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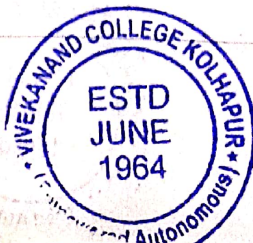
Department of Computer Science

SYLLABUS COMPLETION REPORT
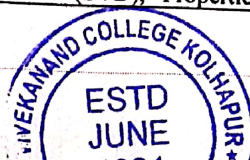
ACADEMIC YEAR 2024-25

Teacher Name: Dr. I. K. Mujawar				
Class	Subject	Total Units	Completed Units	Remaining Units
B.Sc Ist Year (Sem I)	(DSC-II) Introduction to DBMS-I (2DSC03CSC12)	3	**Introduction to DBMS:** Introduction of 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, hierarthical, network) **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) **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 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)	**NIL**
B.Sc Ist Year (Sem II)	(DSC-IV) Introduction to DBMS-II (2DSC03CSC22)	3	**Relational data model**– Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of Relations, Relational Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint **ER to The Relational Model** - Entity to Table, Relationship to tables with and without key constraints. **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) **MySQL Joining Tables** – inner join, outer join (left outer, right outer, full outer) **Subqueries** – sub queries with IN, EXISTS, sub queries restrictions, Nested sub queries, ANY/ALL clause, correlated sub queries **Database Protection:** Security Issues, Threats to Databases, Security Mechanisms, Role of DBA, Discretionary Access Control **MySQL** – Stored functions, procedures, cursor, trigger, views (creating, altering dropping, renaming and manipulating views)	**NIL**

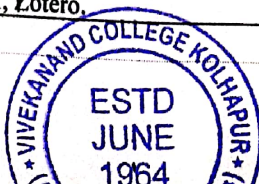|				
B.Sc IIIʳᵈ Year (Sem V)	Introduction to JAVA (DSE1006E4)	3	**Introduction to Java and Java Fundamentals:** History of Java, Features of Java, Comparison of Java and C++, Java Environment, Java Tools – jdb, javap, javadoc, Java IDE – Eclipse/NetBeans, Structure of java program, ,First java program, Types of Comments, Data types, Variables, Operators, Keywords, Naming Convention, Declaring 1D, 2D array, Decision Making (if, switch),Looping(for, while) ,Type Casting , Accepting input using Command line argument, Accepting input from console. **Object, Classes and Inheritance in Java:** Defining Your Own Classes, Access Specifiers (public, protected, private, default), Array of Objects , Constructor, Overloading Constructors and use of 'this' Keyword, static block, static Fields and methods, Object class methods, String Class, Inner class, Packages, Wrapper Classes , Garbage Collection, Memory allocation for objects, Constructor, Implementation of Inheritance, use of super keyword, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes, Use of final keyword related to method and class, abstract class and abstract methods, Defining and Implementing Interfaces, Object Cloning **Exception Handling, GUI components using AWT and Swing and Applets:** Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions, Assertions, Basics of AWT and Swing, their Difference, Layout Manager, Layouts, Components: JButton, JLabel, JText, JTextArea, JCheckBox and JRadioButton, JList, JComboBox, JMenu and JPopupMenu Class, JMenuItem and JCheckBoxMenuItem, JRadioButtonMenuItem, JScrollBar, Dialogs (Message, confirmation, input), JFileChooser, JColorChooser, Event Handling: Event sources, Listeners Mouse and Keyboard Event Handling, Adapters, Applet Life Cycle , appletviewer tool, Applet HTML Tags, Passing parameters to Applet , repaint() and update() method	**NIL**
B.Sc IIIʳᵈ Year (Sem VI)	Data Science using Python (DSE1006F4)	3	**Introduction to Data Science:** Definition, Big Data and Data Science hype, Getting past the hype, Datafication, History and Current landscape of perspectives, Drew Conway's Venn diagram of data science, Roles and Skill sets of the Data Scientist in Data Science. **Statistical Inference:** Populations and samples of Big Data, Statistical Modeling, Probability Distributions, Fitting a Model. Introduction to Data Structures, Exploratory Data Analysis (EDA): The Data Science Process, Basic tools (plots, graphs and summary statistics) of EDA, Case Study: RealDirect (online real estate firm). **Introduction to Machine Learning:** Interpreting parameters, Confidence intervals, The role of explicit assumptions, Three basic Algorithms - Linear Regression: Fitting the model, Extending beyond least squares, Adding in modeling assumptions about the errors, Evaluation metrics(R-squared, p-values, Cross-validation), Transformations. k-Nearest Neighbors (k-NN): distance metrics(Cosine Similarity, Jaccard Distance, Mahalanobis Distance, Hamming Distance, Manhattan), Training and test sets, Choosing k, Binary Classes, Test Set in k-NN, modeling assumptions. k-means: Hierarchical modeling, 2D version, unsupervised learning. **Advances in Data Science:** Spam Filters, Naive Bayes, Bayes Law, Comparison between Naive Bayes to k-NN. Data Wrangling: APIs and other tools for scrapping the Web. Feature Selection (Extracting Meaning from Data), Feature Generation: (brainstorming, role of domain expertise and place for imagination), Feature Selection algorithms: (Filters, Wrappers, Decision Trees, Random Forests). **Recommendation Systems:** Problems with Nearest Neighbors, Sensitivity of distance metrics, The Dimensionality Problem, Singular Value Decomposition (SVD), Properties of SVD, Dimensionality	**NIL**

			Reduction, Singular Value Decomposition, Principal Component Analysis (PCA).	
M.Sc. I (SEM-I)	DSC-II (DSC19CSC12): Advanced Database Techniques	3	**Query Processing and Optimization** Translating SQL Queries into Relational Algebra and Other Operators, Algorithms for External Sorting Algorithms for SELECT Operation, Implementing the JOIN Operation, Algorithms for PROJECT and Set Operations, Implementing Aggregate Operations and Different, Types of JOINs, Combining Operations Using Pipelining, Parallel Algorithms for Query Processing, Query Trees and Heuristics for Query Optimization, Choice of Query Execution Plans, Use of Selectivities in Cost-Based Optimization, Cost Functions for SELECT Operation, Cost Functions for the JOIN Operation, Overview of Query Optimization in MySQL **Transaction Management, Concurrency Control, and Recovery Techniques** The Concept of a Transaction, Transactions and Schedules, Concurrent Execution of Transactions, Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation (Optimistic) Techniques and Snapshot Isolation Concurrency Control, Granularity of Data Items and Multiple Granularity Locking, Deadlock and Deadlock Handling-Deadlock Avoidance (wait-die, wound-wait), Deadlock Avoidance (Wound-Wait, Wait-die), Deadlock Detection and Recovery (Wait For Graph) Recovery Concepts, NO-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm, Recovery in Multidatabase Systems, Database Backup and Recovery from Catastrophic Failures **Introduction of Distributed Databases** Definition of Distributed databases and Distributed Database Management System (DDBMS), Promises of DDBMS, Complicating Factors, Problem Areas, DDBMS Architecture: DBMS standardization, Architectural models for DDBMS, Distributed database design: Design problem of distributed systems, Design, strategies (top-down, bottom-up), Fragmentation, Allocation and replication of fragments. **Introduction to NoSQL** Introduction to NoSQL Systems, Features of NoSQL, Advantage and Disadvantage of NOSQL, The CAP Theorem, Document-Based NoSQL Systems and MongoDB, NoSQL Key-Value Stores, Column-Based or Wide Column NoSQL Systems, NoSQL Graph Databases and Neo4j	**NIL**

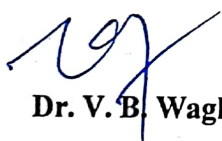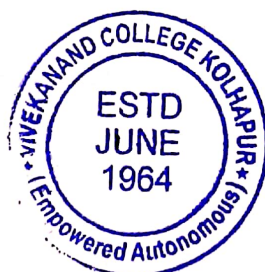Dr. I. K. Mujawar
(Assistant Professor)

Dr. V. B. Waghmare
HEAD
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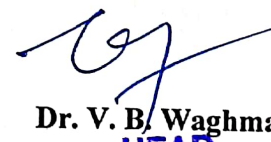VIVEKANAND COLLEGE, KOLHAPUR
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Teacher Name: Dr. V. B. Waghmare

Class	Subject	Total Units	Completed Units	Remaining Units
B.Sc IIIrd Year (Sem V)	Computer Network (DSE1006E1)	3	**Basic concepts:** Components of data communication, standards and organizations, Network Classification, Network Topologies; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite. Network Security: Common Terms, Firewalls, Virtual Private Networks **ISO/OSI Model:** Physical Layer: Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway. Data Link Layer: Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA. Network Layer: Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive) Transport Layer: Transport services, Transport Layer protocol of TCP and UDP Application Layer: Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP. **Introduction to Linux Server Administration:** Technical Summary of Linux Distributions, Managing Software Single-Host Administration: Managing Users and Groups, Booting and shutting down processes, File Systems, Core System Services, Process of configuring, compiling, Linux Kernel.	**NIL**
B.Sc IIIrd Year (Sem VI)	Advanced Computer Network (DSE1006F4)	3	**Networking and Security:** TCP/IP for System Administrators, basic network Configuration, Linux Firewall (Netfilter), System and network security. **Internet Services:** 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, OpenLDAP Server, Samba and LDAP, Network authentication system (Kerberos), Domain Name Service (DNS), Security. **Intranet Services:** Network File System (NFS), Samba, Distributed File Systems (DFS), Network Information Service (NIS), Lightweight Directory Access Protocol (LDAP), Dynamic Host Configuration Protocol (DHCP), MySQL, LAMP Applications File Servers, Email Services, Chat Applications, Virtual Private Networking.	**NIL**
M.Sc Ist Year (Sem I)	Research Methodology (RMD19CSC11)	3	**Fundamentals of Research Methodology:** Meaning, Objectives, Motivation and Types of Research, Research Approaches. Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is done? Criteria of Good Research, research process and steps involved Hypothesis: Meaning, function and types of hypotheses; Null/Alternative hypothesis, Literature survey, sources of information, review. Ethical issues and intellectual property rights. Publication process, selection of journals, citation index, impact factor, h-index, i10 index, Journal Cite Score, Google scholar index, Research gate, Academia, etc. **Interpretation and Report Writing** Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation. Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Types of Reports. Mechanics of Writing a Research Report: Writing preliminaries, main body of research, references and bibliography. Precautions for Writing Research Reports. Meaning and importance of workshop, seminar, conference, symposium, etc. in research. Plagiarism- Concept and significance of plagiarism. Writing tools: Grammerly, Answerthepublic, Quillbot, Notion, Buzzsumo, Copyscape, Chatgpt, ginger. Referencing and citation tools: Endnote, Mendeley, Jabref, Zotero.	**NIL**

			Computer Applications and Research Methods Database Search engines: Google Scholar, Researchgate, Wiki- Databases, Science Direct, SciFinder, Scopus, inflibinet, Cambridge structural database, Web of Science, Indian Citation Index. Publishers in Computer Science: IEEE, Taylor and Francis, Elsevier, Springer, Science Direct, Wiley. Computer based laboratory, statistics and data interpretation, Computer based information systems for e.g docking, Scilab. Softwares for Computer Science: Python, Numpy, Pandas, Google Colab, Matlab, SPSS, Latex. Research Areas, Emerging Technologies and Future Directions: Quantum Computing, Blockchain, Research Design, Data Collection: Quantitative and qualitative data, Data Analysis, Statistical analysis in computer science research, Qualitative data analysis methods, Data visualization techniques.	

Dr. V. B. Waghmare

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Teacher Name: Ms. M. P. Dinde				
Class	Subject	Total Units	Completed Units	Remaining Units
B.Sc. IIIrd Year (Sem V)	Software Engineering (DSE1006E2)	3	**Introduction to System Analysis:** Definition of system, elements and characteristics of system, Types of system **Software Engineering Concepts:** Requirement analysis, System Design, Object Design, Participants and roles: System analyst, Characteristics of software, System Development Life Cycle (SDLC), Classical model, Water fall model, Feasibility study, Fact finding technique. **Software Engineering:** Definition, Modelling, Problem Solving, Knowledge acquisition, Rationale Driven. **Software Project Management:** Estimation in Project Planning Process, Project Scheduling. **Quality Management:** Quality Concepts, Software Qualities, Software Quality Assurance, Software Reviews, Metrics for Process and Projects. **Risk Management:** Software Risks, Risk Identification, Risk Projection and Risk Refinement. **Software Testing:** White Box Testing, Black Box Testing, Alpha Testing, Beta Testing, Change Over. **Case studies:** College Admission system, Library system, Bank management System.	NIL
B.Sc. IIIrd Year (Sem VI)	Object Oriented Software Engineering (DSE1006F2)	3	**Introduction to OOAD:** **Object Oriented Concepts and Modelling:** Introduction to class, Object, inheritance, polymorphism, Aggregation and Composition. **Introduction to UML:** Overview, Conceptual Model of UML, UML architecture. **Unified Process Model** Views, UML Diagrams: Class diagrams, Object diagrams, Statechart diagram. **Static Modelling Notation:** Package Diagrams, Composite Structures, Component Diagrams, Deployment Diagrams **Dynamic Modelling Notation:** Use Case Diagrams, Activity Diagrams, Interaction Diagrams **Mapping Object Model to Database Schema:** **Object Oriented Design:** System Design process, Partitioning the analysis model, Concurrency and subsystem allocation, Task, Data and Resource management. **Object Oriented Analysis:** Iterative Development, Unified process & UP Phases: Inception, Elaboration, Construction and Transition. **Object Oriented Testing:** Types of Testing, Object oriented Testing strategies, Test case design for OO software	NIL

Ms. M. P. Dinde
(Assistant Professor)

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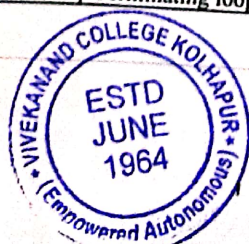| Teacher Name: Dr. V. B. Waghmare				
B.Sc. IInd Year (Sem III)	Operating System-I (DSC03CSC31)	3	**Introduction** What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Operating-System Structure, **Operating-System Operations:** Process Management, Memory Management, 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 **Process Management** Processes- Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication, Examples of IPC Systems **Thread- Threads.** CPU Scheduling-Scheduling Criteria, Scheduling Algorithms (First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling) **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	NIL
B.Sc. IInd Year (Sem IV)	Operating System-II (DSC03CSC41)	3	**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 **Storage Management** File-System Interface-File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection, 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 **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.	NIL

Dr. V. B. Waghmare

Dr. V. B. Waghmare

Teacher Name: Dr. R. Y. Patil

Class	Subject	Total Units	Completed Units	Remaining Units
B.Sc. IIIrd Year (Sem V)	Internet Technologies – I (DSE1006E3)	3	**Introduction to Flask:** Flask as Micro Framework, Characteristics, Who uses Flask, Setup tools and pip (Installing Python, Installing Flask), working with virualenv (Creating new VE, Activating and Deactivating VE, Adding and Removing packages to-from VE), Introduction to IDE (PyCharm, PyDev), Application Structure (Initialization, Routes and View Functions, Server Startup, The Request-Response Cycle, Application and Request Contexts, Request Dispatching, Request Hooks, Responses, Command-Line Options with Flask-Script),First Simple Application **Jinja Templating:** The Jinja2 Template Engine, Rendering Templates, Comments, Variables, Control Structures, Filters, Templates with include and Inheritance, Twitter Bootstrap Integration with Flask- Bootstrap, Custom Error Pages, Links, Static Files **Creating and Rendering Forms:** Cross-Site Request Forgery (CSRF) Protection, Form Classes, HTML Rendering of Forms, Form Handling in View Functions, Redirects and User Sessions, Message Flashing, Validating Fields on the server side, Creating custom fields and validation.	NIL
B.Sc. IIIrd Year (Sem VI)	Internet Technologies – II(DSE1006F3)	3	**Working with Databases:** SQL Databases, NoSQL Databases, SQL or NoSQL? Python Database Frameworks, Database Management with Flask-SQL Alchemy, Model Definition, Relationships, Database Operations ,Creating the Tables, Inserting Rows, Modifying Rows, Deleting Rows, Querying Rows, Database Use in View Functions, Integration with the Python Shell. **User Authentication:** Authentication Extensions for Flask ,Password Security ,Hashing Passwords with Werkzeug ,Creating an Authentication Blueprint, User Authentication with Flask-Login, Preparing the User Model for Logins, Protecting Routes, Adding a Login Form, Signing Users In, Signing Users Out, Understanding How Flask-Login Works, Testing Logins, New User Registration, Adding a User Registration Form, Registering New Users ,Account Confirmation , Generating Confirmation Tokens with itsdangerous, Sending Confirmation Emails, Account Management. **Application Deployment:** Deployment Workflow, Logging of Errors During Production, Cloud Deployment, The Heroku Platform, Preparing the Application, Testing with Heroku Local, Deploying with git push, Deploying an Upgrade, Docker Containers, Installing Docker, Building a Container Image, Running a Container.	NIL
B.Sc. Ist Year (Sem I)	(DSC-I) Problem Solving using Computers-I (2DSC03CSC11)	3	**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. Techniques of Problem Solving: Algorithms, Flowcharting, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. **UNIT-II-Building Blocks of Program:** 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 Indentations, Comments), Python Interpreter, Writing and executing simple program, Basic Data Types: numbers(int, long, float, complex), strings, Declaring variables, Performing assignments, arithmetic operations, Sequence Control – Precedence of operators, Type conversion, Simple input-output (print(), raw_input(),input()) **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(	NIL

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			break, continue, pass) Numeric Functions: abs(), ceil(), floor(), max(), min(), pow(), sqrt() String Manipulation: 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()	
B.Sc. Ist Year (Sem II)	(DSC-III) Problem Solving using Computers-II (2DSC03CSC21)	3	**Unit -1 Python File Input-Output:** Opening and closing file, Various types of file modes, reading and writing to files, manipulating directories **Exception Handling** – What is exception, Various keywords to handle exception such try, catch, except, else, finally, raise – **Regular Expressions** – Concept of regular expression, various types of regular expressions, using match function **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 **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, executing transactions, understanding exceptions in database connectivity Algorithm, Searching and Sorting – Searching and sorting techniques, Efficiency of algorithms	NIL

Dr. R. Y. Patil
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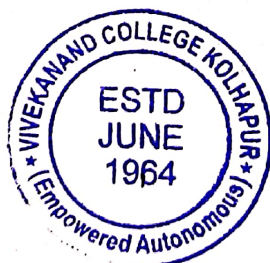
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Teacher Name: Ms. S. V. Aundhakar				
Class	Subject	Total Units	Completed Units	Remaining Units
B.Sc IInd Year (Sem III)	Object Oriented Programming (DSC03CSC32)	3	**Unit-1 Introduction to Object Oriented Programming** Programming Paradigms, What Is Object-Oriented Programming?, Features of OOP, Advantages and disadvantage of OOP, Function Overloading, Operator Overloading, Static and Dynamic Binding, Constructors and Destructors, Techniques of Object-Oriented Programming, When to use OOP?, Applications of OOP. **Unit-2 Classes and Objects** Python Classes, Objects, Specifying attributes and behaviors, instance methods, instance attributes, static methods, constructor, types of constructors(default, parameterized), class methods as alternative constructor, constructor overloading , method overloading. **Unit-3 Inheritance and Polymorphism** Inheritance in Python (Syntax, Advantages,), Access Modifiers in Python, Types of Inheritance (single, multiple, multilevel, hierarchical and hybrid), Polymorphism-Method Overriding, magic methods and Operator Overloading.	NIL
B.Sc IInd Year (Sem IV)	Algorithm Analysis and Data Structures (DSC03CSC42)	3	**Unit-1 Abstract Data Type** **Introduction:** Abstractions, Abstract Data Types, Data Structures, General Definitions; **The Date Abstract Data Type:** Defining the ADT, Using the ADT, Preconditions and Postconditions, Implementing the ADT; **Bags:** The Bag Abstract Data Type, Selecting a Data Structure, List-Based Implementation; **Iterates:** Designing an Iterator, Using Iterators; **Application:** Student Records, Designing a Solution, Implementation **Algorithm Analysis: Complexity Analysis:** Big-O Notation, Evaluating Python Code; Evaluating the Python List; Amortized Cost; **Application:** The Sparse Matrix, List-Based Implementation, Efficiency Analysis **Unit-2 Linked Structure** **The singly Linked List:** Traversing the node, Searching for a node, Prepending Nodes, Removing Nodes; **The Bag ADT Revisited:** A linked List Implementation, Comparing Implementations, Linked list iterators; **More Ways to Build a Linked List:** Using a Tail Reference, The sorted linked list; **The Sparse Matrix Revisited :** An array of Lined list implementation, Comparing the Implementations; **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 **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	NIL

Ms. S. V. Aundhakar
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