Vivekanand College, Kolhapur (Autonomous)
Department of Computer Science
Annual Teaching Plan

Academic Year: 2019-20   **Semester:** B.Sc. Sem-III,IV,V,VI

Subject: Computer Science   **Course Title:** Visual Programming Using C# & E-Commerce Operating System and Linux

Name of the teacher: Dr. V. B. Waghmare

	Month: July 2019			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit -II Introduction** 1.1 Overview, Architecture, Features of .NET , 1.2 Meta data, CLR, Managed and unmanaged code 1.4 Introduction to Visual Studio .NET IDE	1.3 CTS, CLS, .NET base classes, JIT Compiler
B.Sc. III	7	16	23		
B.Sc. II	7	16	23	**Introduction** What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure **Operating-System Operations**	Process Management, Memory Management, Storage Management, Protection and Security Distributed Systems, Special-Purpose Systems, Computing Environments, Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Virtual Machines, Operating-System Generation, System Boot
	Month: August 2019			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit -II Introduction To C#** 2.1 Introduction to C#, Entry point method, command line arguments 2.2 Compiling and building projects.	Compiling a C# program using command line utility, CSC.EXE, Different valid forms of main. Global stack and heap memory, reference type and data type, casting-implicit and explicit Boxing and unboxing, pass by value and pass by reference and out parameters Partial class, DLL, Difference between DLL and EXE
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Process Management Processes-** Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems	Thread- Threads
	Month: September 2019			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-III Introduction to Web Programming** **Unit-IV ADO .NET (10)** 4.1 Introduction to ADO.Net 4.2 ADO.NET Architecture- Connection, command, data reader, data adapter, data set 4.3 Understanding connected layer of ADO.NET and	FORM tag 3.3 Types of server controls 3.4 Validation controls- Base validator, compare validator, range validator, grouping control validator 3.5 Web forms life cycle. 3.6 Event handling in WEB forms, Response.Redirect, Server.Response, cross page, post
B.Sc. III	12	16	28		

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
				disconnected layer of ADO.NET 3.1 Understanding role of WEB server and WEB browser, HTTP request and response structure. 3.2 Introduction to ASP, Types of path	back property of button. 3.7 ASP.NET state management 3.8 WEB.config, globalization and localization, AppDomain
B.Sc. II	7	16	23	CPU Scheduling-Scheduling Criteria, Scheduling Algorithms	(First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling)

Month: October 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Semester Examination**	
B.Sc. III					
B.Sc. II	7	16	23	**Introduction to Linux** Linux History and architecture of Linux system, Shell, Types of Shell's, Kernel, Kernel shell relationship, Login, Logout, Remote login	GPU(General Purpose Utilities) clear, script, cal, who, bc, wc, head, tail, inodes, structure of regular file, file manipulation commands, change file access permissions with chmod command, directories, directory management commands- cd, mkdir, rmdir. Simple filters- cut, paste, sort, tr, Advanced filters-sed, grep, gawk

Month: November 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-I: Introduction** 1.1 E-Commerce- Concept, Definition, Goals 1.2 Components and functions 1.3 Advantages and Limitations 1.4 Challenges and opportunities	1.5 E-Commerce models-B2B, C2C, C2B, C2G, B2C, B2B 1.6 EDI- Concept, components, 1.7 Working mechanism of EDI 1.8 Advantages and disadvantages of EDI
	10	4	14		
B.Sc. II				**Semester Examination**	

Month: December 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-II: Electronic payment System** 2.1 Concept of e-payment 2.2 Difference between traditional and electronics payment system	2.3 Digital cash, cyber cash, e-wallet 2.4 Credit and Debit card system, Smart Card 2.5 Prepaid, post paid and instant payment system 2.6 Electronic funds transfer, NEFT, RTGS
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Memory Management** **Main Memory**-Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Example: The Intel Pentium,	**Virtual Memory**-Demand Paging, Copy-on-Write, Page Replacement (FIFO, Optimal, LRU, MFU,LFU), Allocation of Frames, Thrashing, Memory-Mapped Files

Month: January 2020				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-III: E-Security** 3.1 Concept of E-security 3.2 Security threats- concept and types 3.3 Malicious code 3.4 Phishing and identity theft 3.5 Hacking and cyber vandalism	3.6 Credit card fraud/Theft 3.7 Spoofing 3.8 Denial of service (DoS) 3.9 Firewall and proxy server
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Storage Management**	File-System Interface-File Concept, Access Methods, Directory Structure , File-

				Module/Unit:	Sub-units planned
				System Mounting , File Sharing , Protection,	

	Month: February 2020			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Unit-IV: Security Solutions** 4.1 Introduction to Cryptography 4.2 Concept of encryption and decryption	
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management,	Efficiency and Performance, I/O Systems-I/O Hardware, Application I/O Interface, Kernel I/O Subsystem

	Month: March 2020			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Encryption and Decryption**	4.3 Symmetric and asymmetric key encryption 4.4 Cipher text 4.5 Digital Envelopes 4.6 Digital certificates 4.7 Security socket layer (SSL) 4.8 Limitations of encryption solutions.
B.Sc. III	10	16	26		
B.Sc. II	7	16	23	**Linux Scripting** Writing and running the shell script, read, echo, decisions and loop control structure, file tests, exit, command line arguments,	exporting shell variable, arrays, shell function, writing data entry script to create data files, data validations before storing on hard disk.

	Month: April 2020			Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Practical Examination**	

	Month: May 2020			Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Examination**	

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Annual Teaching Plan

Academic Year: 2019-20   **Semester:** B.Sc. Sem-I,II,V,VI

Subject: Computer Science   **Course Title:** Paper – XI Linux Operating System
Paper – XV Advanced Linux Applications
Database Management System

Name of the teacher: Mr. I. K. Mujawar

Month: July 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Unit-1: Fundamental of PHP	1.1 Concept of PHP 1.2 Constants, variables declaration 1.3 Comments 1.4 Data types 1.5 Operators 1.6 Command line arguments
B.Sc. III	7	16	23		
B.Sc. I	7	16	23	Introduction to DBMS:	Database, DBMS – Definition, Overview of DBMS, File processing system vs DBMS, Limitation of file processing system, Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture, Users of DBMS, Data models - Object Based Logical Model, Record Based Logical Model (relational, hierarchical, network)
Month: August 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Unit-2: Branching and Looping statements	2.1 Conditional statements 2.1.1 If-else 2.1.2 Switch 2.1.3 Ternary operators 2.2 Looping statements 2.2.1 For loop 2.2.2 While loop 2.2.3 Do-while loop
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	Entity Relationship Model -	Entities, attributes, entity sets, relations, relationship sets, Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual Design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary, constraints beyond ER), Entity Relationship Diagram (ERD)
Month: September 2019				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Unit 3: Arrays in PHP	Creating arrays 3.2 Inserting elements in arrays 3.3 Retrieving elements from array 3.4 Displaying arrays 3.5 Sorting array elements
B.Sc. III	12	16	28		
B.Sc. I	7	16	23	MySQL - Unit-4:Developing Applications in PHP using MySQL	DDL Statements - Creating Databases, Using Databases, MySQL datatypes, Creating Tables (with integrity constraints – primary key, default, check, not null), Altering Tables, Renaming Tables, Dropping Tables,

					Truncating Tables, Backing Up and Restoring databases
Month: October 2019				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Semester Examination**	
B.Sc. III					
B.Sc. I	7	16	23	**DML Statements** – Viewing the structure of a table insert, update, delete, Select – all columns, specific columns, unique records, conditional select, in clause, between clause, limit, aggregate functions (count, min, max, avg, sum), group by clause, having clause.	Functions – String Functions (concat, instr, left, right, mid, length, lcase/lower, ucase/upper, replace, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt, round, truncate) Date Functions (adddate, datediff, day, month, year, hour, min, sec, now, reverse) DCL Statements (creating/dropping users, privileges introduction, granting/revoking privileges, viewing privileges)
Month: November 2019				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit- I- Introduction To Java**	1.1 History and features of Java Programming 1.2 Difference between Java & C++ 1.3 Java Environment 1.4 Java tokens, constants, variables, data types, type casting 1.5 Operators and Expressions 1.6 Implementing Java Program 1.7 Branching and looping statements 1.8 Class, objects, methods 1.9 Constructors and destructor
B.Sc. III	10	4	14		
B.Sc. I				**Semester Examination**	
Month: December 2019				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-II- Inheritance and Packages**	2.1 Defining sub class, subclass constructor 2.2 Inheritance- Multiple and hierarchical 2.3 Defining packages, system packages 2.4 Creating & accessing packages 2.5 Adding a class to package 2.6 Polymorphism- function overloading and over ridding, its difference
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	**Relational data model– ER to The Relational Model -**	Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of Relations, Relational Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint Entity to Table, Relationship to tables with and without key constraints.
Month: January 2020				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit-III- Multithreading and Exception Handling**	3.1 Creating threads, extending a thread class- declaring the class,

Course	Lectures	Practicals	Total	Module/Unit:	Sub-units planned
B.Sc. III	10	16	26		run() method 3.2 Stopping and blocking threads 3.3 Life cycle of thread 3.4 Using thread method 3.5 Thread priority 3.6 Introduction to exception 3.7 Syntax of exception handling code 3.8 Multiple catch statement 3.9 Using finally statement 3.10 Throwing exception
B.Sc. I	7	16	23	Introduction to Functional Dependencies and Normalization – 1NF, 2NF, 3NF Relational Algebra	operations (selection, projection, set operations union, intersection, difference, cross product, Joins – conditional, equi join and natural joins, division)
Month: February 2020				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	Unit-IV- Applets Programming & Introduction to AWT	4.1 Introduction to applets 4.2 Building applet code 4.3 Applet life cycle 4.4 Adding applet code to HTML file 4.5 Introduction to Abstract Window Toolkit (AWT)
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	MySQL Joining Tables – Subqueries	inner join, outer join (left outer, right outer, full outer) – sub queries with IN, EXISTS, sub queries restrictions, Nested sub queries, ANY/ALL clause, correlated sub queries
Month: March 2020				**Module/Unit:**	**Sub-units planned**
Course	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	Database Protection: MySQL –	Security Issues, Threats to Databases, Security Mechanisms, Role of DBA, Discretionary Access Control Stored functions, procedures, cursor, trigger, views (creating, altering dropping, renaming and manipulating views)
Month: April 2020				**Module/Unit:**	**Sub-units planned**
	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. I					
Month: May 2020				**Module/Unit:**	**Sub-units planned**
	Lectures	Practicals	Total	**Final Examination**	
B.Sc. III, I					

Mr. L K. Mujawar

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Department of Computer Science
Annual Teaching Plan

Academic Year: 2019-20   **Semester:** B.Sc. Sem-I,II,V,VI

Subject: Computer Science   **Course Title:**   Paper – XI Linux Operating System
Paper – XV Advanced Linux Applications
Problem Solving using Computers
(Python Programming)

Name of the teacher: Ms. R. Y. Patil

Course	Month: July 2019			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Unit -1: Introduction (10)	Linux History and architecture of Linux system, shell, Types of shell's, Operating system services, Kernel, Kernel shell relationship, Login, Logout, Remote login, GPU(General Purpose Utilities) clear, script, cal, who, bc, wc, head, tail.
B.Sc. III	7	16	23		
B.Sc. I	7	16	23	UNIT-I-Introduction to Programming Languages:	Programming languages-their classification and characteristics, language translators and language translation activities Planning the Computer Program: What is program and programming paradigms Concept of problem Solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.
Course	Month: August 2019			Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	Unit -2: Handling Buffer Cache, File and Directories	Buffer, headers, structure of the buffer pool, scenarios for retrieval of a buffer, advantage and disadvantage of the buffer cache, inodes, structure of regular file, change file access permissions with chmode command, directories, directory management commands- cd, mkdir, rmdir.
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	UNIT-II-Building Blocks of Program: Python Interpreter, Writing and executing simple program, Basic Data Types:	Data, Data Types, Data Binding, Variables, Constants, Declaration, Operations on Data such as assignment, arithmetic, relational, logical or boolean, ternary, bitwise, increment or decrement operators. Introduction to Python Programming: Features, Structure of a Python Program(Python Shell
	Month: September 2019			Module/Unit:	Sub-units planned

Course	Lectures	Practicals	Total	Unit -3: System calls and Process Unit -4: VI Editor and simple shell programming	Open, read, write, process states and transitions, process creation, signals, process termination, a waiting process termination, process management- ps, kill, background processing, no hang up, job scheduling using at command. Use and features of vi, modes of operation- a) Commamd mode- text management, repeat factor. b) Insert mode- insert, append, replace text. c) Ex mode- saving the text, global substitution etc. Writing and running the shell script, read, echo, decisions and loop control structure, file tests, exit etc.
B.Sc. III	12	16	28		
B.Sc. I	7	16	23	**UNIT-III- Conditional Statements:** if, if-else, nested if –else Looping: for, while, nested loops, else clause with while and for loop Control statements: Terminating loops, skipping specific conditions	break, continue, pass

	Month: October 2019		**Module/Unit:**		**Sub-units planned**
Course	Lectures	Practicals	Total		
B.Sc. III				**Semester Examination**	
B.Sc. I	7	16	23	**Numeric Functions: Manipulation:**	abs(), ceil(), floor(), max(), min(), pow(), sqrt() String Declaring strings, String immutability, Unicode string (u'String'), escape sequences(\), Operations on String (Concatenation (+), Repetition (*), Slicing ([index]), Range Slicing([start:end] or [:end] or [start:] , Member ship operator (in, not in)), String Functions : capitalize(), len(), lower(), swapcase(), upper()

	Month: November 2019		**Module/Unit:**		**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit -1: Memory management and advanced VI** Memory management-	swapping, demand paging, deleting and moving text (d, p and P), yanking text (y), filtering the text (!), Ex mode- handling multiple files, inserting file and command outputs, moving text from one file to another.
B.Sc. III	10	4	14		
B.Sc. I				**Semester Examination**	

	Month: December 2019		**Module/Unit:**		**Sub-units planned**
Course	Lectures	Practicals	Total	**Unit -2: Advanced Filters**	Sed – syntax, line addressing, multiple instructions (-e .-f) context addressing, internal commands used by sed –i, a, d, p, r, w, q, s etc., gawk- syntax, field level operations, formatted
B.Sc. III	10	16	26		

Course	Lectures	Practicals	Total	Module/Unit	Sub-units planned
					outputs, use of variables and expressions, BEGIN and END section, built-in variables, arrays, built-in functions- system, length, substr, split etc., types of meta characters.
B.Sc. I	7	16	23	**Unit -1 Python File Input-Output: Exception Handling Regular Expressions**	Opening and closing file, Various types of file modes, reading and writing to files, manipulating directories– What is exception, Various keywords to handle exception such try, catch, except, else, finally, raise – Concept of regular expression, various types of regular expressions, using match function

	Month: January 2020			**Module/Unit:**	**Sub-units planned**
Course	**Lectures**	**Practicals**	**Total**		
B.Sc. III	10	16	26	**Unit -3: Advanced shell programming**	Shell and subshell, set command, command line arguments, exporting shell variable, arrays, shell function, writing data entry script to create data files, data validations before storing on hard disk
B.Sc. I	7	16	23	**Unit -2 GUI Programming in Python (using Tkinter/wxPython/Qt) -**	What is GUI, Advantages of GUI, Introduction to GUIlibrary, Layout management, Events and bindings, Font, Colors, drawing on canvas (line, oval, rectangle, etc.) Widget such as : Frame, Label, Button, Checkbutton, Entry, Listbox, Message, Radiobutton, Text, Spinbox etc , Layout management, Events and bindings, Font, Colors, drawing on canvas (line, oval, rectangle, etc.) Widget such as : Frame, Label, Button, Checkbutton, Entry, Listbox, Message, Radiobutton, Text, Spinbox etc

	Month: February 2020			**Module/Unit:**	**Sub-units planned**
Course	**Lectures**	**Practicals**	**Total**		
B.Sc. III	10	16	26	**Unit -4: System administration**	Login with root, su, communicate with users-wall, news, booting and shutdown process, mangibg disk space- df, du, ulimit, find, backup- cpio, printer management- lpsched, lpstat, lpadmin, lpmove, reject, disable etc., mounting a file system, unmounting a file system.
B.Sc. I	7	16	23	**Unit -3 Database connectivity in Python**	– Installing mysql connector, accessing connector module module, using connect, cursor, execute & close functions, reading single & multiple results of query execution, executing different types of statements,

				Module/Unit:	Sub-units planned
					executing transactions, understanding exceptions in database connectivity
Month: March 2020				Module/Unit:	Sub-units planned
Course	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. III	10	16	26		
B.Sc. I	7	16	23	Algorithm, Searching and Sorting –	Searching and sorting techniques, Efficiency of algorithms
Month: April 2020				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Practical Examination**	
B.Sc. I					
Month: May 2020				Module/Unit:	Sub-units planned
	Lectures	Practicals	Total	**Final Examination**	
B.Sc. III, I					

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Month: February 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Applications : Polynomials, Polynomial Operations, The Polynomial ADT, Implementation. **Advanced Linked List:**	**The Doubly Linked List:** Organization, List Operations ;**Circular Linked List:** Organization, List Operation Multi-Linked Lists: Multiple Chains, The sparse Matrix ;**Complex Iterators ; Application:** Text Editor, Typical Editor Operations, The EDIT Buffer ADT, Implementation
4	4	8		

Month: March 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-3 Stacks** **The Stack ADT:** Implementing the stack, using a python list, using a linked list, Stack Applications: Balanced Delimiters, Evaluating Postfix Expression; **Applications:** Solving a Maze: Backtracking, Designing a solution, The Maze ADT, Implementation	**Queues** **The Queue ADT;**Implementing the Queue:Using a Python List, Using a Circular Array, Using a Linked List **Priority Queues:** The priority Queue ADT, Implementation: Unbounded Priority Queue, Implementation :Bounded Priority Queue ;**Application :** Computer Simulation : Airline Ticket Counter, Implementation
4	4	8		

Month: April 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Final Practical Examination**	

Month: May 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Final Examination**	

Ms. S. Z. Mullani

Dr. V. B. Waghmare
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Vivekanand College, Kolhapur (Autonomous)
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Annual Teaching Plan 2019-20

Name of the teacher: Ms. J. A. Chavan

Subject: Computer Science   **Course Title:** Computer Network & Advanced CN

Semester: B.Sc. Sem-V & VI

Month: July 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-1 Introduction to Computer Network**	Transmission Techniques: Scale, Connection Method, Functional Relationship, Network Topology, services provided Protocols, Network Architecture: Protocol Hierarchy, Information flow design issues for the layers, Merits and demerits of layer architecture, service primitives, standardization network.
10	4	14	Definition, Goals, Application, Basic Concept: Entities, Layers, Protocols, Computer Network. Classification Of Computer Network:	

Month: August 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-2 Data Communication**	Transmission Impairments: Attenuation Distortion, Delay, Dispersion, Noise. Data Transmission modes: Serial & Parallel, Simplex, Half Duplex, Full Duplex & Simplex. Synchronous & Asynchronous Transmission.
10	4	14	Objectives, four analysis, Band limited signal, Maximum data rate & channel.	

Month: September 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-3 Introduction to Windows Server 2008**	Active Directory Physical Architecture: Top level view, Local security Authority, Directory service architecture, Data storage architecture. Logical Architecture: Object, Domain, Trees & forests Trust. Managing Users & Computers, Managing Domain user account, Types of user, User account policies, Password setting, User account capabilities, Properties & Rights, Create computer account, Organization Chart.
13	4	17	Managing Windows Server 2008: 1. Working with administrative tool using control panel, Graphical administrative tool & command line utility. 2. Working with computer management: Computer management system tools, Computer management storage tools, computer management services and application tools. 3. Using system console.	

Month: October 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Semester Examination**	

Month: November 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-1 Reference Model** ISO-OSI: principle of layers, data link, Network, Transport, Session, Presentation & Application (Each layer with its function, Protocol, Design issues, Components),	TCP/IP: Concept, history, Layers: Host to network, Internetwork, Transport, Application. Comparative study of ISO-OSI & TCP/IP
10	4	14		

Month: December 2019			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	**Unit-2 Physical Layer:** Objective, Network topology, Linear, Ring, Star, Hierarchical. Topology, comparison, consideration when choosing a topology. Switching- Circuit, message, Packet, Implementation of	Multiplexing: FDM- Frequency division multiplexing, WDM- Wavelength Division Multiplexing, TDM- Time Division Multiplexing, Guided and Unguided Media.
7	4	11		

10	4	14	**Internet Services:** **Intranet Services:** .	

Month: December 2020			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Firewall (Netfilter), System and network security. Domain Name System (DNS),	File Transfer Protocol (FTP), Apache web server, Simple Mail Transfer Protocol (SMTP), Post Office Protocol and Internet Mail Access Protocol (POP and IMAP), Secure Shell (SSH), Network Authentication,
7	4	11		

Month: January 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	OpenLDAP Server, Samba and LDAP,	Network authentication system (Kerberos), Domain Name Service (DNS), Security.
8	4	12		

Month: February 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Network File System (NFS), Samba, Distributed File Systems (DFS), Network Information Service (NIS),	Lightweight Directory Access Protocol (LDAP), Dynamic Host Configuration Protocol (DHCP)
4	4	8		

Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	MySQL, LAMP	Applications File Servers, Email Services, Chat Applications, Virtual Private Networking
4	4	8		

Month: April 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Final Practical Examination	

Month: May 2021			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Final Examination	

Ms. J. A. Chavan

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