

PART A: Introduction			
Program: Degree	Class: B.Sc.	Year: III Year	Session: 2023-24
Subject: Computer Science			
1.	Course Code	S3-COSC1D	
2.	Course Title	Operating System (Group A – Paper I) (Theory)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes (CLO)	<p>After the completion of this course, a student shall be able to do the following:</p> <ul style="list-style-type: none"> • Describe the importance of computer system resources and the role of operating system in their management policies and algorithms. • Specify objectives of modern operating systems and describe how operating systems have evolved over time. • Understand various process management concepts and can compare various scheduling techniques, synchronization, and deadlocks. • Describe the concepts of multithreading and memory management techniques. • Identify the best suited memory management technique for any process. • Describe various file operations, file allocation methods and disk space management. • To understand and identify potential threats to operating systems and the security features design to guard against them. • Learn to operate the Linux system, along with its administration and Shell programming • Getting to know the Android OS and its application framework. 	
6.	Credit Value	Theory - 4 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Lectures per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics		No. of Lectures
I	Introduction to Operating System: What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.		4

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	Keywords: <i>Functions of OS, resource abstractions, multiprogramming, time sharing, workstation.</i>	
II	<p>Process Management: Process Concepts, Process states & Process Control Block.</p> <p>Process Scheduling: Scheduling Criteria, Scheduling Algorithms (Preemptive & Non- Preemptive) – FCFS, SJF, SRTN, RR, Priority, Multiple-Processor, Real-Time, Multilevel Queue and Multilevel Feedback Queue Scheduling.</p> <p>Deadlock - Definition, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock.</p> <p>Deadlock Handling Approaches: Prevention, Avoidance, Detection and Recovery.</p> <p>Keywords: <i>process states, preemptive and non-preemptive scheduling, FCFS, SJF, RR, deadlock.</i></p>	10
III	<p>Memory Management: Introduction, Address Binding, Logical versus Physical Address Space, Swapping, Contiguous & Non-Contiguous Allocation, Fragmentation (Internal & External), Compaction, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement Algorithms.</p> <p>File Management: Concept of File System (File Attributes, Operations, Types), Functions of File System, Types of File System, Access Methods (Sequential, Direct & other methods), Directory Structure (Single-Level, Two-Level, Tree-Structured, Acyclic-Graph, General Graph), Allocation Methods (Contiguous, Linked, Indexed).</p> <p>Keywords: <i>swapping, fragmentation, paging, virtual memory, file management, directory structure.</i></p>	10
IV	<p>Disk Management: Structure, Disk Scheduling Algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK), Swap Space Management, Disk Reliability, Recovery.</p> <p>Security: Security Threats, Security policy mechanism, Protection, Trusted Systems, Authentication and Internal Access Authorization, Windows Security.</p> <p>LINUX: Introduction, History and features of Linux, advantages, hardware requirements for installation, Linux architecture, file system of Linux - boot block, super block, inode table, data blocks.</p> <p>Linux standard directories, Linux kernel, Partitioning the hard drive for Linux, installing the Linux system, system - startup and shut-down process, init and run levels. Process, Swap, Partition, fdisk, checking disk free spaces.</p> <p>Difference between CLI OS & GUI OS, Windows v/s Linux, Importance of Linux Kernel, Files and Directories. Concept of Open Source Software.</p> <p>Keywords: <i>disk scheduling, recovery, authorization, boot block, kernel, partitioning, open source.</i></p>	10
V	<p>Linux Administration:</p> <p>Types of user-Root and normal user, Multiple logins at same time (Ctrl + Alt + F1, F2..F6), who command.</p> <p>Help: whatis, --help, man command.</p> <p>Basic Commands:</p> <p>For displaying current directory, files and directories of current/absolute/relative location(s), creating, removing, renaming, copying and moving files or directories.</p> <p>For comparing, and editing file content, displaying file content(s) with tr, head, tail, last, grep, sort, piping.</p>	14

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	<p>Searching file content or searching file within different directories based on particular search criteria.</p> <p>For implementing general purpose utilities – calendar, date, calculator, basic arithmetic expressions, compression and extraction of file/directory.</p> <p>Text editors: vi, joe, vim, gedit, atom, nano etc. Command mode & Insert mode, cut, yank, undo.</p> <p>Managing multiple processes: connecting processes with pipes, tee, redirecting input output, changing process priority with nice, cron commands, kill, ps.</p> <p>Managing user accounts- Sudo, users: useradd, usermod, userdel, passwd.</p> <p>Group: Primary & Secondary Group, chgrp, chown, groupadd, groupdel.</p> <p>Permissions: adding and removing permissions.</p> <p>Package installation through GUI/ apt-get/yum/dnf.</p> <p>Keywords: <i>head, tail, grep, sort, piping, yank, kill, chgrp, chown, groupadd.</i></p>	
VI	<p>Shell Programming: Types of Shells, Shell Meta Characters - \$#, \$*,\$?, Shell Variables, Shell Scripts, Debugging scripts, echo, read, operators, keywords, Integer Arithmetic and String Manipulation, Functions, I/O Redirection and Piping.</p> <p>Decision Making: if-else-elif-fi, case-esac.</p> <p>Loop Control: while, for, until, break & continue.</p> <p>Automation and Exception Handling: Creating shell programs for automating tasks, file handling, trapping signals etc.</p> <p>Android Operating System: Introduction, Development Framework, Application Architecture, Process Management and File System, Small Application Development using Android Development Framework.</p> <p>Indian contribution to the field – the BOSS operating system, open source softwares, growth of LINUX, Aryabhata Linux, contributions of innovators – Rajen Sheth, Sunder Pichai etc.</p> <p>Keywords: <i>shell programming, exception handling, Android development framework. BOSS OS, Linux, Arya Bhatt, Rajen Sheth, Sunder Pichai.</i></p>	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, John Wiley Publications.
- A.S. Tanenbaum, Modern Operating Systems, Pearson Education.
- J.L.Peterson, Operating System Concepts.
- Sumitabh Das, Linux, TMH.

Reference Books:

- G. Nutt, Operating Systems: A Modern Perspective, Pearson Education.
- W. Stallings, Operating Systems, Internals & Design Principles, Pearson Education.
- M. Milenkovic, Operating Systems- Concepts and Design, Tata McGraw Hill.

Suggestive digital platform web links

- <https://web.iitd.ac.in/~minati/MTL458.html>
- <https://www.cse.iitb.ac.in/~mythili/os/>
- <https://www.youtube.com/watch?v=aCJ3YgoolHQ>

Suggested equivalent online courses

- <https://nptel.ac.in/courses/106/102/106102132/>

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PART D: Assessment and Evaluation

Suggested Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE): 30 Marks

University Exam (UE): 70 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Tests/ Presentation / Assignment	30 Marks
External Assessment: University Exam (UE): Time : 03.00 Hours	Section (A) : Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 Marks
Any remarks/suggestions:		



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PART A: Introduction			
Program: Degree		Class: B.Sc.	Year: III Year
Session: 2023-24			
Subject: Computer Science			
1.	Course Code	S3-COSC1Q	
2.	Course Title	Operating System Lab (Group A – Paper I) (Practical)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes (CLO)	<p>After the completion of this course, a student shall be able to do the following:</p> <ul style="list-style-type: none"> • Operate the Linux system, along with its administration and Shell programming. • Understand and be familiar with the Linux environment. • Learn and run the various Linux commands. • Use vi editor for programming. • Learn and run the shell scripting programs. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Lab. per week			
Total No. of Lab.: 30 Hrs.			
Suggestive List of Practicals			No. of Labs.
<p>I. Linux:</p> <p>a) Linux Directory Commands: pwd, mkdir, rm -rf, ls, cd, cd /, cd ~</p> <p>b) Linux File Commands: touch, cat, cat >, cat >>, rm, cp, mv, rename</p> <p>c) Linux Permission Commands: su, id, useradd, passwd, groupadd, chmod, groupdel, chown, chgrp</p> <p>d) Linux File Content & Filter Commands: head, tail, tac, more, less, grep, cat, cut, grep, comm, sed, tee, tr, uniq, wc, od, sort, diff.</p> <p>e) Linux Utility Commands: find, bc, locate, date, cal, sleep, time, df, mount, exit, clear, gzip, gunzip.</p> <p>f) Linux Networking Commands: ip, ssh, mail, ping, host</p> <p>g) Edit Crontab file: to wall message on system on particular time automatically.</p> <p>h) Vi editor: Create file, edit, save and quit. Highlighting the searched term within a file, cut, yank, undo.</p> <p>II. Shell Scripting:</p> <p>a) Write a shell script to print a message.</p>			30

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	<p>b) Write a shell script to access arguments passed on command line.</p> <p>c) Write a shell script to create files with the names passed on command line.</p> <p>d) Write a shell script to input number from user and display its factorial.</p> <p>e) Write a shell script to input file name and create multiple directories individually for the name in the file given.</p> <p>f) Write a shell script to input number from user and display whether it is prime number or not.</p> <p>g) Write a shell script to list all the files in any directory given by the user</p> <p>h) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory.</p>	
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PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

- Richard Peterson, Linux: The Complete Reference, TMH
- Sumitabh Das , Linux , McGraw Hill
- Jason Cannon, Linux for Beginners, Createspace Independent Publishing Platform
- William E. Shotts Jr., The Linux Command Line: A Complete Introduction, O'Reilly Media, Inc.

Suggestive digital platform web links

<https://web.iitd.ac.in/~minati/MTL458.html>

<https://www.cse.iitb.ac.in/~mythili/os/>

<https://www.youtube.com/watch?v=aCJ3YgoolHQ>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/102/106102132/>

<https://www.youtube.com/watch?v=OHCMfsNpqCc>

PART D: Assessment and Evaluation

Internal Assessment :		External Assessment :	
Class Interaction/Quiz	30	Viva voce practical	70
Attendance		Practical record file	
Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training		Table work / Experiments	
Total Marks: 100			
Any remarks/ suggestions:			

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PART A: Introduction			
Program: Degree		Class: B.Sc.	Year: III Year
Session: 2023-24			
Subject: Computer Science			
1.	Course Code	S3-COSC2D	
2.	Course Title	Programming with Python (Group A – Paper II) (Theory)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes(CLO)	<p>After studying this subject, students shall be able to –</p> <ul style="list-style-type: none"> ● Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. ● Express proficiency in the handling of strings, functions and file handling. ● Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. ● Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python with class, modules and packages. ● Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming. 	
6.	Credit Value	Theory - 4 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Lectures per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics		No. of Lectures
I	<p>Python Basics : Python interpreter, Python idle, dynamically typed and strongly typed features, basic data types, variables, expressions, statements, operators, flow of execution. Input and Output statements, Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration: while, for, break, continue, pass, implementing 'for' through range(), 'in' and 'not in' operators for sequence traversal. Creating and executing .py scripts.</p> <p>Keywords: interpreter, while, for, break, continue, scripts.</p>		12
II	<p>Data Structures: Lists- append, extend, insert, index, remove, pop, count, sort, reverse, slicing, list comprehension, Copying a list: deep copy, shallow copy. Tuples- index, count, usage, use of tuples as a swap function. Dictionaries-keys, values, tuples, nested dictionaries, dictionary</p>		12

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	comprehension. Strings- Single line and multi-line strings, formatter, isdigit, isalpha, isalnum, islower, istitle, isspace, title, lower, upper, strip, split, splitlines, join etc. Sets – union, intersection, subset, superset, difference, symmetric difference, copy, add, remove, discard etc. Keywords: <i>index, sort, deep copy, tuples, dictionary, sets, strings.</i>	
III	Functions & File Handling: Inbuilt Functions- id, len, chr, ord etc., defining and calling a function, arguments, global versus local variables, defining and using lambda functions, the map(), filter(), reduce() functions. Working with files : read, write and append modes: r, w, a, x, r+, w+, a+, x+, reading-read(), readline(), readlines(), writing-write(), writelines(), seek(), tell(). Word count, copy file scripts through file handling concepts. Keywords: <i>function, calling a function, arguments, global variables, read, write, copy, seek.</i>	12
IV	Classes, modules and exceptional handling: Classes: Introduction, Member variables and defining methods, constructor, destructor, data encapsulation, inheritance, multiple inheritance, diamond problem solving technique of python. Modules: inbuilt modules- sys, random, time etc. import, from...import, from..import*. Constructing packages, role of __init__.py Exceptional Handling: The try-except-else-finally block, the raise statement, the hierarchy of exceptions, adding exceptions Keywords: <i>class, constructor, destructor, encapsulation, inheritance, exception, modules.</i>	12
V	Database & GUI Programming: Importing sqlite, connecting to database, creating table, insert, select, update, delete, drop tables, accessing and modifying tables through python. Graphical user interfaces; event-driven programming paradigm; tkinter module, creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes – sizes, fonts, colors layouts, nested frames. Keywords: <i>GUI, tables, database, insert, update, drop tables, event- driven programming, dialogs, frames.</i>	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- Taneja Sheetal & Kumar Naveen, “Python Programming: A modular approach”, Pearson.
- Liang Y. Daniel, “Introduction to Programming Using Python”, Pearson.

Reference Books:

- Zed A. Shaw, “Learn Python the Hard Way”, Zed Shaw's Hard Way Series.
- Charles Dierbach, “Introduction to Computer Science using Python”, Wiley.
- Michael T. Goodrich, “Data Structures and Algorithms in Python”, Wiley.

Suggestive digital platform web links

<https://www.guru99.com/how-to-install-python.html>
<https://www.udemy.com/course/pythonforbeginnersintro/>

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https://www.python.org/about/gettingstarted/ https://spoken-tutorial.org/media/videos/89/Python-3.4.3-Instruction-Sheet-English.pdf		
Suggested equivalent online courses		
https://nptel.ac.in/courses/106/106/106106145/ https://www.youtube.com/watch?v=rfscVS0vtbw https://onlinecourses.swayam2.ac.in/aic20_sp33/preview		
PART D: Assessment and Evaluation		
Suggested Evaluation Methods:		
Maximum Marks: 100		
Continuous Comprehensive Evaluation (CCE): 30 Marks University Exam (UE): 70 Marks		
Internal Assessment : Continuous Comprehensive Evaluation (CCE)	Class Tests/ Presentation / Assignment	30 Marks
External Assessment: University Exam (UE): Time : 03.00 Hours	Section (A) : Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 Marks
Any remarks/suggestions:		

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PART A: Introduction			
Program: Degree	Class: B.Sc.	Year: III Year	Session: 2023-24
Subject: Computer Science			
1.	Course Code	S3-COSC2Q	
2.	Course Title	Python Programming Lab (Group A – Paper II) (Practical)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes(CLO)	After studying this subject, students shall be able to – <ul style="list-style-type: none"> • Understand the python environment and its text editor. • Code and run the programs. • Debug the program. • Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. • Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming. 	
6.	Credit Value	Practical - 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Lab. per week			
Total No. of Lab.: 30 Hrs.			
Suggestive List of Practicals			No. of Labs.
<ol style="list-style-type: none"> 1. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500. 2. Print the first 2 and last 3 characters in a given string. Use the string slicing. 3. Write a program that eliminates duplicates in a list. 4. Implement shallow copy and deep copy of a list. 5. Find the largest of n numbers, using a user defined function largest() 6. Write a function that capitalizes all vowels in a string. 7. Read a line containing digits and letters. Write a program to give the count of digits and letters. 8. Write a function myReverse() which receives a string as an input and returns the reverse of the string. 9. Use the list comprehension methodology in python, to generate the squares of all odd numbers in a given list. 10. Generate a dictionary and print the same. The keys of the dictionary should be integers between 1 and 10 (both inclusive). The values should be the cubes of the corresponding keys. 			30

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	<p>11. Create a nested dictionary. The roll number of a student maps to a dictionary. This inner dictionary will have name, age, and place as keys. Read details of at least three students.</p> <p>12. Enter a word. Create a dictionary with the letters of this word as keys, and the corresponding ASCII values as values.</p> <p>13. Define a class with three methods: readString(), printString(), writeString(). The first method should read the contents of a file. The second method should print the contents to the console. The third method should write the contents to a new file.</p> <p>14. Create a class account which has constructor to input account_no, name, balance from user, print_account() to display the account details, and deposit(), withdraw() which inputs amount and add/subtract them from the total amount of individual object.</p> <p>15. Create a database table in sqlite and show the table data in python.</p> <p>16. Implement DML commands in SQLite from python interface.</p> <p>17. Implement tkinter methods in a python script.</p>	
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PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

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- Liang Y. Daniel, “Introduction to Programming Using Python”, Pearson.

Reference Books:

- Zed A. Shaw, “Learn Python the Hard Way”, Zed Shaw's Hard Way Series.
- Charles Dierbach, “Introduction to Computer Science using Python”, Wiley.
- Michael T. Goodrich, “Data Structures and Algorithms in Python”, Wiley.

Suggestive digital platform web links

<https://www.guru99.com/how-to-install-python.html>

<https://www.python.org/about/gettingstarted/>

<https://spoken-tutorial.org/media/videos/89/Python-3.4.3-Instruction-Sheet-English.pdf>

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/106/106106145/>

<https://www.youtube.com/watch?v=rfscVS0vtbw>

https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

PART D: Assessment and Evaluation

Internal Assessment :

Class Interaction/Quiz

Attendance

Assignments (Charts/ Model)/
Technology Dissemination/ Excursion/
Lab visit/ Industrial Training

30

External Assessment :

Viva voce practical

Practical record file

Table work / Experiments

70

Total Marks: 100

Any remarks/ suggestions:



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PART A: Introduction			
Program: Degree		Class: B.Sc.	Year: III Year
Session: 2023-24			
Subject: Computer Science			
1.	Course Code	S3-COSC3D	
2.	Course Title	PHP & MySQL (Group B – Paper I) (Theory)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Levels. This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes(CLO)	After completing this course student shall be able to: <ul style="list-style-type: none"> • Discover how the web works, what makes web sites work. • Implement simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs. • Use Server Side Scripting. • Implement concept of data persistence. • Apply skills to program logic using PHP and handle data using MySQL. • Develop dynamic websites using PHP & MySQL. 	
6.	Credit Value	Theory – 4 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Hrs. per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics		No. of Lectures
I	Introduction - Introduction to internet & World Wide Web, Internet Addressing, Browsers, URL, Web Development, Domain Names – Basic concepts. HTML - History of HTML, HTML working, Structure of HTML documents, Tags and attributes, Tag vs. element. HTML Basic tags, Basic formatting tags, HTML color coding, Lists, Images, Tables and Hyperlink. Keywords: Browser, URL, domain name, HTML, hyperlink.		7
II	Grouping – Using Div and Span tags for grouping. HTML Forms – input, textarea, button, select, label. HTML Headers – Title, Meta, Base, Link, Style, Script. CSS – Basic Concept of CSS, Benefits of CSS, Deprecated HTML Tags, CSS Syntax. CSS Selectors – Based on tag name, Id, Class. CSS Types – Inline, Internal, External. CSS Properties – Background, Text, Fonts, List, Tables, Border, Margin, Padding, Float, Position. Keywords: textarea, script, link, style, script, css.		7

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III	<p>Scripting: Client Side vs. Server Side.</p> <p>JavaScript: introduction, Syntax review, keywords, variable declaration, data types, expressions & operators, using comments.</p> <p>Interacting with users – Creating alert dialogs, prompts, getting confirmations from users, understanding functions.</p> <p>BASICS OF PHP: Introduction to PHP, what does PHP Do?, Object Oriented Programming with PHP, language basics, installation of XAMPP/LAMP, syntax, comments, variables, constants and data types, expressions and operators, flow control statements, including html code in PHP, embedding PHP in web pages.</p> <p>Keywords: <i>client side and server side script, javascript, php, XAMPP, LAMP.</i></p>	10
IV	<p>FUNCTIONS & STRINGS in PHP: Defining a function, Calling a function, variable scope, function parameters, return values, predefined functions.</p> <p>Strings: Creating & accessing string, searching and replacing strings, encoding and escaping, comparing strings, formatting strings, regular expression.</p> <p>Keywords: <i>client-side and server-side script, JavaScript, php, XAMPP, LAMP.</i></p>	8
V	<p>Data & File Handling: PHP Forms: \$_GET, \$_POST, \$_REQUEST, \$_FILES, \$_SERVER, \$GLOBALS, \$_ENV, input/output controls, validation, Cookies and Sessions.</p> <p>File Handling: File and directory, open, close, read, write, append, delete, uploading and downloading files. File exists, File Size, Rename. Reading and display all/selected files present in a directory.</p> <p>Keywords: <i>data and file handling, cookies, sessions, file handling, file size.</i></p>	10
VI	<p>MYSQL AN OVERVIEW: Introduction, phpMyAdmin, Entering queries, Creating and using a database, Creating and selecting a database, creating a table, loading data into a table, Retrieving information from a table, selecting all data, selecting particular rows, selecting particular columns, sorting, date, calculations, working with NULL values, pattern matching, counting rows, using more than one tables.</p> <p>Keywords: <i>mysql, queries, creating table, loading data into table, pattern matching.</i></p>	8
VII	<p>MYSQL DATABASES IN PHP: Introduction, connecting to a MySQL database, querying the database, Retrieving and displaying the results, modifying data and deleting data through front end. Designing applications using PHP & MySQL.</p> <p>Keywords: <i>mysql, modify data, php.</i></p>	10
PART C: Learning Resources		
Textbooks, Reference Books, Other Resources		
Suggested Readings		

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Textbooks:

- Jon Duckett, Html And Css: Design And Build Websites, Wiley
- Jenifer Niederst Robbins, Learning Web Design: A Beginner's Guide To Html, Css, Javascript, And Web Graphics, O'Reilly
- Steven M. Schafer , HTML, XHTML, and CSS Bible, Wiley
- Felke-Morris, Basics of Web Design: HTML5 & CSS3, Pearson Education.
- Felke-Morris, Web Development & Design Foundations with HTML5, Addison-Wesley.

Reference Books:

- Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley India.
- Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India.
- Thomas A Powell , The complete Reference to HTML, Paperback.
- Lee Anne Philips, Using HTML, PHI
- C. Xavier, World Wide Web Design with HTML, New Age International.
- Laura Lemay, Mastering HTML, CSS & Javascript Web Publishing.
- HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, DT Editorial Services, Paperback

Suggestive digital platform web links

- <https://www.udemy.com/course/web-design-secrets/>
<https://www.udemy.com/course/php-mysql-course-for-absolute-beginners/>
<https://www.simplilearn.com/learn-php-basics-free-course-skillup>
<https://www.coursera.org/learn/web-applications-php>

Suggested equivalent online courses

- https://onlinecourses.swayam2.ac.in/aic20_sp32/preview
<https://www.udemy.com/course/php-mysql-tutorial/>

PART D: Assessment and Evaluation**Suggested Evaluation Methods:****Maximum Marks: 100****Continuous Comprehensive Evaluation (CCE): 30 Marks****University Exam (UE): 70 Marks**

Internal Assessment : Continuous Comprehensive Evaluation (CCE)	Class Tests/ Presentation / Assignment	30 Marks
External Assessment: University Exam (UE): Time : 03.00 Hours	Section (A) : Very Short Questions Section (B) : Short Questions Section (C) : Long Questions	70 Marks

Any remarks/suggestions:



PART A: Introduction			
Program: Degree		Class: B.Sc.	Year: III Year
Session: 2023-24			
Subject: Computer Science			
1.	Course Code	S3-COSC3Q	
2.	Course Title	PHP & MySQL Lab (Group B – Paper I) (Practical)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	To study this course, a student must have successfully completed the course on Programming at Certificate/Diploma Level. This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes(CLO)	After completing this course student shall be able to: <ul style="list-style-type: none"> • Discover how the web works, what makes web sites work. • Implement simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs. • Use Server Side Scripting. • Implement concept of data persistence. • Apply skills to program logic using PHP and handle data using MySQL. • Develop dynamic websites using PHP & MySQL. 	
6.	Credit Value	Practical – 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Lab. per week			
Total No. of Lab.: 30 Hrs.			
Suggestive List of Practicals			No. of Labs.
<ol style="list-style-type: none"> 1. Create an HTML file (e.g. first_page.html) that specifies a page that contains a heading and two paragraphs of text. As the texts in the heading and paragraphs you can use any texts you like. 2. Design a home page which displays information about your college department using paragraph and list tags. Insert images also. 3. Create 3 Hyperlinks in home page connecting it to 3 different pages. 4. Create 3 hyperlinks in a page, which jumps to 3 different headings on same page 5. Design a Registration form in HTML using HTML forms. Apply CSS on web page and various form controls. 6. Implement javascript validation on a sign-up form. Organize the text and form controls within <table>, apply rowspan and colspan attributes. 7. Design a web-page whose content can be changed using JavaScript events. 8. Implement CSS backgrounds and borders in a web-page. 9. Create a simple HTML form and accept the user name and display the name through PHP echo statement. 			30

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10. Write a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator.
11. Write PHP Script to input marks, generate result and display grade.
12. Write PHP Script for addition of two 2x2 matrices.
13. Write PHP script to obtain factorial of a number using function
14. Write PHP script to demonstrate string, date and math function.
15. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
16. Write two different PHP script to demonstrate passing variables through a URL.
17. Write two different PHP script to demonstrate passing variables with sessions.
18. Write PHP script to demonstrate passing variables with cookies.
19. Write a program to keep track of how many times a visitor has loaded the page.
20. Write PHP script to demonstrate exceptional handling.
21. Write a PHP script to connect MySQL server from your website.
22. Write a program to read customer information like cust_no, cust_name, Item_purchase, and mob_no, from customer table and display all these information in table format on output screen.
23. Write a program to edit name of customer to “Bob” with cust_no =1, and to delete record with cust_no=3.
24. Write a program to read employee information like emp_no, emp_name, designation and salary from EMP table and display all this information using table format.
25. Create a dynamic web site using PHP and MySQL.

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks:

- Jon Duckett, Html And Css: Design And Build Websites, Wiley
- Jenifer Niederst Robbins, Learning Web Design: A Beginner’s Guide To Html, Css, Javascript, And Web Graphics, O’Reilly
- Steven M. Schafer , HTML, XHTML, and CSS Bible, Wiley
- Felke-Morris, Basics of Web Design: HTML5 & CSS3, Pearson Education.
- Felke-Morris, Web Development & Design Foundations with HTML5, Addison-Wesley.

Reference Books:

- Steven M. Schafer, HTML, XHTML, and CSS Bible, Wiley India.
- Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India.
- Thomas A Powell , The complete Reference to HTML, Paperback.
- Lee Anne Philips, Using HTML, PHI
- C. Xavier, World Wide Web Design with HTML, New Age International.
- Laura Lemay, Mastering HTML, CSS & Javascript Web Publishing.
- HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, DT Editorial Services, Paperback

Suggestive digital platform web links

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<https://www.udemy.com/course/php-mysql-course-for-absolute-beginners/>

<https://www.simplilearn.com/learn-php-basics-free-course-skillup>

<https://www.coursera.org/learn/web-applications-php>

Suggested equivalent online courses

https://onlinecourses.swayam2.ac.in/aic20_sp32/preview

<https://www.udemy.com/course/php-mysql-tutorial/>

PART D: Assessment and Evaluation

Internal Assessment :

External Assessment :

Class Interaction/Quiz

Viva voce practical

Attendance

Practical record file

Assignments (Charts/
Model)/ Technology

30

Table work / Experiments

70

Dissemination/ Excursion/
Lab visit/ Industrial Training

Total Marks: 100

Any remarks/ suggestions:

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PART A: Introduction			
Program: Degree	Class: B.Sc.	Year: III Year	Session: 2023-24
Subject: Computer Science			
1.	Course Code	S3-COSC4D	
2.	Course Title	Cloud Computing (Group B – Paper II) (Theory)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes (CLO)	<p>After studying this subject, student will be able to do the following–</p> <ul style="list-style-type: none"> • Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure. • Compare the advantages and disadvantages of various cloud computing platforms. • Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google AppEngine • Program data intensive parallel applications in the cloud. • Analyze the performance, scalability, and availability of the underlying cloud technologies and software. • Identify security and privacy issues in cloud computing. • Explain recent research results in cloud computing and identify their pros and cons. • Solve a real-world problem using cloud computing through group collaboration. 	
6.	Credit Value	Theory – 4 Credits	
7.	Total Marks	Max. Marks : 30+70	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lectures (in hours per week): 2 Lectures per week			
Total No. of Lectures: 60 Hrs.			
Module	Topics		No. of Lectures
I	<p>Cloud Computing - Introduction, Definition, characteristics, components, Cloud service provider, the role of networks in Cloud computing, Cloud deployment models- private, public & hybrid, Cloud service models, multitenancy, Cloud economics and benefits. Cloud computing platforms - IaaS: Amazon EC2, S3 Bucket, PaaS: Google App Engine, Microsoft Azure, SaaS: AWS IAM (Identity and Access Management).</p>		12

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	Keywords: cloud computing, models, IaaS, PaaS, Google app engine, Azure, SaaS, AWS.	
II	<p>Virtualization - Virtualization concepts, Server virtualization, Storage virtualization, Storage services, Network virtualization, Service virtualization, Virtualization management, Virtualization technologies and architectures, virtual machine, Measurement and profiling of virtualized applications.</p> <p>Hypervisors: KVM, Xen, VMware hypervisors and their features. Introduction to Containerization Technology, Virtualization vs Containerization</p> <p>Container Engine Tools: Docker/Podman</p> <p>Keywords: virtualization, hypervisors, Docker, Podman.</p>	12
III	<p>Data in cloud computing - Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. MapReduce and extensions: Parallel computing, the map-Reduce model, Parallel efficiency of MapReduce, Relational operations using Map-Reduce, Enterprise batch processing using MapReduce.</p> <p>Keywords: cloud computing, GFS, HDFS, BigTable, MapReduce, batch processing.</p>	12
IV	<p>Cloud security - Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud.</p> <p>Cloud computing security architecture - General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro - architectures; Identity Management and Access control, Autonomic security.</p> <p>Security challenges: Virtualization security management - virtual threats, VM Security Recommendations, VM - Specific Security techniques, Secure Execution Environments and Communications in cloud.</p> <p>Keywords: cloud security, cloud security architecture.</p>	12
V	<p>Issues in cloud computing - Implementing real time application over cloud platform, Issues in Inter -cloud environments, QoS Issues in <i>Cloud</i>, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment, Cloud Middleware, Mobile Cloud Computing, Inter Cloud issue, A grid of clouds, Sky computing, load balancing, resource optimization, resource dynamic reconfiguration, Monitoring in Cloud.</p> <p>Keywords: cloud environment, Quality of Service (QoS), sky computing, resource optimization, resource dynamic reconfiguration.</p>	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks

- Shroff Gautam, Enterprise Cloud Computing, Cambridge Publication.
- Ronald Krutz and Russell Dean Vines, Cloud Security, Wiley -India
- Dr. Kumar Saurabh, "Cloud Computing", Wiley Publication

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Reference Books

- Bloor R., Kanfman M., Halper F. Judith Hurwitz “Cloud Computing for Dummies”, Wiley India Edition.
- John Rittinghouse & James Ransome, “Cloud Computing Implementation Management and Strategy”, CRC Press.
- Antohy T Velte , “Cloud Computing : A Practical Approach”, McGraw Hill
- Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”.
- James E Smith, Ravi Nair, “Virtual Machines”, Morgan Kaufmann Publishers.

Suggestive digital platform web links

https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf

<https://www.cse.iitb.ac.in/~cs695/>

https://www.cse.iitb.ac.in/~convergence/workshops/Intro_to_Virtualization.pdf

Suggested equivalent online courses

<https://nptel.ac.in/courses/106/105/106105167/>

PART D: Assessment and Evaluation**Suggested Evaluation Methods:****Maximum Marks: 100****Continuous Comprehensive Evaluation (CCE): 30 Marks****University Exam (UE): 70 Marks****Internal Assessment :** Continuous Comprehensive Evaluation (CCE)

Class Tests/ Presentation / Assignment

30 Marks**External Assessment:**

University Exam (UE):

Time : **03.00 Hours**Section (A) : Very Short Questions
Section (B) : Short Questions
Section (C) : Long Questions**70 Marks**

Any remarks/suggestions:



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PART A: Introduction			
Program: Degree	Class: B.Sc.	Year: III Year	Session: 2023-24
Subject: Computer Science			
1.	Course Code	S3-COSC4Q	
2.	Course Title	Cloud Computing Lab (Group B – Paper II) (Practical)	
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational)	Discipline Specific Elective	
4.	Pre-Requisite (if any)	This course can be opted as an elective by the students of Computer Science.	
5.	Course Learning Outcomes (CLO)	After studying this subject, student will be able to – <ul style="list-style-type: none"> • Manage different Cloud services and deployment models. • Describe importance of virtualization along with their technologies. • Controlling Virtual Machines. • Design & develop backup strategies for cloud data. • Use and Examine different cloud computing services. • Creating and managing Docker containers. 	
6.	Credit Value	Practical - 2 Credits	
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 35
PART B: Content of the Course			
No. of Lab. Practicals (in hours per week): 1 Lab. per week			
Total No. of Lab.: 30 Hrs.			
	Suggestive List of Practicals		No. of Labs.
	<p>Note - The students shall explore development of web applications in cloud. They must practically design and develop processes involved in creating a cloud based application and programming using Hadoop.</p> <ol style="list-style-type: none"> 1. Download and Install Virtual Machine (Virtual Box, VMware and KVM) 2. Installing Virtual Machine 3. Controlling Virtual Machine (Start, restart, power off) 4. Editing Virtual Machine Hardware 5. Creating and Using Image snapshot 6. Importing and Exporting Virtual Machine images 7. Accessing Linux Command Line 8. Managing Files from the command Line 9. Creating, Viewing, and Editing Text Files 10. Installing and updating Software packages 		30

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	<ol style="list-style-type: none"> 11. Controlling Services 12. Create AWS free tier account 13. Introduction to IAM 14. Creating a User and Group 15. Authorization via Policies 16. Creating and Attaching Policies 17. Launching an EC2 running Linux 18. How to ssh into EC2 using Linux/Windows 19. Launching an EC2 running Windows 20. Connect Windows Instance using RDP 21. Hosting Website on EC2 Instance 22. Create AWS Custom AMI 23. Copy AMI from one region to another 24. Share AMI with AWS account 25. Create S3 Bucket 26. Upload/Download files from S3 Bucket 27. Containerized Application Using Docker container 28. Install docker on EC2 Instance 29. Creating and managing Docker containers 30. Pull and push docker images from docker hub 31. Creating Docker custom Images 	
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PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings

Textbooks

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- Ronald Krutz and Russell Dean Vines, Cloud Security, Wiley -India.
- Dr. Kumar Saurabh, "Cloud Computing", Wiley Publication.

Reference Books

- Bloor R., Kanfman M., Halper F. Judith Hurwitz, "Cloud Computing for Dummies", Wiley India Edition.
- John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press.
- Antohy T Velte , "Cloud Computing : A Practical Approach", McGraw Hill.
- Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online".

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<ul style="list-style-type: none"> James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers. 			
Suggestive digital platform web links			
https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf https://www.cse.iitb.ac.in/~cs695/ https://www.cse.iitb.ac.in/~convergence/workshops/Intro_to_Virtualization.pdf			
Suggested equivalent online courses			
https://nptel.ac.in/courses/106/105/106105167/			
PART D: Assessment and Evaluation			
Internal Assessment :		External Assessment :	
Class Interaction/Quiz	30	Viva voce practical	70
Attendance		Practical record file	
Assignments (Charts/ Model)/ Technology Dissemination/ Excursion/ Lab visit/ Industrial Training		Table work / Experiments	
Total Marks: 100			
Any remarks/ suggestions:			



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