in PC Hardware	**I.A: 10** **Exam: 40**

GROUP-II
COURSE-III   **BASDPCE 233 -E1: Python Programming**   **24 hours**
Theory/Week: 2 Hrs   **I.A: 10**
Credits: 1   **Exam: 40**

Course Objectives:
- Introduce programming using the Python programming language with emphasis common algorithms and programming principles utilizing standard library distributed with Python.

Course outcomes:
- Be skilled at creating, debugging and testing a software application using the Python programming language.

UNIT-I   **12 Hrs.**

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.   Overview of Programming: Structure of a Python Program, Elements of Python **Introduction to Python:** Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator) Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions

UNIT-II   **12 Hrs.**

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables   Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists.   **Object Oriented Programming:** Introduction to Classes, Objects and Methods, Standard Libraries. **Data Structures:** Arrays, list, set, stacks and queues. Searching and Sorting: Linear and Binary Search, Bubble, Selection and Insertion sorting.

Text Books:
1. Ch Satynarayana, M Radhika Mani, ands B N Jagadeesh, Python Programming, Universities Press, 2018.
1. Timothy A Budd, **Exploring Python**, TMH, 2009
2. Allen Downey, Jeffrey Elkner, Chris Meyers, **How to think like a computer scientist: learning with Python,** 1st Edition – Freely available online, 2015

Reference Books:
1. Yuxi (Hayden) Liu, **Python Machine Learning by Example**, Packt Publishing Limited, 2017
2. Narasimha Karumanchi, **Data Structures and Algorithmic Thinking with Python: Data Structure and Algorithmic Puzzles**, Career Monk Publications, 2015

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IV Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks	Marks and Credit		
					I.A	Exam	Total	Credits
1	BADPC281	Introduction to Data Analysis	04	03	20	80	100	2
	BADPP282	Data Analysis Lab	03	03	10	40	50	1
2	BASDPOE283 BASDPOE284	**Elective-IV: Another Discipline/Domain** E1: Internet Technologies E2: IT Fundamentals	**2**	**2**	**10**	**40**	**50**	**1**
		Total	09				200	4

| GROUP-I
COURSE-IV
Theory/Week: 4 Hrs
Credits: 2 | BASDPC 281: Introduction to Data Analysis | 48 hours
I.A: 20
Exam: 80 |

Course Objectives:
CO1: Introduce various principles and methods of statistical analysis
CO2: Explain data analysis using mathematical methods and statistics
Course Outcomes:
Upon completion of the course students will be able to:
   Co1: understand the concepts of number formulations and their arithmetic
   Co2: understand basic statistical methods used in Data Analysis

| UNIT-I | 12 Hrs. |

Number System: Natural numbers, Prime numbers, Integer numbers, Even numbers, Odd numbers, Rational numbers, Fraction numbers, Irrational numbers, Real numbers, Interval, Modulus of real number, Imaginary numbers, Complex numbers, Number systems in chart.
Set Theory: Introduction, Definition of Set, Elements of a set, Methods of describing a set, Types of sets, Operations on sets, Relation, Venn diagram
Sequence and Series: Arithmetic Progression, Harmonic Progression, Geometric Progression, finding the nth term of an AP, Number of terms of an arithmetic progression, Sum of first n terms in an arithmetic progression, sum upto n^{th} term of an AP, Arithmetic Mean, Insertion of Arithmetic means in given terms of AP and representation of AP. Geometric progression: finding nth term of GP.
Permutations and Combinations: Permutation, Factorial notation, Permutations of n different things, Permutations of n things not all different, Combination, Combinations of n different things taken some or all at a time

| UNIT-II | 12 Hrs. |

Determinant and Matrix: Definition of determinant, Value of the determinant, Minors and co-factors, Fundamental properties of determinant, Multiplication of two determinants, Definition of matrix, Types of matrices, Matrices operations, Process of finding inverse matrix
Mathematics of Finance: Simple interest, Compound interest including half yearly and quarterly calculation, Instalment Purchases (Cost of Instalment, Effective rates, amortization of a loan), Percentage and Ratios' Applications: Percent, Commission, Discount, e.g., bill discounting, mark up, margin and concepts of Ratios.

| UNIT-III | 12 Hrs. |

Introduction to Statistics: Cases, Variables, Types of variables - Numerical, categorical, Categorical Variables - Nominal Variable, Ordinal Variable, Quantitative/ Numerical Variables - Continuous Variable, Discrete Variable, Matrix and Frequency Table, Graphs and shapes of Distributions - Categorical Variables, Quantitative Variables - Dot Plot, Histogram, Mode, Median and Mean, Range, Interquartile Range, Mean Deviation, Standard Deviation, Relation between the measures of dispersion, Coefficient of variation, Z-scores, Contingency Table, Scatterplot

| UNIT-IV | 12 Hrs. |

Regression: Introduction, Regression model, estimation using Regression line, the method of least squares
Correlation: Concept and importance of correlation, types of correlation, Methods of studying correlation - Scatter diagram, Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient, Method of least squares

Text Books:

1. Padmalochan Hazarika, **A Textbook of Business Mathematics**, 2nd Edition, S. Chand Publishing, 2010.
2. B L Agarwal, **Basic Statistics**, 5th Edition, New Age International ltd, Publishers, 2011
3. G C Beri, **Business Statistics**, 3rd Edition, McGraw Hill, 2011

Reference Books:

1. B.L. Agarwal, **Basic Statistics**, New Age International Private Limited; 6th Edition,2013.
2. S.C. Gupta, **Fundamentals of Statistics**, Himalaya Publishing House Pvt. Ltd.; Seventh Edition,2016.
3. Alan Graham, **Statistics: A Complete Introduction: Teach Yourself**, John Murray Learning; Edition, 2013

Practical-IV	BADPP 282 : Data Analysis Lab	36 hours
Practical/Week: 3 Hrs	Lab Exercises on Statistical methods using	**I.A: 10**
Credits: 1	R/SPSS/Spreadsheets	**Exam: 40**

GROUP-II
COURSE-IV   **BASDPOE 283-E1: Internet Technologies**   **24 hours**
Theory/Week: 2 Hrs   **I.A: 10**
Credits: 1   **Exam: 40**

Course Objectives:
Help students
- Learn basics, components of Network, Internet and Web technology;
- Learn basics of Internet technology, such as http and the World Wide Web, HTML, and JavaScripts;
- create WWW pages to serve as front-end to client/server, Internet applications;

Course outcomes:
- Be skilled, at a beginners' level, at analyzing and designing Internet applications; implement the design using the client/server model; testing and documenting the solutions developed.
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| **UNIT-I**   **12 Hrs.** |

Computer Networks: Introduction to computer network, LAN, MAN, WAN, wireless LAN, internet, intranet, extranet. Network Models: Client/ server network and Peer-to-peer network, OSI, TCP/IP, layers and functionalities.   Internet Applications: Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc. Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, SciLab, Mathematica etc. Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline. Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs.

| **UNIT-II**   **12 Hrs.** |

Introduction to Web Design: Introduction to hypertext markup language (html) Document type definition, creating web pages, lists, hyperlinks, tables, web forms, inserting images, frames, hosting options and domain name registration. Customized Features: Cascading Style Sheet (CSS) for text formatting and other manipulations. JavaScript Fundamentals: Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.

Text Books:
1. Andrew S. Tanenbaum, David J. Wetherall, **Computer Networks**, PHI, 1999.
2. D.R. Brooks, **An Introduction to HTML and Javascript for Scientists and Engineers**, Springer, 20007.
3. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, **Mastering HTML, CSS & Javascript Web Publishing**, BPB, 2016

Reference Books:
1. B. A. Forouzan, **Data Communication and Networking**, TMH, 2007
2. Thomas Powell, **HTML & CSS: The Complete Reference**, Fifth Edition, McGraw Hill Education, 2017
3. William Fischer, **HTML: QuickStart Guide - Creating an Effective Website (HTML, CSS, Javascript)**, Createspace Independent Publishing Platform, 2016

GROUP-II
COURSE-V   **BASDPOE 284-E1: Internet Technologies**   **24 hours**
Theory/Week: 2 Hrs   **I.A: 10**
Credits: 1   **Exam: 40**

Course Objectives:
- To make the students understand and learn the basics of computer for its effective use in day to day life.

Course outcomes:
- Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution
- Be able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- Be able to effectively integrate IT based solutions into the user environment

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UNIT-I   **12 Hrs.**

Introduction: Introduction to logical organization of computer, input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, monitor, printer, plotter, primary memory, secondary memory, auxiliary memory. User Interface: Operating system as user interface, system tools, utility programs Database: Introduction to database, relational data model, Entity types, entity set, attribute and key, relationships, relation types, SQL queries: select, from, where, order

UNIT-II   **12 Hrs.**

Networks: Definition of network, classification of network, LAN, MAN, WAN, distinction among the networks, Guided Media: Twisted pair, Coaxial cable, and Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite, LAN Topologies: Ring, bus, star, mesh and tree topologies.
Internet Applications: Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc. Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, SciLab, Mathematica etc.

Text Books:
1. ITL Education Solutions Limited, **Introduction to Information Technology**, Pearson Education India; 2 edition,2012.
2. Peter Norton, **Introduction to Computers**, 7th edition, Tata McGraw Hill Publication, 2017

Reference Books:
1. Anitha Goel, **Computer Fundamentals,** Pearson Education, 2010
2. Sanjay Saxena, A First Course in Computers 2003 Edition, 3rd Edition, Vikas Publishing House Pvt Limited, 2009

MANGALORE UNIVERSITY
B.A. (Data Processing) Degree Programme Curriculum Structure and Scheme of Examinations

V Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks I.A	Exam	Total	Credits
1	BASDPC331	Networking Essentials	03	03	20	80	100	2
	BASDPC332	Web Design	03	03	20	80	100	2
	BASDPP333	Networks Lab	02	03	10	40	50	1
	BADPP334	Web Design Lab	02	03	10	40	50	1
		Total	10				300	6

GROUP-I
COURSE-V　　　　　**BASDPC331: Networking Basics**　　　　**48 hours**
Theory/Week: 4 Hrs

I.A: 20
Exam: 80

Credits: 2
Course Objectives:
　　CO1: Define computer networks and their purpose
　　CO2: Describe network media and data transmissions
　　CO3: Explain various network topologies
　　CO4: Discuss network protocols and network software
　　CO5: Describe the features of Windows server and Linux servers
　　CO6: Explain data analysis using mathematical methods and statistics
Course Outcomes:
Upon successful completion of this course, students will be able to
　　Co1: Define the basic components of a Network system.
　　Co2: Differentiate the various types of network configurations
　　Co3: Understand the layers of OSI and TCP
　　Co4: Define the different protocols, software, and network architectures.

| **UNIT-I** | **12 Hrs.** |

Introduction to Networks: Overview of Networking, Network communication standards
Network Topologies: Overview of Network Topologies, Basic topologies, complex topologies
LAN Components: LAN Cables and connectors, LAN devices, Wireless LANs

| **UNIT-II** | **12 Hrs.** |

LAN Protocols: Lower-layer Protocols, Middle-layer Protocols, Higher-layer Protocols,
Network Addressing - Introduction, TCP/IP Addressing scheme, IPX/SPX addressing, NETBEUI
addressing

| **UNIT-III** | **12 Hrs.** |

Introduction to WAN: Overview, WAN connectivity options, virtual private networks
WAN hardware and protocols**: WAN devices, WAN Protocols**

| **UNIT-IV** | **12 Hrs.** |

Network Operating Systems: Windows 2000 server, Novel Netware. **Windows 2000 server**:
Active directory, Internet tools and services

Text Books:
　NIIT, Basics of Networking**, PHI Learning Private ltd, 2010**

Reference Books:
1. Behrouz A. Forouzan, **Data Communications and Networking**, 4th Edition, Tata Mcgraw Hill
2. Andrew S Tanenbaum, **Computer Networks**, 4th edition, Dorling Kindersley Pvt Ltd
3. James Chellis, et al., **MCSE: Networking Essentials Study Guide,** 3rd edition, BPB

GROUP-I
COURSE-VI

BASDPC 332: Web Design

48 hours

Theory/Week: 4 Hrs
Credits: 2

I.A: 20
Exam: 80

Course Objectives:

- To provide in-depth understanding of the tools and technologies necessary for Web application design and development.
- To make the students understand client-side scripting like HTML, JavaScript and server-side scripting like servlets, ASPs and database interfacing.

Course Outcomes:

- Have a sound knowledge of Web Application Terminologies, Internet Tools and web services.
- Select and apply mark-up languages for processing, identifying, and presenting information in web pages.
- Use scripting languages and web services to add interactive components to web pages.
- Design and implement websites with good aesthetic sense of designing
- Design to be reusable the software components in a variety of different environments.

UNIT-I	**12 Hrs.**

Internet Basic - Introduction to HTML - List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Display properties.

UNIT-II	**12 Hrs.**

Introduction to JavaScript - Advantage of JavaScript - JavaScript Syntax – Data type – Variable - Array - Operator and Expression - Looping Constructor - Function - Dialog box.

UNIT-III	**12 Hrs.**

JavaScript document object model - Introduction - Object in HTML - Event Handling - Window Object - Document object - Browser Object - Form Object - Navigator object Screen object - Build in Object - User defined object - Cookies.

UNIT-IV	**12 Hrs.**

ASP.NET Language Structure - Page Structure - Page event, Properties & Compiler directives. HTML server controls - Anchor, Tables, Forms, Files. Basic Web server Controls-Label, Textbox, Button, Image, Links, Check & Radio button, Hyperlink. Data List Web Server Controls - Check box list, Radio button list, Drop down list, List box, Data grid, Repeater.

Text Books:

Ivan Bayross, **Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML & PHP**, BPB Publications, 2009

Reference Books:

1. Sean McManus, **Web Design in Easy Steps**, Tata McGraw hill education private limited, 2011
2. Paul J. Deitel, Harvey M. Deitel, Internet & World Wide Web: How to Program, 4th Edition, PHI, 2007
3. Greg Buczek, ASP.NET: Developer's Guide, Tata McGraw Hill Education private limited, 2002
4. Kogent Learning Solutions Inc, HTML5 Black Book: Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and Jquery (With CD), Dreamtech press, 2011
5. 5. Jon Duckett, **Beginning HTML, XHTML, CSS and Javascript**, Wiley India Pvt Ltd, 2010

Practical-V	**BASDPP 333: Networks Lab**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Lab Exercises on Networking	**I.A:10** **Exam: 40**

Practical-VI	**BASDPP 334: Web Application Lab**	**36 hours**
Practical/Week: 3 Hrs **Credits: 1**	Lab Exercises on Web development	**I.A: 10** **Exam: 40**

MANGALORE UNIVERSITY
B.A. (Data Processing) Degree Programme Curriculum Structure and Scheme of Examinations

VI Semester

Group	Course Code	Course Title	Hours of Instructions/Week	Duration of Exams Theory/ Practical.	Marks I.A	Marks and Credit		
						Exam	Total	Credits
1	BASDPC 381	Operating System	03	03	20	80	100	2
	BASDPC 382	Problem Solving with C	03	03	20	80	100	2
	BASDPP 383	OS Lab	02	03	10	40	50	1
	BASDPP 384	C Lab	02	03	10	40	50	1
	Total		10				300	6

GROUP-I
COURSE-VII   **BASDPC 381: Operating System**   **48 hours**
Theory/Week: 4 Hrs   **I.A: 20**
Credits: 2   **Exam: 80**

Course Objectives:
- To make students understand the purpose, role, structure, functions, application of operating systems
- Understand services provided by operating systems

Course Outcomes:
- Analyze the structure of OS and basic architectural components involved in design
- Analyze the various resource management techniques
- Interpret the mechanisms adopted for file sharing
- conceptualize the components involved in designing a contemporary OS
- To be familiar with various types of operating systems
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UNIT-I   **12 Hrs.**
Introduction: Operating system, Mainframe systems, Desktop Systems, Multi-processor Systems, Distributed Systems, Cluster systems, Real Type Systems, Handheld Systems, Future Migration, Computing Environment. **Operating System Structures:** System Components, Operating System Services, System Calls, System Structures. **Process Management**: Process concept, Process Scheduling, Operations on process, Cooperative Process, Inter process Communication. **Threads:** Overview, Multithreading Models.

UNIT-II   **12 Hrs.**
CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, multiple processor scheduling.
Process Synchronization: Background, the critical section Problems, Synchronization, Semaphore, Classic problems synchronization hardware, Critical region Monitor, Semaphore. **Deadlocks**: System model, deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection.

UNIT-III   **12 Hrs.**
Memory Management: Background, Swapping, contiguous Memory allocations, Paging, segmentation, segmentation with paging, **Virtual Memory:** Background, demand paging, process creation, page replacement, allocation of frames and thrashing. **File Management**: File concept, Access methods, Directory structure, File system Mounting, File sharing, Protection.

UNIT-IV   **12 Hrs.**
Linux: An introduction, reason for its popularity, Linux file system, login and logout.
Linux commands: Command format, Directory oriented command, wild card characters, File oriented commands, File Access Permissions, Process oriented commands, Background processing, Communication oriented commands, General purpose commands, Pipe and Filters related commands, vi editor, Shell programming, System administration.

Text Books:
1. Silberschartz, Galvin and Gagne, **Operating Systems Concepts**, 8th Edition, John Wiley & sons, Pvt. Ltd.2008
2. 2. B Mohamed Ibrahim, **Linux: A Practical Approach**, Laxmi Publications; First edition, ,2016

Reference Books:
1. Pramod Chandra P. Bhatt, **An Introduction to Operating Systems: Concepts and Practice (GNU/ Linux),** Prentice Hall India Learning Private Limited; Fourth edition, 2013
2. Richard Blum, Christine Bresnahan, **Linux Command Line and Shell Scripting Bible**, Third edition, Wiley, 2015.
3. Sobell, **Practical Guide to Linux Commands Editor**, Pearson Education India; 3rd edition, 2013.

GROUP-I
COURSE-VIII   **BASDPC 382**: Problem Solving with C   **48 hours**
Theory/Week: 4 Hrs   **I.A: 20**
Credits: 2   **Exam: 80**

Course Objectives:
- To develop understanding about programming principles/concepts - functional, logic and also learn skills of problem solving and implementation of solution

Course outcomes:
- To apply programming knowledge to create solutions to challenging problems, including specifying, designing, implementing and validating solutions for new problems
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UNIT-I   12 Hrs.

Introduction: Overview of C Program, Importance of C-Program, Basic structure of a C-program, Execution Style of C-Program. **Constants, Variables & Data types**: Features of C language, Character set, C token, Keywords & identifiers, Constants, Variables, data types, Declaration of variables, assigning values to variables, defining symbolic constants. **Operators and Expression**: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bit wise & special operators, evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence & Associativity, built in mathematical functions. **Managing Input and Output operations**: Reading & writing a character, Formatted input and output.

UNIT-II   12 Hrs.

Decision Making and Branching: Decision making with if statement, simple if statement, the if else statement, nesting of if … else statements, the else if ladder, the switch statement, the ?: operator, the go to statement. **Decision making and looping**: The while statement, the do statement, for statement, exit, break, jumps in loops. **Arrays**: Declaration, initialization & access of one dimensional & two-dimensional arrays. Programs using one and two dimensional arrays. : Adding multiplying, transposing matrices, sorting and searching arrays.

UNIT-III   12 Hrs.

Handling of character strings: Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings. **User defined functions**: Need for user defined functions, Declaring, defining and calling C functions return values & their types, Categories of functions: With/without arguments, with/without return values, recursion, functions with arrays, the scope, visibility & lifetime of variables.

UNIT-IV   12 Hrs.

Structures and union: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within structures, structures & functions, unions, size of structures, bit fields. **Pointers**: Understanding pointers, accessing the address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer expression, pointer increments & scale factor, pointers & arrays, Passing pointer variables as function arguments. **The Preprocessor**: Macro substitution, file inclusion, compiler control directives, command line arguments & illustrative programs. **File Management in C:** Introduction, defining and opening a file, closing a file, I/O operations on files, error handling during I/O operations.

Text Books:
1. E. Balagurusamy, **Programming in ANSI C**, McGraw Hill Education India Private Limited; Seventh edition, (2017
2. .M. T. Somashekara, D. S. Guru, K. S. Manjunatha, **Problem Solving with C**, PHI Learning Pvt. Ltd.; Second edition, 2018

Reference Books:
1. Hanly, **Problem Solving and Program Design in C**, Pearson Education India; 7 edition, 2013
2. Satish Jain, **Programming & Problem Solving Through C Language**, BPB Publications, 2012

Practical-VII	**BASDPP 383**: OS Lab	36 hours
Practical/Week: 3 Hrs **Credits: 1**	Lab Exercises on OS	**I.A:10** **Exam: 40**

Practical-VIII	**BASDPP 384**: C Programming Lab	36 hours
Practical/Week: 3 Hrs **Credits: 1**	Exercises in C language	**I.A: 10** **Exam: 40**