VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY: VISAKHAPATNAM
DEPARTMENT OF ECM
PROGRAM STRUCTURE – VR-20

II Year **I Semester**

II B.Tech						**Semester-I**
S.No	**Course Code**	**Name of the Course**	**L**	**T**	**P**	**Credits**
1	1000202102	Probability and Statistics	3	1	0	3
2	1019202100	Integrated Analog Electronics-I	3	0	0	3
3	1005202101	Operating Systems	3	0	0	3
4	1012202100	Python Programming	3	0	0	3
5	1019202101	Fundamentals of Signals & Systems	3	1	0	3
6	1019202110	Integrated Analog Electronics-I Lab	0	0	3	1.5
7	1005202111	Operating Systems Lab	0	0	3	1.5
8	1012202110	Python Programming Lab	0	0	3	1.5
9	1020202100	Employability Readiness Program	1	0	2	2
10	1000202120	Life Skills	2	0	0	0
				Total Credits		**21.5**

II B.Tech I Semester

II Year – I Semester	PROBABILITY AND STATISTICS	L	T	P	C
1000202102		3	0	0	3

COURSE OBJECTIVES:

- To explain fundamental concepts of probability theory and random variables.
- To develop an understanding of the role of discrete and continuous probability distributions in science and engineering.
- The basic ideas of statistical methods of studying data samples.
- To impart statistical methods in various applications Engineering

COURSE OUTCOMES:

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	**Explain** the notion of random variable and **evaluate** the expected value and probability of random variables.	1 2 12	1 2 3
CO2	**Apply** Binomial, Poisson, Normal, gamma and weibull distributions for real data to **compute** probabilities, theoretical frequencies.	1 2 3	2 2 3
CO3	**Evaluate** the confidence levels and maximum error for large and small samples, **Apply** the concept of hypothesis testing for large and small samples in real life situations to draw the inferences and estimate the goodness of fit.	1 2 3 4	1 2 3 3
CO4	**Examine** correlation for the bi-variate data and fit the different curves using principle of least squares and to **predict** the regression analysis	1 2 3	1 2 3

UNIT- I

RANDOM VARIABLES: [8 Hours]

Review on Probability, Random experiment, sample space, events, Random variable, Discrete and Continuous variables, mathematical expectation and properties of Momentgenerating Functions(Without proof).

UNIT- II

DISTRIBUTIONS: [10 Hours]

Binomial, Poisson distributions (MGF, Mean and Variance without proofs), Normal distribution (MGF, area and symmetric properties without proofs) -related properties, Gamma and Weibull distributions.

UNIT- III

SAMPLING DISTRIBUTIONS: [10 Hours]

Introduction, Population and samples, Sampling distribution of mean for large and small samples (with known variance), proportion - Point and interval estimators for means and proportions (for large and small samples), Maximum error.

UNIT- IV

TESTING OF HYPOTHESIS [14 Hours]

Introduction, Null and alternative hypothesis, Type I and Type II errors, one tail, two-tail tests, Level of Significance. Tests concerning means, proportions and their differences using Z-test. Student's t-test, F-test and χ^2 test of goodness of fit and independence of attributes.

UNIT- V

CORRELATION & CURVE FITTING [10 Hours]

Introduction, simple correlation, regression, fitting of straight line, second degree curves, exponential and power curves by method of least squares.

Text Books:

1. Probability & Statistics for Engineers, Miller& John E. Freund, Prentice Hall of India.
2. Probability & statistics for Engineers and Scientists ; R.E.Walpole, S.L.Myeres Pearson

Reference Books:

Fundamentals of Applied Statisitics ; S.C.Gupta & V.K.Kapoor S.Chand & Sons, Cengage.

II Year – I Semester	INTEGRATED ANALOG ELECTRONICS-I	L	T	P	C
1019202100		3	0	0	3

COURSE OBJECTIVES:

- To provide an overview of the operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions.
- To provide the student with the basic knowledge about design, functionality and fabrication of semiconductor devices.
- Understanding of complex devices such as semiconductor diodes and field-effect transistors are modeled and how the models are used in the design and analysis of useful circuits.
- Capability to design circuits, take measurements of circuit behavior and their performance, compare with predicted circuit models and explain discrepancies.

COURSE OUTCOMES:

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	Summarize the characteristics of PN junction diode in different modes of operation.	1 2 3 4 6 12	2 1 1 1 2 1
CO2	Compare the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.	1 2 3 4 5 6 12	1 2 3 2 1 1 1
CO3	Summarize the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations and understand the various biasing techniques for BJT and FET.	1 2 3 4 5 6 12	1 2 3 2 1 1 1
CO4	Explain the stabilization concepts with expressions and perform the analysis of small signal low frequency transistor amplifier circuits using BJT	1 2 3 4 5 6 12	1 2 3 2 1 1 2

UNIT- I

Junction Diode Characteristics: Open circuited p-n junction, Biased p-n junction,

V-I Characteristics of diode, current components in PN junction Diode, diode equation, , Diode capacitance, and energy band diagram of PN junction Diode. Zener Diode characteristics, LED and Varactor diode.

UNIT- II

Rectifiers and Filters: Half wave rectifier, full wave rectifier, rectifier circuits-operation, filters; Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

Non Linear Wave shaping circuits: Series and shunt clippers, clipping at two independent levels, Positive and Negative Clampers.

UNIT- III

Linear Wave shaping circuits: Response of high pass and low pass RC circuits to step, pulse inputs. High pass RC circuit as differentiator, low pass RC circuit as integrator.

UNIT- IV

Transistor & FET Characteristics:

BJT: Junction transistor, transistor current components, transistor configurations, transistor as an amplifier, and characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through.

FET: FET types, construction, operation and characteristics

UNIT- V

Transistor Biasing: Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias.

Small Signal Low Frequency Transistor Amplifier Models: BJT: Two port network, Transistor hybrid model, determination of h-parameters, generalized analysis of transistor amplifier model using h-parameters

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition
2. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition

Reference Books:

1. Electronic Devices and Circuit Theory-R.L.Boylestad and Louis Nashelsky, Pearson Publications, Tenth Edition.
2. Electronic Devices and Circuits-B.P. Singh, Rekha Singh, Pearson Publications, Second Edition

II Year – I Semester	Operating Systems	L	T	P	C
1005202101		3	0	0	3

COURSE OBJECTIVES:

1. Study the basic concepts and functions of operating systems.
2. Understand the structure and functions of OS.
3. Learn about Processes, Threads and Scheduling algorithms.
4. Understand the principles of concurrency and Deadlocks.
5. Learn various memory management schemes.
6. Study I/O management and File systems.

COURSE OUTCOMES:

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	Summarize various concepts of Operating Systems	PO1 PO2	1 2
CO2	Implement and Apply Process Scheduling Algorithms	PO1 PO2 PO4	1 2 2
CO3	Illustrate concepts of Paging, Segmentation and Apply Concurrency, Deadlock Mechanisms in real world	PO1 PO2 PO3	2 2 3
CO4	Analyze the concepts of file systems in operating systems	PO1 PO3 PO12	1 2 3

UNIT- I

INTRODUCTION TO OPERATING SYSTEM CONCEPT

Types of operating systems, operating systems concepts, operating systems services, Introduction to System call, System call types. **[8 Hours]**

UNIT-II

PROCESS MANAGEMENT

Process concept, The process, Process State Diagram ,Process control block, Process Scheduling-Scheduling Queues, Schedulers, Operations on Processes, Inter process Communication, Threading Issues, Scheduling-Basic Concepts, Scheduling Criteria, Scheduling Algorithms. **[8 Hours]**

UNIT-III

MEMORY MANAGEMENT

Swapping, Contiguous Memory Allocation, Paging, structure of the Page Table, Segmentation.

VIRTUAL MEMORY MANAGEMENT

Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing **[10 Hours]**

UNIT-IV

CONCURRENCY

Process Synchronization, The Critical- Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples.

PRINCIPLES OF DEADLOCK

System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock

[8 Hours]

UNIT-V

FILE SYSTEM INTERFACE

The concept of a file, Access Methods, Directory structure, File system mounting, files sharing, protection. File System implementation- File system structure, allocation methods, free-space management Mass-storage structure overview of Mass-storage structure, Disk scheduling, Device drivers. **[10 Hours]**

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.
3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second 2016.

Reference Books:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, TataMc Graw-Hill Education, 2007.

II Year – I Semester	Python Programming	L	T	P	C
1012202100		3	0	0	3

COURSE DESCRIPTION:

This course introduces computer programming using the Python programming language. This Python Programming course will help you master the Programming with Python by introducing the Object Oriented programming concepts, creation of Data Structures, Implementation of Functions, and Visualization libraries using the Python programming language. Lastly you will get into design, code, test, and debug Python programming Language Scripts.

COURSE OUTCOMES:

CO	Course outcomes	Cognitive Level as per Bloom's Taxonomy	PO
CO1	Install Python IDE and run basic Python scripts.	Understand	PO1
CO2	Understand the operators, functions, key Concepts of Object Oriented Programming in python.	Understand	PO1,PO2
CO3	Access Python from various online resources and import packages to the current working environment.	Applying	PO5
CO4	Understand file handling operations and implement ML/DS Libraries using in Python.	Implementation	PO12

UNIT-I

Introduction: History of Python, Need of Python Programming, Applications, Basics of Python Programming, Using the REPL(Shell), Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators and Expressions: Types - Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations..

Outcome:

- Understanding the Python IDE.
- Learn the basics building blocks of python.
- Write the basic programs in python

A**ctivity:** Install Python on PCs or through Mobile applications run basic Python Scripts for a given data.

UNIT-II

Control Flow- if, if-elif-else, for, while, break, continue, pass
Data Structures Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

Outcome

- Usage of different operators in conditional statements and flow of program.
- Understanding the sequences and dictionaries.

Activity

Identify Operators and types in Python. Implement Data Structure concepts by writing python Scripts.

UNIT-III

Functions - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables.
Modules- Creating modules, import statement, from import statement, name spacing,
Python packages-Introduction to PIP, Installing Packages via PIP, Using Python Packages.

Outcome:

- Understanding Functions implementation in Python.
- Learn the scope or life time of variables in a function.
- Usage of import statement in modules.
- Create a package, import and install PIP package in python.

Activity/Event

Using Functions develop simple scripts in Python Programming.

UNIT-IV

Object Oriented Programming in Python: Classes, 'self variable', Methods, Constructor Method, Inheritance, Overriding Methods, and Data hiding.
Error and Exceptions: Difference between an Error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions.

Outcome:

- Implement the OOP concepts using python
- Understand the Exception handling in python.

Activity/Event

Implement OOP concepts in Writing Python Scripts

UNIT-V

Regular Expressions: Simple Meta characters, Character classes.

File handling: Python File(doc and csv) Operation Reading config files in python, Writing log files in python, Understanding read functions, Understanding write functions, Manipulating file pointer using seek, Programming using file operation.

Introduction to ML/DS Libraries: Introduction to NumPy, Pandas and Matplotlib

Brief Tour of the Standard Library:

Operating System Interface - String Pattern Matching, Mathematics, Internet Access, Dates and Times, Multithreading.

Outcome:

- Perform various Regular operation
- Perform various File handling operation
- Understand standard Libraries and GUI visualization in Python.

Activity/Event

Write various test cases and implement specific test for a given case study.

Text Books:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Learning Python, Mark Lutz, Orielly

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W. Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. http://nptel.ac.in/courses/117106113/34
5. https://www.python.org/

II Year – I Semester	FUNDAMENTALS OF SIGNALS & SYSTEMS	L	T	P	C
1019202101		3	1	0	3

COURSE OBJECTIVES:

- To introduce the basic concepts of analog and digital signal processing, a topic that forms an integral part of engineering systems in many diverse areas, including communications, speech processing, image processing, defense electronics, consumer electronics, seismic data processing, and consumer products. Understanding the fundamental characteristics of signals and systems, and developing the mathematical skills to solve problems involving filtering, modulation and sampling.

.**COURSE OUTCOMES:**

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	Apply the knowledge of linear algebra topics like vector space and orthogonal basis to signals, Analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.	1 2 9 12	2 2 1 1
CO2	Understand the process of sampling and the effects of under sampling, Analyze system properties based on impulse response and Fourier analysis	1 2 3 9 12	2 2 1 1 1
CO3	Apply convolution both in time domain and frequency domain.	1 2 9	3 2 1
CO4	Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.	1 2 9	3 2 1

UNIT- I [10 Hours]

Signal Analysis:

Definition and classification of Signals and Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Complex exponential and sinusoidal signals, Singularity function and related functions: impulse function, unit step, ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, closed or complete set of orthogonal functions.

UNIT- II [10 Hours]

Fourier Series & Fourier Transforms: Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum.

Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform

UNIT- III [8 Hours]

Concept of Sampling & Signal Transmission Through:

Linear Systems: Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.

Linear system, Impulse response, Linear time invariant (LTI) system, Transfer functions of a LTI system, Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics.

UNIT- IV [8 Hours]

Convolution and Correlation of Signals: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property, Cross correlation and auto correlation functions, properties of cross correlation and auto correlation of functions, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation.

UNIT- V

Laplace Transforms & Z–Transforms: [10 Hours]

Laplace Transforms: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's, and F.T. of a signal.

Z–Transforms: Fundamental difference between continuous-time and discrete-time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Signals & Systems- Narayan Iyer and K SatyaPrasad ,Cenage Pub.

Reference Books:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Signals and Systems – K R Rajeswari
3. Fundamentals of Signals and Systems- Michel J. Robert, MGH International Edition, 2008.

II Year –I Semester	INTEGRATED ANALOG ELECTRONICS-I LAB	L	T	P	C
1019202110		0	0	3	1.5

COURSE OBJECTIVES:

- To observe the characteristics of different diodes and transistors practically.
- To Design and construct simple electronic circuits to accomplish a specific← function, e.g. designing rectifiers, designing amplifiers etc.

COURSE OUTCOMES:

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	Verify the working of diodes, transistors and their applications	1 2 3 4 6 12	2 1 1 1 2 1
CO2	Design simple hardware circuits using diodes and transistors	1 2 3 4 5 6 12	1 2 3 2 1 1 1
CO3	Set up a bias point in a transistor	1 2 3 4 5 6 12	1 2 3 2 1 1 1
CO4	Design simple DC power supply circuits.	1 2 3 4 5 6 12	1 2 3 2 1 1 2

LIST OF EXPERIMENTS

S.No.	Name of the experiment	Skill
1	Identification of Components	Colour Codes are used to identify the value of resistor, capacitor , inductor. Overall idea on basic electronic components

2	V-I characteristics of P-N junction diode	Observe and draw the Forward and Reverse bias V-I Characteristics of a P-N Junction diode Calculate static and dynamic resistance in both forward and Reverse Bias Condition.
3	V-I characteristics of Zener diode	Observe and draw the static characteristics of a zener diode Find the voltage regulation of a given zener diode
4	HWR with and without filter	Examine the input and output waveforms of half wave Rectifier and also Calculate its load regulation and ripple factor Without Filter
5	FWR with and without filter	Examine the input and output waveforms of Full Wave Rectifier and also calculate its load regulation and ripple factor Without Filter
6	Non Linear wave shaping – Clippers.	Design and verify waveforms of different clipping circuits with different reference voltage
7	Non Linear wave shaping – Clampers	Design and verify the characteristics of different clamping circuits with different reference voltage
8	Characteristics of BJT in CB configuration	Observe and draw the input and output characteristics of a transistor connected in common base configuration Find α of the given transistor and also its input and output Resistances
9	Characteristics of BJT in CE configuration	Draw the input and output characteristics of transistor connected in CE configuration find β of the given transistor and also its input and output Resistances
10	Characteristics of BJT in CC configuration	Draw the input and output characteristics of transistor in CC mode

11	Frequency response of CE amplifier	Measure the voltage gain of a CE amplifier Draw the frequency response of the CE amplifier
12	Frequency response of CC amplifier	Measure the voltage gain of a CC amplifier Draw the frequency response of the CC amplifier

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition
2. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition

Reference Books:

1. Electronic Devices and Circuit Theory-R.L.Boylestad and Louis Nashelsky, Pearson Publications, Tenth Edition.
2. Electronic Devices and Circuits-B.P. Singh, Rekha Singh, Pearson Publications, Second Edition

II Year – I Semester	Operating Systems Lab	L	T	P	C
1005202111		0	0	3	1.5

COURSE OBJECTIVES:

1. To provide an understanding of the design aspects of operating system.
2. To provide practical knowledge on the different concepts of operating systems.
3. To familiarize students with the Linux environment.

COURSE OUTCOMES:

CO's	At the end of the course, the student will have the ability to:	POs Mapped	Strength of mapping
CO1	Stimulate CPU scheduling algorithms in operating system.	PO1 PO2 PO12	3 3 3
CO2	Evaluate memory management techniques in operating system.	PO1 PO2 PO12	3 3 3
CO3	Implement page replacement algorithms in operating system	PO1 PO2 PO3 PO12	3 3 3 3
CO4	Implement file allocation strategies used in operating system.	PO1 PO2 PO3 PO12	3 3 3 3

LIST OF EXPERIMENTS

S.No.	Name of the experiment	Skill
1.	**Exercise -1** Study of Unix/Linux general purpose utility command list man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.	Unix/Linux Commands
2.	**Exercise – 2** Simulate the following CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority	CPU Scheduling
3.	**Exercise – 3** Simulate MVT and MFT	Multi Programming

4.	**Exercise – 4** Simulate Bankers Algorithm for Dead Lock Avoidance	Dead Lock Avoidance
5.	**Exercises –5** Simulate Bankers Algorithm for Dead Lock Prevention	Dead Lock Prevention
6.	**Exercise -6** Simulate all page replacement algorithms. a) FIFO b) LRU c) LFU	Page Replacement
7.	**Exercise -7** Simulate all File allocation strategies a) Sequenced b) Indexed c) Linked	File Allocation
8.	**Exercise -8** C program to emulate the UNIX ls –l command.	ls –l command
9.	**Exercise -9** C program that illustrates how to execute two commands concurrently with a command pipe.	Command Pipe
10.	**Exercise -10** C program that illustrates two processes communicating using shared memory	Shared Memory

Text Books:

1. Operating System Concepts, Abraham Silberschatz, Peter Baer Galvin and Greg Gagne 9th Edition, John Wiley and Sons Inc., 2012.
2. Operating Systems – Internals and Design Principles, William Stallings, 7th Edition, Prentice Hall, 2011.
3. Operating Systems-S Halder, Alex A Aravind Pearson Education Second 2016.

Reference Books:

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2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata Mc Graw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, TataMc Graw-Hill Education, 2007.

II Year – I Semester	Python Programming Lab	L	T	P	C
1012202110		0	0	3	1.5

COURSE OBJECTIVES:

1. To acquire programming skills in core Python.
2. To acquire Object Oriented Skills in Python
3. To develop the skill of designing Graphical user Interfaces in Python
4. To develop the ability to write database applications in Python

LIST OF EXPERIMENTS

Exercise 1- Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purposefully raise Indentation Error and Correct it.

Exercise 2- Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

Exercise 3- Control Flow

a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

Exercise 4 - Control Flow - Continued

a)Find the sum of all the primes below two million.
Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
b)By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 5 - DS

a)Write a program to count the numbers of characters in the string and store them in a dictionary data structure. Eg: hello -> {“h”:1,”e”:1,”l”:2,”0”:1}
b)Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

Exercise - 6 DS - Continued

a)Write a program combine lists that combines these lists into a dictionary.
b)Write a program to count frequency of characters in a given file.

Exercise -7 Functions

a)Write a function ball collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius
If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
b)Find mean, median, mode for the given set of numbers in a list.

Exercise - 8 Functions - Continued
a)Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
b)Write a function dups to find all duplicates in the list.
c)Write a function unique to find all the unique elements of a list.

Exercise - 9 - Functions - Problem Solving
a)Write a function cumulative product to compute cumulative product of a list of numbers.
b)Write a function reverse to reverse a list. Without using the reverse function.
c)Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 10 - Multi-D Lists
a)Write a program that define and print a matrix.
b)Write a program to perform addition of two square matrices.
c)Write a program to perform multiplication of two square matrices.

Exercise - 11 - Modules
a) Using PIP install packages requests, flask and explore them.
b) Write a script that imports requests and fetch content from the page. Eg.(Wiki).
c) Write a simple script that serves a simple HTTP Response and a simple HTML Page.
Write various test cases and implement specific test for a given case study.

Exercise - 12 OOP
a) Class variables and instance variable and illustration of the self-variable
i)Robot.
ii)ATM Machine.

Exercise - 13 Files
a) Write a program to print each line of a file in reverse order.
b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 14 File access
a) Create a CSV file (roll no, subject1, subject2, subject 3) with 100 rows. All the marks randomly generated having range (0-100), roll no are having range (1-100)
b) Read the above CSV file having(roll no,subject1, subject2,subject 3) and create new CSV (roll no,subject1, subject2,subject 3, average marks)

Exercise – 15 Introduction to ML/DS Libraries

a) Write a program to represent 2 – dimensional matrix using NUMPY and perform basic operations like addition, multiplication, transpose.
b) Develop a student dataset using PANDAS and perform some basic operations. Visualize the above student dataset using MATPLOTLIB

II Year – I Semester		L	T	P	C
1020202100	**Employability Readiness Program**	**1**	**0**	**2**	**2**

COURSE OBJECTIVES

1. To enhance the problem solving skills in the area of 'Quantitative Aptitude' this will enable the students to achieve in-campus placements and competitive examinations.
2. To improve the logical thinking capability of students by enhancing the skills in Reasoning.
3. To encourage the all-round development of students by focusing on verbal ability.
4. To perform better during Campus Recruitment and various interviews they face in their career.

COURSE OUTCOMES

CO	At the end of the course, the student will have the ability to:	Strength of Mapping	POs Mapped
CO1	Follow strategies in minimizing time consumption in problem solving and apply shortcut methods to solve problems and confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.	Understanding and Applying (L2&L3)	PO-1 PO-2 PO-12
CO2	Apply various methods of solving a problem by analysing the concept and situation effectively.	Understanding and Applying (L2&L3)	PO-1 PO-2 PO-12
CO3	Communicate effectively with improved vocabulary and able to write e-mails, essays and resumes appropriately.	Understanding (L2)	PO-10 PO-12
CO4	Succeed in professional and personal life by applying all mathematical, reasoning and verbal skills.	Understanding and Applying (L2&L3)	PO-1 PO-2 PO-10 PO-12

Part-A **No. of lecture hours: 25**

Aptitude

Number System: Speed Maths, Numbers, Factors, Prime & Co-Primes, LCM, HCF, Divisibility rules, finding unit place digit and last two digits of an expression.

Averages and Ages: Average of different groups, change in averages by adding, deleting and replacement of objects, problems on ages.

Ratio, Proportion and Variations: Definition of Ratio, Ratio of Proportion, Comparison of ratios, Compound ratio, Direct and indirect proportion.

Allegation and mixtures: Allegation rule, Mean value of the mixture, Replacement of equal amount of quantity.

Percentages: Converting fractions and decimal into percentages, successive percentage, populations, expenditure and savings

Time and Work: Men and Days, Work and Wages, Hours and Work, Alternate days concept.

Time and Distance: Difference between the average and relative speeds, reaching the destination late and early, Stoppage time per hour, time and distance between two moving bodies.

Trains, Boats and Streams: Train crossing man, same and opposite directions, Speed of boat and stream.

Profit and loss: Relation between Cost price and Selling price, Discount and Marked price, Gain or Loss percentages on selling price

Simple and Compound Interest: Problems on Interest (I), Amount (A), Principal (P) and Rate of

Interest(R), Difference between the simple interest and compound interest for 2 and 3 years.

Permutation and Combination: Fundamental rules, problems on permutations & combinations.

Outcome:

1. Apply shortcut methods to solve mathematical problems.

2. Follow strategies in minimizing time consumption in problem solving and to perform well in various competitive exams and placement drives.

3. Solve various Basic Mathematics problems by following different methods

4. Solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.

Logical Reasoning

Blood Relations: Defining the various relations among the members of a family, Solving Blood Relation Puzzles by using symbols and notations. Problems on Coded relations.

Series completion: Number series, Alphabet series, and Letter series.

Coding and Decoding: Letter coding, Number coding, Number to letter coding, Matrix coding, Substitution, Mixed letter coding, Mixed number coding, deciphering individual letter codes by analysis.

Direction sense test: Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks: Relation between minute-hour hands, angle vs. time, exceptional cases in clocks

Calendars: Definition of a Leap Year, Finding the odd days, finding the day of any random calendar date, repetition of calendar years.

Outcome:

1. Solve various Basic Mathematics problems by following different methods and analyses.

2. Follow strategies in minimizing time consumption in problem solving

3. Apply shortcut methods to solve problems and confidently solve any mathematical problems

Part-B **No. of lecture hours: 25**

Verbal: Competitive Grammar: Verb-Tenses, Adjectives & Adverb, Preposition, Conjunction, Syntax (Activity based learning).

Word Etymology, One word substitutes, Word games – Vocabulary development.

Reading Comprehension: General Strategies for Reading Comprehension: Narrative Text, Strategies for Reading Comprehension: Expository Text, Main Idea/Summarization

Sentence Correction/ Improvement/ Completion, Subject-verb agreement, Repetition, Error in modifiers.

Direct-Indirect Speech, Active Passive Voice, Cloze Test

Outcome:

1. Understand the vocabulary.
2. Understand the core competencies to succeed in professional and personal life.

3. Students have the adequate writing skills that are needed in an organization.

Text Books:

1. Quantitative Aptitude by R S Agarwal, S Chand Publications

2. Quantitative Analysis. Third edition (Hall, William Thomas). Norris F. Hall · Cite this: J. Chem. Educ. 1942, 19, 7, 350.

3. A Modern Approach to Verbal Reasoning by R S Agarwal, S.Chand Publications.

4. Arun Sharma and Meenakshi Upadhyay for verbal ability

Reference Books:

1. Quantitative Aptitude – Abhijit Guha, McGraw Hills.

2. Logical Reasoning, Arun Sharma, McGraw Hill.

3. Analytical & Logical Reasoning, Peeyush Bhardwaj, Arihant Publications

4. Mc Graw Hill Objective English 5 th edition.

II Year – I Semester	LIFE SKILLS (AUDIT COURSE)	L	T	P	C
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UNIT1: LIFE SKILLS: Positive Attitude and Positive Work Ethics, Time Management, Goal Setting: Short term, Long Term. (Activity has to be conducted)

UNIT2: EMOTIONAL INTELLIGENCE: Self Awareness through Johari Window and SWOT analysis (Activity has to be conducted)

UNIT3: PROBLEM SOLVING SKILLS: Critical Thinking and Brain Storming, Creative Thinking, Conflict Management. (Activity has to be conducted)

UNIT4: PUBLIC SPEAKING: Body Language, presentation skills, impromptu presentation, interviewing others. (Activity has to be conducted**)**

UNIT 5: NPTEL Course/Coursera/Any relevant Certificate Course has to be done

Assessment: Student has to submit Project Report on all the activities and he/she has to do a certificate course in order to clear internal assessment.

References:

- Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; Oxford
- Publishers.
- Kalyana; (2015) "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd.
- Larry James (2016); "The First Book of Life Skills"; First Edition; Embassy Books.
- Shalini Verma (2014); "Development of Life Skills and Professional Practice"; First
- Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); "The 5 Levels of Leadership", Centre Street, A division of
- Hachette Book Group Inc.