Dr.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

CIRCULAR NO.SU/B.Sc./CBC&GS /65/2023

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies, Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following syllabi of Bachelor of Science with Practical Pattern of Question Paper under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	**B.Sc. Home Science (Degree)**	**IIIrd & IVth semester**
2.	**B.Sc. Information Technology (Degree)**	**IIIrd & IVth semester**
3.	**Bachelor of Computer Application (Degree)**	**IIIrd & IVth semester**
4.	**B.Sc.Botany (Optional)**	**IIIrd & IVth semester**
5.	**B.Sc.Dairy Science & Technology(Optional)**	**IIIrd & IVth semester**
6.	**B.Sc.Fisheries Science (Optional)**	**IIIrd & IVth semester**
7.	**B.Sc.Computer Science (Optional)**	**IIIrd & IVth semester**
8.	**B.Sc.Zoology (Optional)**	**IIIrd & IVth semester**

This is effective from the Academic Year 2023-24 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/2023/30210-26
Date:- 26.05.2023.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] **The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.**

2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.

3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.

4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.

5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.

6] The Public Relation Officer, Dr.BAMU,A'bad.

7] The Record Keeper, Dr.BAMU,A'bad.

Dr. Babasaheb Ambedkar Marathwada University

Aurangabad- 431004(MS) India

Three Year Undergraduate Bachelor Degree Program In Science and Technology

B. Sc. (Information Technology) Second Year(III and IV Semester)

Curriculum Structure and Scheme of Examination

Choice Based Credit System

(Effective from Academic Year 2022-23)

Dr. Babasaheb Ambedkar Marathwada University
Aurangabad – 431004 (MS) India

Bharti

Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

Pattern of Question Paper (Theory)

B. Sc. (Information Technology) Semester -----------
Course Code ----------------
Paper Number --------------------
Title of Paper --------------------------------

Time : 1.30 Hrs. **Max Marks: 40**

N.B.

1. Attempt All Questions.
2. All questions carry equal marks.
3. Illustrate your answer with suitable labelled diagram.

Q.1. Multiple choice questions / Fill In the Blanks / Terms / Definition / One Line Answer questions. (10 Marks)

1)
2)
3)
4)
5)
6)
7)
8)
9)
10)

Q.2. Long answer question. (10 Marks)
OR
Long Answer question

Q.3. Long answer question (10 Marks)
OR
Short answer questions
a)
b)

Q.4. Short Notes on any TWO of the following:- (10 Marks)
a)
b)
c)
d)

Bachelor of Science in Information Technology
(Choice Based Credit System)
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum

For

Faculty of Science and Technology

Course Structure and Scheme of Examination

B. Sc. (Information Technology) Three Year Under Graduate Degree Program

Semester-I

Course Type	Course Code	Course Title	Total Periods (Teaching Periods / Week)	Credits	Scheme of Examination			
					UA	IA	Max Marks	Min Marks
Core Course I (DSC-1A)	IT-111T	Computer Fundamentals	45 (3/per week)	2	40	10	50	20
	IT-112T	Digital Electronics	45 (3/per week)	2	40	10	50	20
	IT-121P	Lab Course (based on IT-111T and IT-112T)	45 (3/per week)	1.5	40	10	50	20
Core Course II (DSC-2A))	IT-113T	Operating System-I	45 (3/per week)	2	40	10	50	20
	IT-114T	Programming in C	45 (3/per week)	2	40	10	50	20
	IT-122P	Lab Course (based on IT-113T and IT-114T)	45 (3/per week)	1.5	40	10	50	20
Core Course III (DSC-3A)	IT-115T	Mathematical Foundation	45 (3/per week)	2	40	10	50	20
	IT-116T	Programming Methodology	45 (3/per week)	2	40	10	50	20
	IT-123P	Lab Course (based on IT-115T and IT-116T)	45 (3/per week)	1.5	40	10	50	20
Ability Enhancement Compulsory Courses (AECC-I)	IT-131T	English communication Skills(linguistic Approach)	45 (5/per week)	3	40	10	50	20
	IT-132T	Marathi/Hindi/Urdu/Sanskrit SL-I	45 (4/per week)	3	40	10	50	20
Non Credit Course								
		36 Period Per week		22.5	440	110	550	220

*DCS – discipline Specific core courses **Total Credit for Semester I : 22.5 (Theory : 18 : Laboratory : 4.5)**

Bhati

Structure and Curriculum for
Bachelor of Science in Information Technology
(Choice Based Credit System)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum

For

Faculty of Science and Technology

Course Structure and Scheme of Examination

B. Sc. (Information Technology)Three Year Under Graduate Degree Program

Semester-II

Course Type	Course Code	Course Title	Total Periods (Teaching Periods / Week)	Credits	Scheme of Examination			
					UA	IA	Max Marks	Min Marks
Core Course IV (DSC-I B)	IT-211T	Data Structure	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-212T	8086 Microprocessor	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-221P	Lab Course (based on IT-211T and IT-212T)	45 (3/per week)	**1.5**	**40**	**10**	**50**	**20**
Core Course V (DSC-II B)	IT-213 T	Operating System- II	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-214T	Advanced Programming in C	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-222P	Lab Course (based on IT-213T and IT-214T)	45 (3/per week)	**1.5**	**40**	**10**	**50**	**20**
Core Course VI (DSC-III B)	IT-215T	Numerical Methods M-2	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-216T	Database Management System	45 (3/per week)	**2**	**40**	**10**	**50**	**20**
	IT-223P	Lab Course (based on IT-215T and IT-216T)	45 (3/per week)	**1.5**	**40**	**10**	**50**	**20**
Ability Enhancement Compulsory Courses (AECC - 2)	IT-231T	English Communication Skills(Soft Skill Development)	45 (5/per week)	**3**	**40**	10	**50**	**20**
	IT-232T	Marathi/Hindi/Urdu/Sanskrit	45 (4/per week)	**3**	**40**	10	**50**	**20**
Non Credit Course	IT-261T	Constitution of India	45 (3/per week)	**2***				
			36 Period Per week	**22.5**	**440**	**110**	**550**	**220**

Total Credit for Semester I : 22.5 (Theory : 18 : Laboratory : 4.5)

Bhati

Structure and Curriculum for
Bachelor of Science in Information Technology
(Choice Based Credit System)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum
For
Faculty of Science and Technology
Course Structure and Scheme of Examination
B. Sc. (Information Technology) Three Year Under Graduate Degree Program

Semester-III

Course Type	Course Code	Course Title	Total Periods (Teaching Periods / Week)	Credits	Scheme of Examination			
					UA	IA	Max Marks	Min Marks
Core Course VII (DSC-1C)	IT-311T	Computer Graphics	45 (3/per week)	2	40	10	50	20
	IT-312T	Basics of Computer Networking	45 (3/per week)	2	40	10	50	20
	IT-321P	Lab Course (based on IT-311T)	45 (3/per week)	1.5	40	10	50	20
	IT-322P	Lab Course (based on IT-312T)	45 (3/per week)	1.5	40	10	50	20
Core Course VIII (DSC-2C))	IT-313T	Linux	45 (3/per week)	2	40	10	50	20
	IT-314T	Object Oriented Programming using C++	45 (3/per week)	2	40	10	50	20
	IT-323P	Lab Course (based on IT-313T)	45 (3/per week)	1.5	40	10	50	20
	IT-324P	Lab Course (based on IT-314T)	45 (3/per week)	1.5	40	10	50	20
Core Course IX (DSC-3C)	IT-315T	Computational Statistics (M-3)	45 (3/per week)	2	40	10	50	20
	IT-316T	RDBMS	45 (3/per week)	2	40	10	50	20
	IT-325P	Lab Course (based on IT-315T)	45 (3/per week)	1.5	40	10	50	20
	IT-326P	Lab Course (based on IT-315T)	45 (3/per week)	1.5	40	10	50	20
Skill Enhancement Course (SEC-1)	IT-317T	Any one skill to be chosen out of two SEC-1(A): Critical Thinking SEC-1(B): Web Fundamentals	45 (3/per week)	2	--	50	50	20
Ability Enhancement Compulsory Courses (AECC-I)	IT-331T	English Communication Skills(Soft Skill Development)	45 (5/per week)	3	40	10	50	20
	IT-332T	Marathi/Hindi/Urdu/Sanskrit	45 (4/per week)	3	40	10	50	20
Non Credit Course								
				29	560	190	750	300

Total Credit for Semester I : 29 (Theory : 20 : Laboratory : 09)

Structure and Curriculum for
Bachelor of Science in Information Technology
(Choice Based Credit System)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum
For
Faculty of Science and Technology
Course Structure and Scheme of Examination
B. Sc. (Information Technology)Three Year Under Graduate Degree Program

Semester-IV

Course Type	Course Code	Course Title	Total Periods (Teaching Periods / Week)	Credits	Scheme of Examination			
					UA	IA	Max Marks	Min Marks
Core Course X **(DSC-1 D)**	IT-411T	Introduction to Digital Image Processing	45 (3/per week)	2	40	10	50	20
	IT-412T	Software Engineering	45 (3/per week)	2	40	10	50	20
	IT-421P	Lab Course (based on 411T)	45 (3/per week)	1.5	40	10	50	20
	IT-422P	Lab Course (based on 412T)	45 (3/per week)	1.5	40	10	50	20
Core Course XI **(DSC-2D)**	IT-413T	Android Operating System	45 (3/per week)	2	40	10	50	20
	IT-414T	Core Java	45 (3/per week)	2	40	10	50	20
	IT-423P	Lab Course (based on 413T)	45 (3/per week)	1.5	40	10	50	20
	IT-424P	Lab Course(based on 414T)	45 (3/per week)	1.5	40	10	50	20
Core Course XII **(DSC-3D)**	IT-415T	Python Programming	45 (3/per week)	2	40	10	50	20
	IT-416T	Data Analytics	45 (3/per week)	2	40	10	50	20
	IT-425P	Lab Course (based on IT-415T)	45 (3/per week)	1.5	40	10	50	20
	IT-426P	Lab Course (based on IT-416T)	45 (3/per week)	1.5	40	10	50	20
Skill Enhancement Course (SEC-2)	IT-417T	Any one skill to be chosen out of two SEC-2(A): Emotional Intelligence SEC-2(B): PHP	45 (3/per week)	2	--	50	50	20
Ability Enhancement Compulsory Courses (AECC - 2)	IT-431T	English Communication Skills(Soft Skill Development)	45 (5/per week)	3	40	10	50	20
	IT-432T	Marathi/Hindi/Urdu/Sanskrit	45 (4/per week)	3	40	10	50	20
Non Credit Course	IT-461T	Environment Studies	45 (3/per week)					
				29	560	190	750	300

Total Credit for Semester I : 29 (Theory : 20 : Laboratory : 09)

Total Credit for Semester I : 29 (Theory : 20 : Laboratory : 09)

Important Note Regarding Skill Enhancement Courses

1. Skill Enhancement Courses have a significant theoretical component therefore theory workload is assigned to the course but the teaching of these courses should focus on practical application, with the goal of developing practical skills and knowledge as the final outcome.
2. There shall be no theory examination for Skill Enhancement Courses (SEC-1, SEC-2).
3. The evaluation of Skill Enhancement Courses should be entirely based on college internal assessment, meaning that the assessment will be carried out by the college's respective course incharge, rather than by an external entity.
4. To assess the students' understanding and skills in Skill Enhancement Courses, they should demonstrate their acquired skill through hands-on experience, practical work, projects, and case studies. There should be one assessment for each unit and an additional assessment at the end of the semester.
5. Records of each assessment should be maintained by the college's respective course incharge and should be readily made available upon request.
6. At the end of the semester, the consolidated marks should be submitted to the University for Inclusion in the student's mark sheet, which will contribute towards their final grade.
7. The university should generate the mark list for Skill Enhancement Courses, similar to the internal assessment mark list. The mark list should be downloaded, filled with the consolidated marks of all assessments, and submit along with the internal marks list.

Curriculum
For
Second Year (Semester III)

Course Code: IT-311T	**Course Title: Computer Graphics**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

1. Mathematics.
2. Good programming skills in C&C++
3. Data Structures

Learning Objectives

- Understanding how the various elements that like algebra, geometry, algorithms and data structures interact in the design of graphics.
- To provides an idea on hardware system architecture for computer graphics.
- To give idea about basic building blocks of multimedia

Learning Outcomes

After the completion of this course student should apply its real time application knowledge for

- Geometrical Transformations in 2-Dimensional and 3-Dimensional perspectives
- Object representations
- Surface detection procedures
- Computer Animations

Unit -I: Introduction to Computer Graphics:

Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays.

Unit – II: Scan conversion:

Scan conversion: Digital Differential Analyzer (DDA) algorithm, Bresenhams' Line drawing algorithm. Bresenhams' method of Circle drawing, Midpoint Circle Algorithm, Midpoint Ellipse Algorithm, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles,

Unit – III: 2-D Geometrical transforms:

Two-Dimensional Transformations: Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation

Unit – IV: **3-D Three-Dimensional Transformations**

Three-Dimensional Transformations: Three-Dimensional Scaling, Three-Dimensional Shearing, Three- Dimensional Rotation, Three-Dimensional Reflection, Three- Dimensional Translation, Multiple Transformation,

Introduction to animation: Design of animation sequence, general computer animation functions, raster animation

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

TEXT BOOKS

1."Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.

2."Computer Graphics Second edition", Zhigandxiang, Roy Plastock, Schaum's outlines, Tata Mc Graw hill edition.

Books Recommended:

1. J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.

2. D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008.

3. D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.

4. D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill 2nd edition 1989.

NPTEL Video :

1. http://nptel.ac.in/courses/106106090/#

Free E-Books

1. https://www.pdfdrive.com/computer-graphics-books.html
2. https://www.pdfdrive.com/introduction-to-computer-graphics-e34322358.html

Course Code: IT-321P	**Course Title: Lab Course(Lab based on IT-311T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course IT-311T (Computer Graphics)

This practical can be implemented in C or C++ programming language.

1. Study and enlist the basic functions used for graphics in C / C++ language. Give an example for each of them.
2. Draw a co-ordinate axis at the center of the screen.
3. Divide your screen into four region, draw circle, rectangle, ellipse and half ellipse in each region with appropriate message.
4. Draw a simple hut on the screen.
5. Draw the following basic shapes in the center of the screen:

   i. Circle ii. Rectangle iii. Square iv. Concentric Circles v. Ellipse vi. Line
6. Develop the program for DDA Line drawing algorithm
7. Develop the program for Bresenham's Line drawing algorithm.
8. Develop the program for the mid-point circle drawing algorithm.
9. Develop the program for the mid-point ellipse drawing algorithm
10. Write a program to implement 2D scaling
11. Write a program to perform 2D translation
12. Perform 2D Rotation on a given object.
13. Program to create a house like figure and perform the following operations.

    i. Scaling about the origin followed by translation.

    ii. Scaling with reference to an arbitrary point.

    iii. Reflect about the line y = mx + c.
14. Develop a simple text screen saver using graphics functions
15. Perform smiling face animation using graphic functions.

Course Code: IT-312T	**Course Title: Basics of Computer Networking**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	
Prerequisites: IT112T, IT212T	

Learning Objectives

To educate concepts and techniques currently used in the area of computer networks.

- To study protocols, network standards, the OSI model, IP addressing, cabling and networking components.
- To learn existing state-of-the-art in network protocols, architectures, and applications.
- To be familiar with contemporary issues in networking technologies

Learning Outcomes

After completing these course students should be use this knowledge for real time network creation, and its maintenance.

1. Summarize the basics of Computer Networks and its types.
2. Illustrate the routing algorithms.
3. Identify error detection and correction in data link layer
4. Explain and formulate IP addresses and subnetting
5. Comprehend the application layer protocols

Unit -I: Introduction

Communication System, Components of communication system, Computer network Advantages and applications of computer networking . point-to-point and multipoint line configuration, LAN, MAN and WAN. Analog and Digital signals, Data Transmission: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex

Unit -II: Network Topologies Data Transmission

: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex.Mesh, Star, Tree, Bus and Ring and Hybrid Topology.(Advantages and disadvantages of each)

Unit -III: Transmission Media

Guided and unguided media, Twisted-pair, UTP and STP cable, coaxial cable, Optical Fiber cable, Radio waves, Microwaves, Satellite Communication (Transmission characteristics and advantages of each type)

Unit-V: Data Networks and Protocols

Network Protocol: syntax, semantics and timings, The OSI model, 7-layers of n/w model., Functions of each layer.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Textbook

1. Data Communication and Networking- Behrouz A. Forouzan , Tata McGraw Hill, 5th edition, 2013

2. Computer Networks-Andrew Tanenbaum, Pearson, 5th edition, 2013.

References:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

Course Code: IT-322P	**Course Title: Lab Course(Lab based on IT-312T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course IT-312T (Basics of Computer Networking)

Kindly add minimum 12 practical. 03 practical on each unit.

1. Given an IP address and network mask, determine other information about the IP address such as:

- Network address
- Network broadcast address
- Total number of host bits
- Number of hosts

2. Given an IP address and network mask, determine other information about the IP address such as:

- The subnet address of this subnet
- The broadcast address of this subnet
- The range of host addresses for this subnet
- The maximum number of subnets for this subnet mask
- The number of hosts for each subnet
- The number of subnet bits
- The number of this subnet

3. Use of ping and tracert / traceroute, ipconfig / ifconfig, route and arp utilities

4. Configure IP static routing.

5. Configure IP routing using RIP.

6. Configuring Simple OSPF.

7. Configuring DHCP server and client.

8. Create virtual PC based network using virtualization software and virtual NIC.

9. Configuring DNS Server and client.

10. Use of Wireshark to scan and check the packet information of following protocols

- HTTP
- ICMP
- TCP
- SMTP
- POP3

Course Code: IT-313T	**Course Title: Linux**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

The prerequisite of this course is understanding the concepts of operating system.

Learning Objectives

1.To introduce students the basic knowledge of open source operating system such as Linux.
2.To acquaint students with installation of open source operating system.
3.To acquaint students about implementation of execution of Linux commands.
4. To develop skills in managing software and system administration tool.
5. To prepare students for future courses having technical operating system knowledge.

Learning Outcomes

- Students will be able to understand the basic commands of Linux operating system and can write shell scripts
- Students will be able to create file systems and directories and operate them
- Explain the structure and functions of operating systems along with their components, types and working.
- Make use of appropriate Linux commands for memory management, file management and directory management.
- Recognize users, security, and privacy settings in Ubuntu Linux.
- To do the study a free operating system and is backed by a huge open-source community.

Unit-I: Overview of Linux & Unix based operating systems

History of UNIX & Linux.Differences between centos, red hat enterprise Linux & fedora, Difference between Red Hat &Ubuntu, Difference between UNIX & LINUX. Difference Between Linux & Windows. Features of Linux O.S

Unit-II: Linux Operating System

Linux Distribution, Architecture of Linux- kernel,shell, Tools and applications, Advantages of Linux, Disadvantages of Linux, Linux File System – file names, addressing of files, Directories or Files and their description, Types of Linux files, Linux Kernel, file permissions (file access modes), i-node number, Terminal window, command prompt

Unit-III: Linux commands

Command syntax, Command history, Feeding commands on prompt, ls, man, script, info, cd, pwd, cat, cp, rm, mv, mkdir, rmdir, finger, who, whoami, chmod, head, tail, page, more, nl, ln, chown, chgrp, date, cal, file, wc, cmp, tty, bc, sort, uniq, diff, comm, cut, paste, ps, kill, grep, type, spell, at, uname, nice, renice, less, free, stty, clear. Filters – vertical bar-pipe, tee , redirection I/O - <, >, >>, 2>, metacharacters.

Branching & Looping

Conditional Statements – test command, if statement , if-else statement , nested if, switch statement, Looping – while , for, until statement. break and continue, exit command,

Unit-IV: Linux Shell and Shell Scripting

What is Shell ? Functions of a shell, Types of Shell, Command Line Shell , Graphical Shells, Shell Scripting, Why do we need shell scripts, Advantages of shell scripts, Simple demo of shell scripting using Bash Shell, Basic Operators in Shell Scripting- Arithmetic, Relational, Boolean, Bitwise, File Test Operators, echo command, Shell variables – user defined, positional parameter, pre-defined, command substitution, system shell variables, Quote Characters – single, double, back slash, back quote character. Read command. Creating and executing shell script – sh command.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Textbook

1. Introduction to Linux and Shell Scripting byAmalorpavam G M.T. Somashekara, K.R. Venugopal
2. Linux: The Complete Reference, Sixth Edition by Richard Petersen

Online Resources

1. https://www.redhat.com/en/topics/linux/what-is-linux

2. https://www.javatpoint.com/linux-unix-system-resources

Reference Book

1.Linux and shell programming for beginners (English, Paperback, PoornimhaJ)

Course Code: IT-323P	**Course Title: Lab Course(Lab baseɑ on IT-313T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course IT-313T (Linux)

1. Installation of Linux Red Hat or Ubuntu O.S.
2. Practical based on Linux Commands
3. Practical based on The Command Line Interface
4. Shell script on echo with all quote characters
5. Shell script on echo with all types of variables.
6. Shell script to test all operators.
7. Shell script to test conditional statements
8. Shell script to test looping statements
9. Shell script to test switch statement
10. Shell script to test break statement in loop.
11. Shell script to test continue statement in loop.
12. Shell script to demo of nested if.
13. Shell script to test nested loop.

CourseCode:IT-314T	**Course Title: Object Oriented Programming Using C++**
Total Credit: 02	Marks:50 (UA: 40 +IA: 10)
Periods:3 per week (50Minutes each)	

Prerequisites:

Student must aware of Programming using C and Programming language concepts.

Learning Objectives

1. To teach the student the concepts of object oriented and procedure programming.
2. To differentiate between functions, classes and objects.
3. To learn to overload functions and operators.
4. To learn basic file handling.

Learning Outcomes

1. Understand the importance of OOP approach over procedural language.
2. Apply the concept of classes, functions and objects
3. Apply the constructors, destructors and inheritance
4. Apply the concept of OOPS like inheritance and polymorphism.

Unit-I:

Introduction to Object Oriented Programming:

Object oriented paradigm-Differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object-Oriented Programming, Encapsulation, Inheritance and Polymorphism, Benefits of OOP, Structure of a C++ program, namespace, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures & Loops.

Unit-II:

Functions, Classes and Objects:

Introduction of Classes, Class Definition, Defining a Members,Objects,Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects.

Unit-III:

Constructors, Destructors, Inheritance:

Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a Class, Destructors.

Inheritance :

Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Unit-IV:

Pointers, Virtual Functions and Polymorphism:

Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes, Polymorphism, Compile time polymorphism, Run time polymorphism, Virtual Functions, Overloading- Function Overloading, Operator overloading

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Text Book

1. Object Oriented Programming with C++ by Balagurusamy
2. C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

References:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ.
3. Object Oriented Analysis and Design by Timothy Budd TMH, 2001.
4. Let Us C++ by KanetkarYashwant, Publisher:BPB Publication, 2020.

E-Resources

1. https://www.w3schools.com/cpp/cpp_oop.asp
2. https://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm

Course Code: IT-324P	**Course Title: Lab Course (based on IT-314T)**
TotalCredit:1.5	Marks:50 (UA: 40 +IA: 10)
Periods:3 per week(50 Minutes each)	

Sample list of experiment based on the course **IT-314T**

1. Write a C++ program to check leap year.
2. Write a C++ program to find Armstrong numbers between two integers.
3. Write a C++ program to print a multiplication table of a given number.
4. Write a C++ program to Illustrating Class Declarations, Definition, and Accessing Class Members.
5. Write a C++ program to define a class "City" having data members name, population. Accept and display data for 10 cities.
6. Write a C++ program to swap the values of two variables using friend function.
7. Write a C++ program to illustrate default constructor, parameterized constructor and copy constructors.
8. Write a C++ program with constructor function and destructor function.
9. Write a C++ program to illustrate the use of single inheritance.
10. Write a C++ program to illustrate the function overloading.
11. Write a C++ program to illustrate the operator overloading.
12. Write a C++ program to illustrate the virtual function.

Course Code: IT-315T	Course Title: **Computational Statistics (M-3)**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites: The prerequisite for this course is Numerical method.

Learning Objectives

To enable the students to understand the fundamentals of statistics to apply descriptive measures and probability for data analysis.

Learning Outcomes

Upon completion of this course, the students should be able to:

1. Understand the science of studying & analyzing numbers.
2. Identify and use various visualization tools for representing data.
3. Describe various statistical formulas.
4. Compute various statistical measures.

Unit -I:

Statistics: Definition and scope. Concepts of statistical population and sample. Data: quantitative and qualitative, cross-sectional and time-series, discrete and continuous. Scales of measurement: nominal, ordinal, interval and ratio.

Presentation of data: tabular and graphical. Frequency distributions, cumulative frequency distributions and their graphical representations. Stem and leaf displays

Unit -II:

Introduction to Central Tendency, Purpose and Functions of Average, Characteristics of a Good Average, Types of Averages, Meaning of Arithmetic Mean, Calculation of Arithmetic Mean, Merit and Demerits of Arithmetic Mean, Meaning of Median, Calculation of Median, Merit and Demerits of Median, Meaning of Mode, Calculation of Mode, Merit and Demerits of Mode, Harmonic Mean- Properties Merit and Demerits

Unit -III:

Dispersion and measures of Dispersion , Range (definitions and problems) Quartile Deviation (definitions and problems) Mean Deviation (definitions and problems) Standard Deviation

(definitions and problems) Variance, different formulae for calculating Variance. Coefficient of variation, Gini's Coefficient, Lorenz Curve. Moments, skewness and kurtosis. Quantiles and measures based on them. Box Plot. Outliers.

Unit -IV:

Bivariate data: Definition, scatter diagram, simple correlation, linear regression, principle of least squares, fitting of polynomial and exponential curves, correlation ratio, correlation index, intraclass correlation. Rank correlation –Spearman's and Kendall's measures.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Text Book

1. Statistics and Data Analysis, A.Abebe, J. Daniels, J.W.Mckean, December 2000.
2. Statistics, Tmt. S. EzhilarasiThiru, 2005, Government of Tamilnadu.
3. Introduction to Statistics, David M. Lane.
4. Weiss, N.A., Introductory Statistics. Addison Wesley, 1999.
5. Clarke, G.M. & Cooke, D., A Basic course in Statistics. Arnold, 1998

Reference Books:

Reference Books:

1. Banfield J.(1999), Rweb: Web-based Statistical Analysis, Journal of Statistical Software.
2. Bhattacharya,G.K. and Johnson, R.A.(19977), Statistical Concepts and Methods, New York, John Wiley & Sons

E-Resources

1. http://onlinestatbook.com/Online_Statistics_Education.pdf
2. https://textbookcorp.tn.gov.in/Books/12/Std12-Stat-EM.pdf
3. https://3lihandam69.files.wordpress.com/2015/10/introductorystatistics.pdf

Course Code: IT-325T	**Course Title: Lab Course (Lab based on IT-315T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample list of experiment based on the course **IT-315T.**

The practical can be done using any tool such as excel, SPSS,scilab, Matlab, R programming as per availability.

1. Diagrammatic representation of data.
2. Problems based on construction of frequency distributions, cumulative frequency distributions and their graphical representations, stem and leaf plot.
3. Problems based on measures of central tendency.
4. Problems based on measures of dispersion.
5. Problems based on combined mean and variance and coefficient of variation.
6. Problems based on moments, skewness and kurtosis.
7. Problems related to quantiles and measures based on them, construction of box plot.
8. Problems based on analysis of bivariate data.
9. Problems based on measures of rank correlation.
10. Problems based on analysis of categorical data

Course Code: IT-316T	**Course Title: RDBMS**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites: Knowledge of DBMS

Learning Objectives

To learn Relational Database Management system and database languages.

- To learn Relational Algebra and Calculus.
- To study Integrity Constraints and PL/SQL
- To develop an application using PL/SQL

Learning Outcomes

1.To get a good job in DBMS, students must have good knowledge of RDBMS, any 4 GL, Networking Concepts, Operating System Concepts and Web related issues.
2.The ORACLE / MAINFRAME are the popular DBMS technologies students should learn and master.
3.The students are also encouraged to appear for OCP / OCA – DBA certification examinations

Unit -I: Introduction

Introduction to DBMS, Applications of DBMS, Data Models, Database Architecture, Database Users & Administrators, Entity, Attributes & Entity Set, Database Languages, DDL,DML,DCL

Unit -II: Relational Algebra and Calculus

Introduction to Selection, Projection, Union, and Joins, introduction to SQL, Basic SQL Query and Examples of SQL Queries: select, where, from, Introduction to views, Aggregate Operators Group by & Order by Clause.

Unit -III: Integrity Constraints

Introduction, Domain Constraint, Primary Key, Unique Key, Foreign Key

Unit -IV: Introduction to PL/SQL

Introduction, Architecture of PL/SQL, Data types, operators, Decision making and looping statements, Simple PL/SQL programs, Introduction to Triggers

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Textbook

1. SQL, PL/SQL the programming language of ORACLE 4th Edition, Ivan Bayross
2. An Introduction to Database Systems, Bipin C Desai , Galgotia Publication

Course Code: IT-326P	**Course Title: Lab Course (Lab based on IT-316T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-316T.**

Kindly add minimum 12 practical. 03 practical on each unit.

1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario.

a. Two assignments shall be carried out i.e. consider two different scenarios (eg. bank, college)

2. Write relational algebra queries for a given set of relations

3. Perform the following:

a. Viewing all databases, Creating a Database, Viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback)

4. Perform the following:
a. Altering a Table, Dropping/Truncating/Renaming Tables, Backing up / Restoring a Database

5. For a given set of relation schemes, create tables and perform the following Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (group by and having clause), Queries involving- Date Functions, String Functions , Math Functions

Join Queries- Inner Join, Outer Join

Subqueries- With IN clause, With EXISTS clause

6. For a given set of relation tables perform the following
a. Creating Views (with and without check option), Dropping views, Selecting from a view

7. Write a Pl/SQL program using FOR loop to insert ten rows into a database table.
8. Given the table EMPLOYEE (EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table.
9. Illustrate how you can embed PL/SQL in a high-level host language such as C/Java And demonstrates how a banking debit transaction might be done.
10. Given an integer i, write a PL/SQL procedure to insert the tuple (i, 'xxx') into a given relation

Course Code: IT-317(A) (SEC-1(A))	**Course Title:- Critical Thinking**
Total Credit: 2	Marks: 50 (UA: 40 + IA: 10)

Periods: 3 per week (50 Minutes each)

Prerequisites:

There are no prerequisites for this course

Learning Objectives

1. To understand the concept of critical thinking and its significance in personal and professional life
2. To develop critical thinking skills like analysis, interpretation, evaluation, inference, and explanation
3. To apply critical thinking skills in decision-making and problem-solving
4. To exercise and improve the brain's ability to think critically

Learning Outcomes

After Completion of the Course students will be able to

1. Develop critical thinking skills and apply them in various aspects of personal and professional life
2. Make informed decisions by analyzing information and evaluating options
3. Improve problem-solving skills by breaking down complex problems into smaller components
4. Enhance cognitive abilities to think critically and make logical decisions.

Unit -I: Introduction to Critical Thinking (10 Periods)

Understanding the concept of critical thinking, Historical details of critical thinking, Thinkers who fashioned critical thinking of their time

Unit -II: Developing Critical Thinking Skills (10 Periods)

The process of critical thinking, Inductive and deductive reasoning, Difference between reading and thinking, Reason to Adopt Critical Thinking, How critical thinking solves problems

Unit -III: Improving Decision Making (10 Periods)

Getting logical thinking, Strategies to improve decision-making skills, Making better decisions

Unit -IV: Applying Critical Thinking (10 Periods)

Strategies to help improve critical thinking, Group decision-making skills, Applying questions in critical thinking, Exercising the brain

Unit-V: Test and Tutorials (05 Periods)

In addition to CIA, Tutorial, Seminars, Assignments & case studies are to be given for building proficiency in the course. (Respective course in-charge should maintain the records for the same).

Textbook

1. "Critical Thinking: Proven Strategies To Improve Decision Making Skills, Increase Intuition And Think Smarter" by Simon Bradley.

References:

1. Thinking Critically" by John Chaffee (Oxford University Press India)
2. "Critical Thinking: An Introduction" by Alec Fisher (Cambridge University Press India)

3. "The Miniature Guide to Critical Thinking" by Richard Paul and Linda Elder (Foundation for Critical Thinking India)
4. "Asking the Right Questions: A Guide to Critical Thinking" by M. Neil Browne and Stuart M. Keeley (Pearson India)"Critical Thinking: Tools for Taking Charge of Your Learning and Your Life" by Richard Paul and Linda Elder (Pearson India)

E-Resources

1. https://argumentful.com/16-best-free-online-critical-thinking-courses/

Course Assessment (Full 50 Marks Internal Assessment)

To assess the skills acquired in a critical thinking course, you can use a combination of formative and summative assessment methods, including written assignments, discussions, group activities, quizzes, tests, and self-assessment. Here are some suggestions:

1. **Written Assignments**: Assign tasks that require students to analyze, evaluate, and synthesize information, such as essays, case studies, and reflections. These assignments can be graded based on predefined rubrics that outline expectations for clarity, depth, and logical reasoning.
2. **Discussions:** Organize in-class or online discussions in which students are required to critically analyze and evaluate different viewpoints, arguments, or evidence. Encourage students to ask probing questions and provide reasoned responses. Assess students' participation and the quality of their contributions.
3. **Group Activities**: Assign group projects or activities that require students to collaborate, analyze problems, and develop solutions using critical thinking skills. Evaluate the projects based on the quality of the work produced, as well as each student's participation and contribution to the group.
4. **Quizzes and Tests**: Create quizzes and tests that evaluate students' understanding of critical thinking concepts and their ability to apply these skills. Assessments can include multiple-choice questions, true/false questions, and short-answer questions. Quizzes can be administered throughout the course to gauge understanding, while tests can be used at the end of each unit or at the end of the course to assess overall learning.
5. **Self-assessment:** Encourage students to self-assess their progress and skill development in critical thinking throughout the course. This can be done through reflective journaling, self-assessment checklists, or periodic self-evaluations.
6. **Peer Assessment**: Have students review and evaluate their peers' work, providing constructive feedback on areas for improvement. This can help students develop their own critical thinking skills and foster a collaborative learning environment.
7. **In-class Activities**: Conduct hands-on, in-class activities that allow students to practice their critical thinking skills in real-time. Observe how students analyze problems, evaluate evidence, and generate solutions, and provide feedback and support as needed.

By using a combination of these assessment methods, you can effectively evaluate students' skills and knowledge in critical thinking, ensuring that they have developed the necessary competencies for academic and professional success.

Here are sample questions for each of the suggested assessment methods:

1. **Written Assignments:**
   Write an essay analyzing a controversial issue, discussing the main arguments on both sides, and presenting your own reasoned conclusion.
2. **Discussions:**

In a class discussion, debate the merits of implementing a new policy in a given context (e.g., a workplace, school, or government). Encourage students to ask probing questions and provide well-reasoned arguments.

3. **Group Activities**:
   As a team, analyze a real-life case study involving a complex problem. Develop a solution using critical thinking skills and present your findings to the class.
4. **Quizzes and Tests:**
   Multiple-choice question: Which of the following is an example of inductive reasoning?
   a) All dogs are mammals. Rover is a dog. Therefore, Rover is a mammal.
   b) Every time you eat peanuts, you have an allergic reaction. Therefore, you are allergic to peanuts.
   c) If it rains, the streets will be wet. The streets are wet. Therefore, it rained.
   d) A triangle has three sides. This shape has three sides. Therefore, this shape is a triangle.
5. **True/False** question: Critical thinking requires accepting arguments at face value without questioning the underlying assumptions or evidence.
6. **Self-assessment:**
   Reflect on your growth in critical thinking skills throughout the course. Identify two areas where you have improved, and discuss one area where you still need to improve.
7. **Peer Assessment:**
   Review a classmate's essay on a controversial issue. Provide feedback on the clarity, organization, and depth of their analysis, as well as the strength of their arguments. Suggest at least two specific improvements.
8. **In-class Activities:**
   Participate in a group exercise where students are presented with a hypothetical scenario and must use critical thinking skills to evaluate the situation and make decisions. Observe and provide feedback on students' problem-solving and decision-making processes.

By incorporating these sample questions and activities into your assessments, you can effectively gauge students' understanding and mastery of critical thinking skills.

Course Code: IT317T(B) (SEC-1(B))	**Course Title: Web Fundamentals**
Total Credit:02	Marks: 50 (UA: -- + IA: 50)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

Basic HTML has **no prerequisites in any formal education**

Learning Objectives

To impart the skills needed for web programming, web administration, and web site development.

Learning Outcomes

To learn HTML tags and JavaScript Language programming concepts and techniques. To develop the ability to logically plan and develop web pages. To learn to write, test, and debug web pages using HTML and JavaScript

Unit -I:

Internet Basic: Basic Concepts, Communicating on the Internet, Internet Domains, Establishing connectivity to
the Internet, Client IP Address, IP Address, TCP/IP
HTML: Introduction, Web Server, Web Client/ Browser, HTML Tags

Unit -II:

HTML: Commonly used HTML Commands, Structure of HTML Program, Formatting, Text Styles, Text Effects
HTML: HTML Lists, Types of lists, Adding graphics to HTML Document
HTML: Creating tables, Linking documents, Frames

Unit -III:

Introduction to Javascript: Javascript and Web. <script> Tag and browsers compatibility. Data types: Numeric, Text, Boolean, Type casting, Arrays
Javascript: Operators and expressions in Javascript, Programming Constructs, Conditional and Looping Statements,Functions, User defined functions, Dialog Boxes

DOM Model: Understanding DOM Model, Objects in HTML, Browser Objects, window, history, location, navigator,
document object. Handling Events using Javascript

Unit -IV:

HTML Forms: Properties and Methods, Button, Text, Text Area, Checkboxes, radio buttons, select and option elements,
Built-In objects in Javascript, String Object, Math Object, Date Object, User Defined objects

DHTML: Cascading Style Sheets, Class, External Style Sheet

Unit-V: Practical based on Web fundamentals

References:

1.Web Enabled commercial Application Development Using HTML, DHTML,JavaScript by -Ivon Bayross.
2. Complete reference HTML, Narosa Publication
3. Cassidy Williams, Camryn Williams Introduction to HTML and CSS, O'Reilly, 2015

Curriculum
For
Second Year (Semester IV)

Course Code: IT411T	**Course Title: Introduction to Digital Image Processing**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites: The prerequisite for this course is computer graphics.

Learning Outcomes

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

Unit -I:

Introduction: Need for DIP- Fundamental steps in DIP – Elements of visual perception -Image sensing and Acquisition – Image Sampling and Quantization – Imaging geometry, discrete image mathematical characterization.

Unit -II:

Image_Transforms :_ Two dimensional Fourier Transform- Properties – Fast Fourier Transform – Inverse FFT, Discrete cosine transform.

Unit -III:

Image Enhancement : Spatial Domain: Basic relationship between pixels- Basic Gray level Transformations – Histogram Processing – Smoothing spatial filters- Sharpening spatial filters. **Frequency Domain:** Smoothing frequency domain filters- sharpening frequency domain filters Homomorphic filtering.

Unit -IV:

Image Restoration: Overview of Degradation models –Unconstrained and constrained restorations- Inverse Filtering ,WienerFilter.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Text Book

1. Rafael C.Gonzalez & Richard E.Woods – Digital Image Processing – Pearson Education- 2/e – 2004.
2. Anil.K.Jain – Fundamentals of Digital Image Processing- Pearson Education-2003.

Reference Books:

1. B.Chanda & D.Dutta Majumder – Digital Image Processing and Analysis – Prentice Hall of India – 2002

2. William K. Pratt – Digital Image Processing – John Wiley & Sons-2/e, 2004

Course Code: IT-421P	**Course Title: Lab Course (based on IT-411T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-411T.**

Kindly add minimum 12 practical. 03 practical on each unit.

1. To create a program to display grayscale image using read and write operation

2. To create a vision program to find histogram value and display histograph of a grayscale and color image.

3. To create a vision program for Non- Linear Filtering technique using edge detection

4. To create a vision program to determine the edge detection of an image using different operators.

5. To create a program to discretize an image using Fourier transformation

6. To create a program to eliminate the high frequency

7. To create a color image and perform read and write operation.

8. To obtain the R, B, G colour values and resolved colour values from a colour box by choosing any colour

9. To create a program performs discrete wavelet transform on image.

10 To create a program for segmentation of an image using watershed transforms.

Course Code: IT412T	Course Title: Software Engineering
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites: There is no prerequisite

Learning Objectives

After successful completion of this course, student will understand the basic concept of software engineering.

- On the completion of this course student will elaborate their programming knowledge for software designing and implementation.
- The software engineering subject will support to student for designing and development of large-scale software for real time application

Learning Outcomes

On successful completion of the course, students will be able to do real time software development.

Unit -I: Introduction

The Nature of Software,. Definition of Software, Legacy of Software, Software Engineering, Software characteristics, Application software. A process framework, waterfall model, prototyping model, incremental and evolutionary models, spiral model RAD model.

Unit -II: Requirement Analysis

Requirement engineering: Requirement engineering task, initiating the requirement engineering process, eliciting requirements, developing use cases, building analysis model, Negotiating requirements, validating requirements, data modeling, functional modeling and behavioral modeling.

Requirements Specification: Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a requirements document

Unit -III: Software Design

Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model.

Architectural Design :Software Architecture, Architectural Genres, Architectural Styles Architectural Design, AssessingAlternative Architectural Designs. Component Level Design

Designing Class-Based Components Conducting Component-Level Design, Cohesion and Coupling.User InterfaceDesign: The Golden Rules, Interface Analysis and Design, Interface Analysis Interface Design Steps

Unit -IV: Software Testing

Verification and Validation, Testing Overview: Verification vs Validation, Design of test cases Black- Box testing: Equivalence Class Partitioning, Graph based testing Boundary Value analysis White- Box Testing

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Reference Books:

1. Roger S. Pressman - Software Engineering A Practitioner's Approach - 5thedition, McGraw

2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa
3. Software Engineering – A Programming Approach, D. Belie I. Moray, J. Rough, P

Course Code: IT422T	**Course Title:Lab Course (Lab based on IT-112T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-112T.**

Kindly add minimum 12 practical. 03 practical on each unit.

1. Write down the problem statement for a suggested system of relevance.
2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4. To perform the user's view analysis for the suggested system: Use case diagram.
5. To draw the structural view diagram for the system: Class diagram, object diagram.
6. To draw the behavioral view diagram : State-chart diagram, Activity diagram
7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram
8. To perform the implementation view diagram: Component diagram for the system.
9. To perform the environmental view diagram: Deployment diagram for the system.
10. To perform various testing using the testing tool unit testing, integration testing for a sample
code of the
suggested system.
11. Perform Estimation of effort using FP Estimation for chosen system.
12. To prepare time line chart/Gantt Chart/PERT Chart for selected software project

Course Code: IT413T	**Course Title: Android Operating System**
Total Credit:02	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites: 1. Basic Knowledge of Programming, Concepts of OOPS

Learning Objectives

1. Describe Platforms on which Android operating system will run. Install Android studio
2. Understand the fundamentals of Android Architecture
3. Create simple application which runs under Android Operating system
4. Understand the UI components
5. Explain event handling and create style sheets

Learning Outcomes

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

1. Student should perfect in the android operating system and its real time application development.

Unit-I:

Environment Setup: Setup Java Development Kit (JDK), Android SDK, Android Development Tools (ADT) Plugin, Create Android Virtual Device,

Architecture: Linux kernel, Libraries, Android Runtime, Application Framework, Applications.

Application Components

Activities, Services, Broadcast Receivers, Content Providers, Additional Components, Create Android Application, Anatomy of Android Application, The Main Activity File, The Manifest File, The Strings File, The R File, The Layout File, Running the Application.

Unit-II:

Resources Organizing & Accessing: Alternative Resources, Accessing Resources

UI Layouts Android Layout Types: Relative Layout Attributes, Grid View Attributes, Sub-Activity, Layout Attributes, View Identification,

Android UI Controls: TextView Attributes, EditText Attributes, AutoComplete Text View Attributes, Button Attributes, ImageButton Attributes, CheckBox Attributes, ToggleButton Attributes, RadioButton Attributes, RadioGroup Attributes.

Unit-III:

Intents and Filters: Intent Objects, Action, Android Intent Standard Actions, Data, Category, Extras, Flags, Component Name, Types of Intents: Explicit Intents, Implicit Intents.

Fragments: Fragment Life Cycle, Creating new Fragments, Fragment States, Adding Fragments to activities.

Unit-IV:

Event Handling: Event Listeners & Event Handlers, Event Listeners Registration, Styles and Themes, Defining Styles, Using Styles, Style Inheritance, Android Themes, Default Styles & Themes, Custom Components, Creating a Simple Custom Components.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Textbook

1. Android Application Development (O'Reilly)

2. Head First Android Development: A Brain-Friendly GuideBook by David Griffiths and Dawn Griffiths

Online Resources

1. https://developer.android.com/guide

2. https://www.tutorialspoint.com/android/index.htm

Reference Book

1.Learn Android App Developmentby Wallace Jackson

2.Android App Development for Dummies, 3edby Michael Burton

Course Code: IT423P	Course Title:Lab Course (Lab based on IT-413T)
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-112T.**

Prerequisite:

1.Basic Knowledge of Programming, Concepts of OOPS

Objective:

1. Install Android studio
2. Create simple Android "Hello World" application
3. Create Android applications using different layout
4. Create Android applications using different UI components
5. Create Android applications showing the use of Frames
5. Create Android applications which show event handling
6. Create Android applications which show use style sheets
7. Design Basic Android Application

Specific Tool Used for Practical

Android Studio

List of Practical
(Minimum 10)

1. Practical No.1: Installing "Android Studio IDE" and "Android SDK"
2. Working with Linear Layout and UI components in Android
3. Working with Relative Layout and UI components in Android
4. Working with Table Layout and UI components in Android
5. Working with UI components (TextView, EditText, RadioButton, ToggleButton, CheckBox, RatingBar,AutocompleteTextView)
6. Create Android Application to demonstrate button click event
7. Create Android Application to demonstrate RadioButton checked event
8. Create Android Application to demonstrate ToggleButton clicked event and change attributes of Layout/UI components
9. Create Android Application to demonstrate basic calculatoractivity_main.xml
10. Design Android Application components using style sheet.

Course Code: IT-414T	**Course Title: Core Java**
Total Credit: 2	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

Student should know basics of Programming concepts, C Language, and object-oriented programming

Learning Objectives

1. To understand object-oriented programming concepts using Java, and apply them in solving problems.
2. To study various java programming concept like Interface, File and Exception Handling etc.
3. To design User Interface using Swing and AWT

Learning Outcomes

On completion of the course, student will be able to–

1. Able to solve real world problems using OOP techniques
2. Understand the concept of classes, object, packages and Collections.
3. To develop GUI based application.

Unit -I: An Introduction to Java

Object Oriented Programming Concepts: A short history of Java, Introduction, Features, Basics of Java, Data Types, Structure of Java Program, Command Line Arguments, Array, Types of Arrays, String in java, Built In packages and classes

Unit -II:

Class and Object, Object reference, Constructor: Constructor Overloading, Method Overloading, new operator, this and static keyword, Nested class, Inner class, and Anonymous inner class

Overview of Inheritance, Types of Inheritance, method overriding, Use of super and final keyword, Creation and Implementation of an interface, Abstract class , Comparison between Abstract Class and interface, Access control, Packages, Packages Concept, Creating user defined packages , Java Built-in packages, Import statement, Static import, Collection, Collection Framework, Interfaces: Collection, List, Set, Navigation: Enumeration, Iterator, ListIterator , Classes: LinkedList, ArrayList, Vector, HashSet

Unit -III:

Exception Handling Exception: Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class.

File Handling: Overview of Different Stream (Byte Stream, Character stream), Readers and Writers class, File Class, File Input Stream, File Output Stream, Input Stream Reader and Output Stream Writer class, FileReader and FileWriter class, Buffered Reader class.

Unit -IV:

Applet Introduction, Types of applet, Applet Lifecycle, Creating applet, Applet tag, Applet Classes, applet examples.

Introduction to Swing Component and Container Classes, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JTable, JComboBox, Swing Menus, Dialogs, JFileOpen, JColorChooser.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

References:

1. Programming with JAVA – E Balgurusamy
2. The Complete Reference – JAVA Herbert Schildt
3. Programming in Java, S. Malhotra, S. Chaudhary, 2nd edition, Oxford Univ. Press.

Course Code: IT-424P	**Course Title: Lab Course(Lab based on IT-414T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-414T**

Kindly add minimum 12 practical. 03 practical on each unit.

1. Introduction to java environment, javac, jdb and javadoc
2. WAP in java to Defining simple class and creating objects
3. WAP in java to Creating an array of objects.
4. WAP in java to implement inheritance in java.
5. WAP in java to define abstract classes.
6. WAP in java to define and use interfaces and Functional Interface
7. WAP in java to demonstrate Exception Handling Mechanism in Java.
8. WAP in java to demonstrate use of try, catch, throw, throws ,finally blocks
9. WAP in java to Creation of files and demonstration of I/O operations
10. WAP in java to Defining User defined Exception classes
11. WAP in java to demonstrate GUI creation using Swing Package and Layout managers.
12. WAP in java to understand Event handling mechanism in Java.

Course Code: IT-415T	**Course Title: Python Programming**
Total Credit: 2	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

Student should know basics of statistics, and knowledge of programming language such as C, C++ and core java.

Learning Objectives

- To understand why Python is a useful scripting language for developers.
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs.
- To learn how to identify Python object types.
- To learn how to use indexing and slicing to access data in Python programs.
- To define the structure and components of a Python program.
- To learn how to write loops and decision statements in Python

Learning Outcomes

On completion of the course, student will be able to–

1. Demonstrate the concepts of control structures in Python.
2. Implement Python programs using functions and strings.
3. Implement methods to create and manipulate lists, tuples and dictionaries.
4. Apply the concepts of file handling and regExusing packages.
5. Illustrate the working of scraping websites with CSV

Unit -I: An Introduction

Introduction: The Python Programming Language, History, features, Installing Python, Running Python program, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The Difference Between Brackets, Braces, and Parentheses

Variables and Expressions: Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations.

Conditional Statements: if, if-else, nested if –else

Looping: for, while, nested loops

Control statements: Terminating loops, skipping specific conditions

Unit -II:

Functions: Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Stack Diagrams, Fruitful Functions and Void Functions, Why Functions? Importing with from, Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Leap of Faith, Checking Types

Strings: A String Is a Sequence, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations.

Unit -III:

Lists: Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods

Tuples and Dictionaries: Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, Built-in Tuple Functions

Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods

Unit -IV:

Files: Text Files, The File Object Attributes, Directories

Exceptions: Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions

Creating the GUI Form and Adding Widgets:
Widgets: Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel, Spinbox, PanedWindow, LabelFrame, tkMessagebox. Handling Standard attributes and Properties of Widgets.

Unit-V: Test and Tutorials

In addition to CIA, Tutorial, Seminars, Assignment & case studies are to be given for building proficiency in the course. (Respective Course in-charge should maintain the records for the same).

Textbook

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN: 978-9352134755.

References:

1. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd. ISBN-13: 978-8126556014.
2. Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education
   India, 2015. ISBN-13: 978-9332555365.
3. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.
4. ReemaThareja, "Python Programming using problem solving approach", Oxford University press, 2017. ISBN-13: 978-0199480173
5. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, Shroff Publishers, 2017. ISBN: 978-9352136278

E-Resources

1. https://infytq.infosys.com/

Course Code: IT-425P	**Course Title: Lab Course(Lab based on IT-415T)**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-415T**

Kindly add minimum 12 practical. 03 practical on each unit.

1 Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.

2 Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.

3 Write a program to generate the Fibonacci series.

4 Write a function that reverses the user defined value.

5 Write a function to check the input value is Armstrong and also write the function for Palindrome.

6 Write a recursive function to print the factorial for a given number.

7 Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.

8 Define a function that computes the length of a given list or string.

9 Define a procedure histogram() that takes a list of integers and prints a histogram to the screen. For example, histogram([4, 9, 7]) should print the following:

```
****
*********
*******
```

10 A pangram is a sentence that contains all the letters of the English alphabet at least once, for example: The quick brown fox jumps over the lazy dog. Your task here is to write a function to check a sentence to see if it is a pangram or not.

11 Take a list, say for example this one: a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89] and write a program that prints out all the elements of the list that are less than 5.

12 Write a program that takes two lists and returns True if they have at least one common member.

13 Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.

14 Write a Python program to clone or copy a list

15 Write a Python script to sort (ascending and descending) a dictionary by value.

16 Write a Python script to concatenate following dictionaries to create a new one.
Sample Dictionary:
dic1={1:10, 2:20}
dic2={3:30, 4:40}
dic3={5:50,6:60}
Expected Result: {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

17 Write a Python program to sum all the items in a dictionary.

18 Write a Python program to read an entire text file.

19 Write a Python program to append text to a file and display the text.

Course Code: IT-416T	**Course Title: Data Analytics**
Total Credit: 2	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

1. Basic Knowledge of Microsoft Excel or Google sheets

Course Objectives

1. Develop Excel proficiency for data analytics
2. Understand data analysis concepts and techniques
3. Use advanced Excel features for data visualization
4. Learn practical skills for data-driven decision-making

Course Outcomes

1. Able to analyze data using Excel.
2. Effectively visualize data using advanced charting techniques
3. Apply statistical analysis techniques in business scenarios
4. Make data-driven decisions using advance analysis techniques.

Unit-I: Understanding Data Analytics and Excel, Data import & Pre-processing: (10 Periods)

1: Introduction to Data Analytics and Excel Basics

- Understanding the importance of data analytics.
- Introduction to Excel as a data analytics tool
- Familiarization with the Excel interface

2: Data Types, Formats, and Basic Excel Functions

- Learning about data types and formats in Excel
- Introduction to Excel functions and formulas
- Practice with basic functions and formulas

3: Data Import Techniques

- Importing data from various sources
- Introduction to Excel's data import tools
- Hands-on practice with importing data

4: Data Cleaning and Transformation

- Understanding the need for data cleaning
- Techniques for data transformation and normalization
- Hands-on practice with data cleaning and transformation

5: Handling Missing Values in Excel

- Identifying and understanding missing values
- Methods for handling missing values in Excel
- Hands-on practice with missing value management

6: Data Formatting in Excel

- Introduction to data formatting in Excel
- Customizing cell formats for better data presentation
- Hands-on practice with data formatting

7: Conditional Formatting in Excel

- Understanding conditional formatting
- Applying conditional formatting rules to improve data visualization
- Hands-on practice with conditional formatting

8: Advanced Excel Functions and Formulas

- Introduction to advanced Excel functions and formulas
- Hands-on practice with advanced functions and formulas

9: Data Analytics Techniques in Excel

- Understanding various data analytics techniques

- Applying Excel functions and tools for data analysis
- Hands-on practice with data analytics techniques in Excel

10: Unit 1: Project and Review

- Applying the learned concepts to a real-world data analytics project
- Review of key concepts and techniques
- Presentation and discussion of final projects

Unit-II: Descriptive Statistics and Data Visualization, Data Analysis Techniques: (10 Periods)

1: Basic Statistical Functions

- Introduction to descriptive statistics
- Using basic statistical functions in Excel: COUNT(), SUM(), AVERAGE(), MEDIAN(), MODE(), MIN(), MAX(), STDEV()
- Hands-on practice with basic statistical functions

2: Frequency Distributions and Histograms

- Understanding frequency distributions and their importance
- Creating frequency distributions and histograms in Excel
- Hands-on practice with frequency distributions and histograms

3: Pivot Tables and Pivot Charts

- Introduction to PivotTables and PivotCharts
- Creating and customizing PivotTables and PivotCharts for data summarization
- Hands-on practice with PivotTables and PivotCharts

4: Basic Excel Charts for Data Visualization

- Introduction to basic Excel chart types: column, bar, line, pie, and area charts
- Creating and customizing basic Excel charts
- Hands-on practice with basic chart types

5: Advanced Chart Types and Customization

- Exploring advanced Excel chart types: scatter, bubble, radar, waterfall, and treemap charts
- Customizing chart elements and formatting for effective data visualization
- Hands-on practice with advanced chart types

6: Sorting and Filtering Data

- Introduction to sorting and filtering data in Excel
- Using sorting and filtering tools for data organization and analysis
- Hands-on practice with sorting and filtering

7: Data Validation and Data Auditing

- Understanding data validation and its importance
- Implementing data validation rules in Excel
- Introduction to data auditing tools and techniques
- Hands-on practice with data validation and auditing

8: Advanced Excel Functions for Data Analysis

- Introduction to advanced Excel functions: VLOOKUP(), HLOOKUP(), INDEX(), MATCH(), COUNTIF(), SUMIF()
- Hands-on practice with advanced functions for data analysis

9: What-If Analysis: Goal Seek

- Understanding Goal Seek and its applications
- Using Goal Seek to find input values that achieve a specific goal
- Hands-on practice with Goal Seek

10: What-If Analysis: Data Tables and Scenario Manager

- Introduction to Data Tables and Scenario Manager for what-if analysis
- Creating one-variable and two-variable data tables
- Using Scenario Manager to analyze different scenarios and their impact
- Hands-on practice with Data Tables and Scenario Manager

11: Unit 2: Project and Review

- Applying the learned concepts to a real-world data analytics project
- Review of key concepts and techniques
- Presentation and discussion of final projects

Unit-III: Working with Time Series Data & Regression Analysis: (10 Periods)

1: Introduction to Time Series Data

- Understanding time series data and its importance
- Working with time series data in Excel: date and time functions
- Hands-on practice with time series data manipulation

2: Trend Analysis and Forecasting

- Identifying trends and patterns in time series data
- Introduction to time series forecasting
- Forecasting techniques in Excel: linear and polynomial trendlines
- Hands-on practice with trend analysis and forecasting

3: Smoothing Techniques: Moving Averages

- Introduction to moving averages as a smoothing technique
- Calculating simple, weighted, and exponential moving averages in Excel
- Hands-on practice with moving averages for trend analysis

4: Smoothing Techniques: Exponential Smoothing

- Understanding exponential smoothing and its applications
- Implementing exponential smoothing in Excel using the "Forecast Sheet" feature
- Hands-on practice with exponential smoothing for forecasting

5: Simple Linear Regression

- Introduction to simple linear regression analysis
- Using Excel's Data Analysis ToolPak to perform simple linear regression
- Interpreting regression output and understanding coefficient estimates
- Hands-on practice with simple linear regression

6: Multiple Linear Regression

- Introduction to multiple linear regression analysis
- Performing multiple linear regression using Excel's Data Analysis ToolPak
- Interpreting multiple regression output and understanding coefficient estimates
- Hands-on practice with multiple linear regression

7: Model Diagnostics and Validation

- Assessing the quality of regression models: R-squared, adjusted R-squared, and standard error
- Testing for assumptions: normality, linearity, multicollinearity, and homoscedasticity
- Cross-validation and model selection techniques
- Hands-on practice with model diagnostics and validation

8: Nonlinear Regression Models

- Introduction to nonlinear regression models
- Implementing nonlinear regression models in Excel using the Solver add-in
- Hands-on practice with nonlinear regression

9: Time Series Decomposition

- Understanding the components of time series data: trend, seasonality, and noise
- Decomposing time series data in Excel using moving averages and seasonal indices
- Hands-on practice with time series decomposition

10: Advanced Time Series Forecasting Techniques

- Introduction to advanced time series forecasting techniques: autoregressive (AR) and moving average (MA) models
- Implementing advanced forecasting techniques in Excel using custom formulas and add-ins
- Hands-on practice with advanced time series forecasting techniques

11: Unit 3: Project and Review

- Applying the learned concepts to a real-world data analytics project
- Review of key concepts and techniques
- Presentation and discussion of final projects

Unit-IV: Hypothesis Testing, Confidence Intervals And Excel Add-ins for Data Analytics: (10 Periods)

1: Hypothesis Testing Basics

- Introduction to hypothesis testing and its importance

- Understanding null and alternative hypotheses
- Types of hypothesis tests: one-tailed and two-tailed tests
- Hands-on practice with hypothesis testing in Excel

2: Confidence Intervals

- Understanding confidence intervals and their interpretation
- Calculating confidence intervals for means and proportions in Excel
- Hands-on practice with constructing confidence intervals

3: T-Tests and Z-Tests

- Introduction to t-tests and z-tests
- Performing one-sample, two-sample, and paired t-tests in Excel using the Data Analysis ToolPak
- Conducting z-tests in Excel using custom formulas
- Hands-on practice with t-tests and z-tests

4: Chi-Square Tests and ANOVA

- Introduction to chi-square tests for independence and goodness-of-fit
- Performing chi-square tests in Excel using the Data Analysis ToolPak or custom formulas
- Introduction to Analysis of Variance (ANOVA) for comparing multiple means
- Conducting one-way and two-way ANOVA in Excel using the Data Analysis ToolPak
- Hands-on practice with chi-square tests and ANOVA

5: Excel Analysis ToolPak

- Introduction to the Excel Analysis ToolPak and its features
- Using the ToolPak for statistical analysis: t-tests, ANOVA, correlation, and regression
- Hands-on practice with the Excel Analysis ToolPak

6: Power Query for Data Transformation

- Introduction to Power Query and its applications
- Importing, cleaning, and transforming data using Power Query
- Merging and appending queries to combine data from multiple sources
- Hands-on practice with Power Query for data transformation

7: Power Pivot for Data Modeling

- Introduction to Power Pivot and data modeling in Excel
- Creating and managing data models using Power Pivot
- Working with calculated columns and measures using DAX (Data Analysis Expressions)
- Hands-on practice with Power Pivot for data modeling

8: Power Map for Geospatial Data Visualization

- Introduction to Power Map (3D Maps) for geospatial data visualization
- Creating interactive, 3D geospatial visualizations using Power Map
- Customizing map layers, chart types, and visual elements
- Hands-on practice with Power Map for geospatial data visualization

9: Advanced Hypothesis Testing Techniques

- Introduction to advanced hypothesis testing techniques: F-tests, Mann-Whitney U test, and Kruskal-Wallis test
- Implementing advanced hypothesis tests in Excel using custom formulas or third-party add-ins
- Hands-on practice with advanced hypothesis testing techniques

10: Data Analytics Project and Review

- Applying the learned concepts to a real-world data analytics project involving hypothesis testing, confidence intervals, and Excel add-ins
- Review of key concepts and techniques covered in the chapters
- Presentation and discussion of final projects

Jnit-V: Test and Tutorials (05 Periods)

n addition to CIA, Tutorial, Seminars, Assignments & case studies are to be given for building proficiency n the course. (Respective course in-charge should maintain the records for the same).

Textbook

1. Mastering Data Analytics (Using Excel), By Dr. Nazneen Akhter & Dr. Bharti Gawali, Shroff Publishers.

References:

1. Data Analysis with Excel Paperback – 1 January 2019 by Manish Nigam.
2. Microsoft Excel Data Analysis and Business Modelling by Wayne Winston

E-Resources

1. Microsoft Excel Help Center: This is a comprehensive resource for all things in Excel, including tutorials, how-to guides, and troubleshooting tips.
2. Excel Easy: A free online tutorial website that covers all the basics of Excel and includes step-by-step guides for common data analysis tasks.

Course Code: IT-426P	**Course Title: Practical Based on IT-416T**
Total Credit: 1.5	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Sample List of experiments to be carried out based on the course **IT-416T**

The following Experiments can be performed in Microsoft Excel and/or Google Sheets

1. Clean and prepare a messy dataset for analysis using Excel's data cleaning tools.
2. Use Excel's pivot tables and charts to explore and visualize data from a large dataset.
3. Use Excel's conditional formatting to highlight important data trends and outliers.
4. Use Excel's charting tools to create a scatter plot and identify correlation between two variables.
5. Use Excel's data filtering and sorting tools to explore a large dataset.
6. Use Excel's pivot tables and charts to create a dashboard that summarizes key metrics.
7. Use Excel's text-to-columns feature to split data in a single column into multiple columns.
8. Use Excel's remove duplicates feature to identify and remove duplicate entries in a dataset.
9. Use Excel's fill handle to quickly fill in missing data in a dataset.
10. Use Excel's SUMIFS function to sum data based on multiple criteria.
11. Use Excel's COUNTIF function to count data based on a specific condition.
12. Use Excel's AVERAGEIF function to calculate the average of data that meets a specific criterion.
13. Use Excel's pivot tables to calculate total sales by region and product category.
14. Use Excel's pivot tables to calculate the average order value by customer segment.
15. Use Excel's pivot tables to calculate the top selling products by region.
16. Use Excel's line chart to plot the trend of sales over time.
17. Use Excel's bar chart to compare sales across different product categories.
18. Use Excel's pie chart to visualize the percentage breakdown of sales by region.
19. Use Excel's combination chart to plot multiple data series on a single chart.
20. Use Excel's waterfall chart to visualize the contribution of each factor to a total value.

21. Use Excel's heat map chart to visualize the correlation between multiple variables.
22. Use Excel's t-test function to compare the means of two different datasets.
23. Use Excel's regression analysis tool to build a linear regression model.
24. Use Excel's ANOVA function to compare the means of three or more datasets.

Course Code: IT-417(A) **(SEC-2(A)**	**Course Title:- Emotional Intelligence**
Total Credit: 2	Marks: 50 (UA: 40 + IA: 10)
Periods: 3 per week (50 Minutes each)	

Prerequisites:

There are no prerequisites for this course

Learning Objectives

1. Understand the concept of Emotional Intelligence and its importance in personal and professional life
2. Develop skills for improving self-awareness, self-management, social awareness, and relationship management
3. Apply EI skills in personal and professional settings to enhance relationships, teamwork, and leadership
4. Create an action plan for continuous improvement of EI skills

Learning Outcomes

1. Improved self-awareness and ability to regulate emotions
2. Enhanced social awareness and empathy
3. Improved communication and relationship management skills
4. Increased leadership potential and effectiveness in the workplace.

Unit -I: Introduction to Emotional Intelligence (10 Periods)

1. What is Emotional Intelligence (EI)?
2. Why is EI important?
3. Understanding the four components of EI: self-awareness, self-management, social awareness, and relationship management.

Unit -II: Developing Self-Awareness and Self-Management Skills (10 Periods)

1. Assessing your EI using the Emotional Intelligence Appraisal
2. Strategies for improving self-awareness, including mindfulness and journaling
3. Techniques for improving self-management, including stress management, emotional regulation, and impulse control.

Unit -III: Developing Social Awareness and Relationship Management Skills (10 Periods)

1. Understanding social awareness and empathy
2. Developing relationship management skills, including communication, conflict resolution, and leadership
3. Building and maintaining positive relationships

Unit -IV: Applying EI in Personal and Professional Settings (10 Periods)

1. Applying EI in personal relationships, including family and friendships
2. Using EI in the workplace, including teamwork, leadership, and career development

3. Developing an action plan for improving EI skills and setting goals for personal and professional growth.

Unit-V: Test and Tutorials (05 Periods)

In addition to CIA, Tutorial, Seminars, Assignments & case studies are to be given for building proficiency in the course. (Respective course in-charge should maintain the records for the same).

Textbook

1. The Emotional Intelligence Handbook: A Complete Guide to Developing and Improving Your Emotional Intelligence by Anthony C. Mersino (2021)

References:

1. Emotional Intelligence: Why it can matter more than IQ by Daniel Goleman
2. Emotional Intelligence 2.0 by Travis Bradberry and Jean Greaves
3. The Emotional Life of Your Brain: How Its Unique Patterns Affect the Way You Think, Feel, and Live--and How You Can Change Them by Richard J. Davidson and Sharon Begley
4. Emotional Intelligence for Managers: Rise above the chaos of the workplace by R. Sridhar
5. The Power of Emotional Intelligence by Sanjay Singh
6. Emotional Intelligence at Work by Geetu Bharwaney
7. Mind Over Mood: Change How You Feel by Changing the Way You Think by Dennis Greenberger and Christine A. Padesky

E-Resources

2. Emotional Intelligence 2.0 website: https://www.emotionalintelligence2-0.com/
3. Greater Good Science Center at UC Berkeley: https://ggsc.berkeley.edu/topic/emotional_intelligence
4. MindTools Emotional Intelligence Toolkit: https://www.mindtools.com/pages/article/newCDV_59.htm
5. Harvard Business Review Emotional Intelligence articles: https://hbr.org/topic/emotional-intelligence
6. Psychology Today Emotional Intelligence articles: https://www.psychologytoday.com/us/basics/emotional-intelligence

Course Assessment (Full 50 Marks Internal Assessment)

Assessing the effectiveness of an emotional intelligence course can be challenging, but there are several practical assessments that can be used to demonstrate the skills acquired through the course. Here are some before and after tests that could be used to assess the effectiveness of an emotional intelligence course:

1. **Self-Assessment**: Before and after the course, students could be asked to complete a self-assessment of their emotional intelligence using a standardized tool such as the Emotional Intelligence Appraisal or the Mayer-Salovey-Caruso Emotional Intelligence Test. The results of these assessments could be compared to show any changes in their emotional intelligence.
2. **Role-Play Exercises**: Before and after the course, students could be asked to participate in a role-play exercise that requires them to apply emotional intelligence skills. For example, they could be asked to role-play a difficult conversation with a coworker or friend, and the before and after conversations could be compared to demonstrate any improvements in their ability to manage their emotions and respond to others effectively.
3. **Feedback from Others**: Before and after the course, students could be asked to collect feedback from colleagues, friends, or family members on their emotional intelligence skills.

They could ask for feedback on specific areas, such as empathy or self-awareness, and compare the feedback to demonstrate any improvements.

4. **Case Studies: Before and after the course**, students could be asked to analyze a case study that requires them to apply emotional intelligence skills. For example, they could be asked to analyze a workplace conflict and suggest solutions that demonstrate empathy and relationship management skills. The before and after case studies could be compared to show any improvements in their ability to apply emotional intelligence skills.
5. **Group Project**: Before and after the course, students could be asked to work on a group project that requires them to apply emotional intelligence skills. For example, they could be asked to plan a community service project or organize a charity event. The before and after projects could be compared to demonstrate any improvements in their ability to work collaboratively and manage relationships effectively.

These practical assessments can help demonstrate the effectiveness of an emotional intelligence course and show how students have acquired the necessary skills to apply emotional intelligence in their personal and professional lives.

Course Code: IT-417T(B) (SEC-2(B)	**Course Title: PHP**
Total Credit: 2	Marks: 50 (UA: -- + IA: 50)
Periods: 3 per week (50 Minutes each)	
Prerequisites: Paper No. IT-317T	

Course Objectives

- Develop Excel proficiency for data analytics
- Understand data analysis concepts and techniques
- Use advanced Excel features for data visualization
- Learn practical skills for data-driven decision-making

Course Outcomes

- Able to analyze data using Excel.
- Effectively visualize data using advanced charting techniques
- Apply statistical analysis techniques in business scenarios
- Make data-driven decisions using advance analysis techniques.

Unit-I: Essential PHP:

Mixing HTML and PHP- comments – variables. Operators and flow control: Assignment operators-incrementing and decrementing values-string,bitwise,execution operators-operator precedence-relational, logical operators- if, if-else, elseif statement, ternary operator, switch statement-for loops-while loops- do-while loops, foreach loop.

Unit-II: Strings and Arrays:

String functions-converting to and from strings-formatting. Arrays-modify, delete- handling arrays with loops- array functions-implode-explode functions-extracting data from array- sorting arrays-array operators-multidimensional arrays.

Functions: creating- passing & returning data in arrays-passing arrays and returning arrays from functions-pass by reference- using default arguments-returning references, Lists. Variable scope-global data- static variables, conditional functions-variable functions-nesting functions- creating include files- returning errors from functions..

Unit-III: Object oriented Programming:

Classes-objects-constructors- destructors-overriding methods-overloading methods- autoloading classes. File handling: fopen-feof –fgets-fclose-fgetc. Use of file-get-contents, file-put-contents, reading and writing a file into and from an array- use of file-exists, filesize

Unit-IV: Working with database-

Basic SQL commands- creating MySQL database-table-insert-delete-update table. Sessions, Cookies : Setting , reading, deleting cookies, simple email creation and Sending , Storing data in sessions. Ajax: Getting started with Ajax- writing Ajax- creating and opening XMLHttpRequest Object-Handling downloaded data, starting the download-Ajax with PHP-Passing data to the server with GET and POST.

Unit-V: Lab based on PHP

Textbook

1. PHP: The complete Reference- "Steven Holzner"- TMH publication- 2011

References:

1. Beginning PHP and MySQL 5: From Novice to Professional, W. Jason Gilmore, Second Edition, Apress publication1

2. PHP in a Nutshell- Paul Hudson, O'Reilly Media, 2005

Bharti