Khandesh Education Society's,
Pratap College,Amalner (Autonomous)
Dist. Jalgaon.

'A+' Grade NAAC Reaccredited
(CGPA3.52)
DST-FIST Assisted College
UGC Honored "A College with Potential for Excellence"

Syllabus for

Fourth Year B. Sc.

For the Degree of

Honors in

Computer Science

Under New Education Policy-2020

(With effect from June 2023)

Faculty of Science and Technology
Fourth Year B. Sc. Program
Department of Computer Science
Credit Distribution Structure for Three / Four / Year Honors / Honors with research
Degree program with multiple entry and exit options

Level (year)	Sem	Course Type	Paper Code Major (Core) Subjects	Credits
Fourth Year B.Sc. Comp. Science	VII	DSC 25 (2) T	CS-111 THEORETICAL COMPUTER SCIENCE	02 Credits
		DSC 26 (4) T	CS-112 ADVANCED DATABASE MANAGEMENT SYSTEM	04 Credits
		DSC 27 (4) P	CS-113 LAB ON ADVANCED DATABASE MANAGEMENT SYSTEM	04 Credits
		DSC 28 (4) P	CS-114 LAB ON ADVANCED JAVA	04 Credits
		DSE 5 (4) T	CS 115 ADVACED JAVA	04 Credits
		RM (4) T	CS 116 RESEARCH METHODOLOGY	04 Credits
	VIII	DSC 29 (2) T	CS-121 ARTIFICIAL INTELLIGENCE	02 Credits
		DSC 30 (4) T	CS-122 DESIGN & ANALYSIS OF ALGORITHM	04 Credits
		DSC 31 (4) P	CS-123 LAB ON DESIGN& ANALYSIS OF ALGORITHM	04 Credits
		DSC 32 (4) P	CS- 124 LAB ON ADVANCED OPERATING SYSTEMS	04 Credits
		DSE 6 (4) T	CS-125 ADVANCED OPERATING SYSTEMS	04 Credits
		OJT	CS-126 OJT/INTERNSHIP	04 Credits

PROGRAMME OBJECTIVES (POs):

1) Broadly Educated and Versatile - Able to draw upon foundational knowledge, learn, adapt and successfully bring to bear analytical and computational approaches on changing societal and technological challenges.

2) Inspiring and Collaborative - Able to induce and contribute to diverse teams, expertise, and experiences.

3) Innovative - Drives scientific and societal advancement through technological Innovation and entrepreneurship.

4) Engaged - Is and remains engaged with the academics, technical and scientific professional communities

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Program has been designed to prepare graduates for attaining the following program outcomes:

1) An ability to apply knowledge of computer science appropriate to the discipline.

2) An ability to apply computer science foundations, algorithmic principles, and computer science theory in the modeling and design of computational systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

3) Analyze a complex computing problem and to apply principles of computing and other Relevant disciplines to identify solutions.

4) Communicate effectively in a variety of professional and research contexts.

5) Recognize professional responsibilities and make informed judgments in computing Practice based on legal and ethical principles.

6) Apply computer science theory and software development fundamentals to produce Computing-based solutions.

7) Acquire and apply new knowledge as needed, using appropriate learning strategies.

SEM: I

Major Core Subject-I

CS 111: THEORETICAL COMPUTER SCIENCE

Credits: 02

Theory: 30 Hours

Course Objectives:

1. To understand formal languages and finite automata.
2. To understand the conversion from regular expressions, regular sets.
3. To understand context free grammars and its machine Push down automata
4. To understand phrase structure grammar and its machine, Turing machine

Course Outcomes:

1. The students will be able to know about grammar, its different types, language of a grammar and design a FA.
2. The students will be able to construct RE, Regular Sets, finite automata
3. The students will be able to design CFG.
4. The students will be able to understand the time complexities.

Course Content:	**Unit-1 Grammers and Regular Languages: [L:08, M:08]** Production systems, Right Linear, Left Linear grammar, Context free grammar, Regular expressions: Defination and examples, Regular expressions from DFA, Parikh Mapping, Derivation Trees and Ambiguity. **Unit-2 Finite Automata [L:08, M:10]** Deterministic and Non deterministic Finite Automata, NFA with E-Moves, Equivalence of Regular Expressions and FA, Pumping Lemma, Applications of Pumping Lemma, Closure Properties of Regular Sets, Myhill-NerodeTheoram, FA with output. Pumping lemma for regular sets, application of pumping lemma, closure properties of regular sets. **Unit-3 Pushdown Automata: [L:08,M:10]** Normal forms: Chomsky Normal Form, Griebach Normal Form., Equivalence between PDA and CFG, Closure Properties of CFL, Deterministic PDA, Acceptance by empty store and Final State, Simplification of CFG, Elimination of NULL and UNIT Production, Normal Forms CNF and GNF. **Unit-4 Turing Machine: [L:04, M:10]** Techniques for TM construction : Generalized and restricted versions equivalent to the basic model, Gödel numbering, Universal TM, recursive enumerable sets and recursive sets, context sensitive languages and linear bounded automata (LBA.) **Unit-5 Decidability and Computability: [L:04, M:07]** Post correspondence problem, Rice's Theorem, decidability of membership, emptiness and equivalence problems of languages, Recursive Functions, Primitive Recursive functions, Primitive Recursive Functions over N

References:	1. K. Krithivasan and R. Rama, "Introduction to Formal Automata Theory and Computation",,2009, ISBN: 9788131723562, Pearson Education. 2. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory Languages and Computation", 2nd Edition, 2001,ISBN: 9780201441246, Pearson Education Asia. 3. Bernard M. Moret, "The Theory of Computation", 2nd Edition, 2008, ISBN: 9788131708705, Pearson Eaduction.

SEM I

Major Core Subject-II

CS 112: ADVANCED DATABASE MANAGEMENT SYSTEM

Credits: 04

Theory: 30 Hours

Course Objectives:

1 Knowledge of database design

2 A general understanding of database, design and dependency

3 Understanding of different types of databases

4 Knowledge of databases on the internet

5 Application on enhanced database

Course Outcomes:

At the end of the course the students should be able to:

1 Basic knowledge and understanding of ER diagram and UML class diagram.

2 Ability to apply functionality and Normalization in relational databases.

3 Recognize and fetch data from object oriented, parallel and distributed databases.

4 Use XML and understand unstructured data

Course Content

Unit-1 Database System Architectures [L:08, M:12]
Centralized and Client-Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems

Unit-2 Parallel Databases [L:08, M:12]
Introduction, I/O Parallelism, Inter and Intra Query Parallelism, Inter and Intra operation Parallelism

Unit-3 Distributed Database Concepts [L:08, M:12]
Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control, Distributed Query Processing – Three Tier Client Server Architecture.

Unit-3 Object and Object Relational Databases [L:12, M:18]
Concepts for Object Databases, Object Identity, Object structure and Type Constructors, Encapsulation of Operations, Methods and Persistence, Type and Class Hierarchies and Inheritance, Complex Objects, Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object

	Relational features in SQL/Oracle **Unit-4 1XML Databases [L:08, M:12]** XML Data Model, XML Documents, DTD and XML Schema, XML Querying, Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining **Unit-5 Mobile Databases [L:08, M:12]** Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes **Unit-6 Multimedia Database [L:08, M:12]** Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases – Audio Databases – Multimedia Database Design.

References	1. AviSilberschatz, Henry F. Korth,S. Sudarshan, "Database System Concept", 4th Edition,2001, ISBN: 0072283637, McGraw-Hill publications. 2. RamezElmasri, ShamkantNavathe, "Fundamental of Database Systems",5thEdition, 2009,ISBN: 9780321369574,Pearson Education. 3. Alexis Leon, Mathews Leon, "Database Systems concept", 2002, ISBN: 9788125911654, Leon Vikas.

SEM I

CS- 113: LAB ON ADVANCED DATABASE MANAGEMENT SYSTEM

Credits: 04 Practical

Course Objectives:

1 Knowledge of database design

2 A general understanding of database, design and dependency

3 Understanding of different types of databases

4 Knowledge of databases on the internet

5 Application on enhanced database

Course Outcomes:

At the end of the course the students should be able to:

1 Basic knowledge and understanding of ER diagram and UML class diagram.

2 Ability to apply functionality and Normalization in relational databases.

3 Recognize and fetch data from object oriented, parallel and distributed databases

Course Content	1. Write down Stored Procedure for inserting , updating values in the table 2. Write down stored procedure to accept input values as a parameter and update values of the tables 3. Write down DML trigger to raise the error while inserting duplicate value in the table 4. Write down DML trigger to raise the error violating Check Constraints 5. Write down DML trigger to raise the error when user deletes more than 5 records from table 6. Create index and measure the performance of query on the table 7. Compare results before and after indexing by considering any sample table.
	8. Write down stored procedure for selecting first five records and copy that five records in another table 9. Write down function which prints higher salaried person from table by inputing his empid and name. 10. Write down function which selects part name(substring, like surname,firstname or middle name and copy that part in another table's column).

SEM I

CS 114 LAB ON ADVANCED JAVA

Credits: 04Practical's

COURSE OBJECTIVES:

1 Knowledge of basic Object-Oriented paradigm, practices and application.

2 A general understanding of class, object and methods.

3 Understanding of multithreading and applets. 4 Basic knowledge of swings and Beans with implementation.

5 Understanding of Servlet programming.

COURSE OUTCOMES:

At the end of the course the students should be able to:

1 Basic knowledge and understanding of object-oriented programming.

2 Ability to apply OOPs concept in real life problems.

3 Ability to design, develop, maintain and evaluate large-scale software systems.

4 To produce efficient, reliable, robust and cost-effective software solutions using Java.

Course Content	1. Create 02 Threads which solving consumer producer problem using Synchronization. 2. Write a Java program to demonstrate: a) FileInputStream and FileOutputStream b) FileReader and FileWriter 3. Create a console base application to demonstrate CRUD operation using JDBC (Create, Read, Update, and Delete). 4. Create a Java beans using Servlet. 5. Create a static page using JSP. 6. Create an application to demonstrate Serialization and Deserialization. 7. Write an application to show one to one mapping using Hibernate. 8. Write a Program to demonstrate Caching mechanism. 9. Write a program which implements Spring MVC.

SEM I

CS 115: ADVANCED JAVA

Credits: 04

Theory

Course Objectives:

1 Knowledge of database design

2 A general understanding of database, design and dependency

3 Understanding of different types of databases

4 Knowledge of databases on the internet

5 Application on enhanced database

Course Outcomes:

At the end of the course the students should be able to:

1 Basic knowledge and understanding of ER diagram and UML class diagram.

2 Ability to apply functionality and Normalization in relational databases.

3 Recognize and fetch data from object oriented, parallel and distributed databases

Course Content

Unit I: Java Basics Review **[M: 15, L: 12]**

Multithreading, Event Handling, Data Structure, Java Streaming, Networking, Byte Code Interpretation, customizing Application.

Unit II: Introduction to JSP & Servlets **[M: 15, L: 12]**

JSP Tags, Java Beans, Servlets, Life cycle of a Servlet, HTTP Request and Response, JDBC, Session Beans, Entity Beans.

Unit III: Distributed Computing **[M: 18, L: 12]**

Custom Sockets, Remote Method Invocation, Object Activation, Object Serialization, Distributed Garbage Collection.

Unit IV: Object Relation Mapping **[M: 17, L: 12]**

Introduction to Hibernate, Difference between Hibernate & JDBC, Hibernate Entity, Mapping, Hibernate Configuration, Relations, Types of Relations, Caching mechanism

Unit V: Spring Framework **[M: 25, L: 12]**

Introduction to spring, Spring MVC, IOC, Spring Boot-Apache Tomcat Server, postman (client)

References	1. Paul J. Deitel, Harvey M. Deitel, "Java How to program ",8th Edition, 2010, ISBN: 9780136053064, Pearson Prentice Hall. 2. Gary Cornell and Cay S. Horstmann, "Core Java Vol 1 and Vol 2", 5th Edition, 2001, ISBN: 0130894680, Sun Microsystems Press. 3. Stephen Asbury, Scott R. Weiner, "Developing Java Enterprise Applications",1stEdition, 1999, ISBN: 978-0471327561, Wiley. 4. RajkumarBuyya, S. ThamaraiSelvi , Xingchen Chu, "Object Oriented Programmingwith JAVA: : Essentials and Applications" ,2009, ISBN: 9780070678835, TataMcGraw Hill Education.

SEM I

CS 116: RESEARCH METHODOLOGY

Credits: 04

Theory

Course Content

Course Objective:

Guiding philosophy of knowledge creation and dissemination will be discussed in this course. Features of various approaches to research, data collection, analysis and inference will be taught. Principles of formulating research problems, designing experiments and documentation will form a major part of the course.

Course Outcomes:

After completing this course, student is expected to learn the following:

CO1: Basic understanding of various types of methodologies used during research.
CO2: Basic idea of literature review and defining problems.
CO3: Basic knowledge of working hypothesis.
CO4: Basic knowledge of various software used during research.
CO5: Skills for writing a research report.
CO6: Basic knowledge for writing dissertation.

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1. **Methods And Types of Research:**

Research methods vs Methodology. Types of research, Descriptive vs. Analytical, Applied vs Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical. Research proposals- design and components.

2. **Literature Review:**

Importance of literature review in defining a problem, Primary and secondary sources, reviews, treatise, monographs-patents, Defining and formulating the research problem, Selecting the Problems, Development of working hypothesis.

3. **Scientific Software's in Research Design:**

Data Analysis using Tools like MS Excel, MATLAB, google scholar, using advanced search techniques, web resources, e-journals, e-books, journal access, subscribing TOC alerts, hot articles, citation index, h-index and i-index, Impact factor

4. **Reporting, Documentation and presentation:**

Scientific Document; Organization and writing of research papers, short communications, review articles, monographs, peer reviewing, ethics in publishing, predatory journals and publishers, technical and survey reports, authored book and edited books and dissertation.

References	1. P.D.Leedyand J. E. Ormrod, Practical Research: Planning and Design, Prentice Hall, 2004. 2. L. Garg, R. Karadia, F. Agarwal and U. K. Agarwal, An introduction to Research Methodology, RBSAPublishers,2002. 3. R. A. Day, How to Write and Publish a Scientific Paper, Cambridge University Press,1992 4. R.Kothari, Research Methodology: Methods and Techniques, NewAgeInternational,1990. 5. S.M.ColeyandC.A.Scheinberg,ProposalWriting,SagePublications,1990.

SEMESTER II

SEM II

CS 121: ARTIFICIAL INTELLIGENCE

Credits: 02

Theory: 15 Hrs.

Course Objectives:

1. The primary objective of this course is to introduce the basic principles, techniques and applications of Artificial Intelligence.
2. Emphasis will be placed on the teaching of these fundamentals, not on providing a mastery of specific software or tools programming environments.

Course Outcomes:

The student should be made to: 1. Gain a historical perspective of AI and its foundations. 2. Study the concepts of artificial intelligence.

3. Investigate applications of AI techniques in intelligent agents.
4. Learn the methods ofsolving problems using artificial intelligence.
5. Learn various peculiar search strategies for AI.

Course Content

Unit-1 : Introduction to Artificial Intelligence [M: 08, L:3]

What is Machine Intelligence?The AI Problems, What is an AI Technique, Criteria for Success, AI Task domains.

Unit-2 : Problems, Problem Spaces [M:06, L:5]

Defining the Problem as a State Space Search, Production systems, Problem Characteristics,Production System Characteristics, Issues in the Design of Search Programs, Uninformed Search Techniques: DFS and BFS.

Unit-3 : Heuristic Search Techniques [M:06, L:5]

Generate-and- Test, Hill Climbing, Best-First Search, A* Search, AO* Search

Unit-4 : Knowledge Representaion [M:07, L: 5]

Knowledge Representation Issues, Representations and Mappings, Approaches to KnowledgeRepresentation, Issues in Knowledge Representation, The Frame Problem.

Unit-5 : Fuzzy logic [M: 10, L: 5]

Fuzzy Sets, Operations on Fuzzy Sets,Fuzzy Relations, Membership Functions, Fuzzy Rules andFuzzy Reasoning,Fuzzy Inference Systems, Fuzzy Expert Systems,Fuzzy Decision Making.

Unit-6 : Neural networks [M: 08, L: 6]

Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks.

References	1. Elaine Rich, Kevin Knight, "Artificial Intelligence", 2nd Edition, 1991, ISBN: 9780071008945, Tata McGrawHill. 2. Stuart Jonathan Russell, Peter Norvig, "Artificial Intelligence – A modern approach", illustrated, 2010, ISBN:9780136042594, Prentice Hall.

SEM II

Major Subject: II

CS 122: DESIGN AND ANALYSIS OF ALGORITHMS

Credits: 04

Theory: 30 Hrs.

Course Objectives:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.

- Explain what competitive analysis is and to which situations it applies. Perform competitive analysis.
- Compare between different data structures. Pick an appropriate data structure for a design situation.

Course Content

Unit - 1 Introduction **[M: 15, L: 14]**

Algorithm definition, Analysis of Algorithms, Principles of Algorithm, Some stylistic issues, Euclid's` algorithm, Recursion - Removal of Recursion (GCD, Factorial), Asymptotic complexity, Heaps (Insert, Adjust),Finding Maximum and Minimum

Unit - 2 Divide and Conquer **[M: 15, L: 8]**

Introduction, Control Abstraction for Divide and Conquer, Binary Search, Sorting(Merge, Quick), Matrix Multiplication

Unit- 3 Greedy Algorithms **[M: 15, L: 12]**

Introduction, Control Abstraction for Greedy Algorithms, Single source shortest path,

	Minimum cost spanning tree (Kruskal, Prims), Fractional knapsack, Huffman Coding **Unit- 4 Dynamic Programming [M: 15, L: 14]** Introduction, Control Abstraction for Dynamic Programming, All pair shortest path, Knapsack (0/1) ,Matrix chain multiplication , Longest common subsequence, DFS and BFS **Unit - 5 Backtracking [M: 15, L: 6]** GeneralMethod,8-Queen'sproblem, Sum of subset problem, Graph coloring problem, Hamiltonian cycle **Unit - 6 Problem Classifications [M: 15, L: 6]** Nondeterministic Algorithm, The class of P,NP, NP-hard and NP-Complete problem, Significance of cook's theorem.
References	1. Ellis Horowitz, SatrajSahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", 2010, ISBN: 8175152575, Galgothia publications. 2. AnanyLevitin, "Introduction to the design and analysis of Algorithms",2003, ISBN:9788178089843, Pearson Education, 3. Parag H. Dave, Himanshu B. Dave, "Design and Analysis of Algorithms", 1st Edition, 2008, ISBN: 8177585959, Pearson Education.. 4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein ,"Introduction to Algorithms",3rd Edition, 2010, ISBN:9788120340077, Prentice Hall of India.

SEM II

CS 123: LAB ON DESIGN AND ANALYSIS OF ALGORITHM

Credits: 04-Practicals

Course Objectives:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Course Outcomes:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.

- Explain what competitive analysis is and to which situations it applies. Perform competitive analysis.

Design &Analysis of Algorithms

1. Write a program to implement removal of recursion for

i) Finding maximum from array

ii) Binomial coefficient B(n,m)= B(n-1, m-1)+B(n-1,m), B(n,n)=B(n,0)=1

iii) Searching element from array

2. Write a program for creating max./min. heap using

i) INSERT

ii) ADJUST/HEAPIFY

3. Write a program to find minimum and maximum form a given array.

4. Write a program for searching element form given array using binary search for n=1000,

2000, 3000 find exact time of execution.

5. Write a program for sorting given array in ascending/descending order with

n=1000,2000,3000 find exact time of execution using

i) Heap sort

ii)Merge sort

6. Write a program for matrix multiplication using Strassen's matrix multiplication.

7. Write a program to find solution of Knapsack instant.

8. Write a program to find minimum spanning tree using prim's/kruskal's algorithm.

9. Write a program to find shortest path using single source shortest path.

10. Write a program to find shortest path using all pair path.

SEM II

CS 124: LAB ON ADVANCED OPERATING SYSTEMS

Credits: 04-Practicals

Course Objectives:

Students will learn how Operating System is Important for Computer System.

1. To make aware of different types of Operating System and their services.

2. To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.

3. To know virtual memory concepts.

4. To learn secondary memory management.

Course Outcomes:

1. To understands the different services provided by Operating System at different level.

2. They learn real life applications of Operating System in every field.

3. Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.

4. They will learn different memory management techniques like paging, segmentation and demand paging etc.

1. Use of Unix/Linux:
    - User Commands
    - Editors
    - Shell programming
2. C/C++ programming on Unix/Linux – use of make, version control
3. Use of system calls
    - files
    - processes
    - I/O

- IPC

4. Experiments using C
   - File system
   - Processes
   - Memory Management
   - Drivers

5. Unix / Linux sources
   - build
   - run kernel
   - small modifications

SEM II

CS 125: ADVANCED OPERATING SYSTEM

Credits: 04

Theory: 30 Hours

Course Objetives:

Students will learn how Operating System is Important for Computer System.

1. To make aware of different types of Operating System and their services.

2. To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.

3. To know virtual memory concepts.

4. To learn secondary memory management.

Course Outcomes:

1. To Understands the different services provided by Operating System at different level.

2. They learn real life applications of Operating System in every field.

3. Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.

4. They will learn different memory management techniques like paging, segmentation and demand paging etc.

Course Content	**Unit-1: Overview of UNIX Operating System and Shell Programming:** **[L:10, M:20]** Architecture of UNIX/LINUX Operating System, Introduction to Kernal, Unix Commands, Introduction to shell programming and Unix commands, Introduction Shell Programming, Types of Shell, Shell Commands, Environment Variables. **Unit-2 File Subsystem and Directory I/O :** **[L:20, M:30]** Nodes, structure of regular file, Inode, Super block, Allocation of Disks Blocks, assignment to a new file, Allocation of disk blocks. System calls for File system: Open – Read – Write – Adjusting the position of file I/O lseek , Close, Pipes, Dup, Creat, Stat, Fstat, Link and Unlink File, Mounting and unmounting file, creation Changing directory, root, ownership of new files and Directories, mkdir, Rmdir, Reading Directories, Chdir Etc. **Unit -3 Processes and Signal Handling :** **[L:10, M:10]** Process states and transitions, Process Creation, The context of a process, Saving the context of a process, Termination of Process, Signal Conepts, Signal Functions, Signal Management, Sending Signal, Blocking Signals. **Unit -4 Memory Management:** **[L:10, M:20]** Memory Management Policies: Swapping – Demand paging, Driver Interface – Disk Drivers – Process Adress Space, Allocating Dynamic Memory. **Unit-5 Protection and Security:** **[L:10, M:10]** Illustration of Security Model of UNIX and other Operating Systems, Examples of attack
References	1. Maurice J. Bach, "The Design of the Unix Operating System",ISBN : 9780132017992, Prentice Hall. 2. B. Goodheart, J. Cox, "The Magic Garden Explained",1994, ISBN: 9780130981387, Prentice Hall of India. 3. S. J. Leffler, M.K. Mckusick, M. J. .Karels and J. S. Quarterman.,"The Design andImplementation of the 4.3 BSD Unix Operating System",1st Edition, 1996, ISBN: 9780132317924, Addison-Wesley Professional. 4. J. Hart, "Windows System Programming", 4th Edition, 2008, ISBN: 9780321658272,PearsonEducation. 5. A. Robbins, "Linux Programming by Example: The Fundamentals",2nd Edition,2008, ISBN: 9788131704196, Pearson Education.

SEM II

CS 126: ON JOB TRAINING / INTERNSHIP

Credits: 04

Objectives:

1. The key objective of on-the-job training (OJT) is to provide hands-on knowledge about a particular topic so that it becomes easy for the trainee to understand it practically and it can be implemented effectively.

2. Training objectives are similar to goals or desired outcomes that provide value to the employees that participate in the training Program

Outcomes:

1. Retention of Knowledge Management
2. Effective Training with Real Experience
3. Faster Adaptation to a New Job
4. Effective Team Building

On-the-job training: Internship

OJT is a practical approach for the students to acquiring new competencies and skills needed for a job in a real, or close to real, working environment. It is often used to learn how to use particular tools or equipment in a live-work practice, simulated, or training environment. It is designed to immerse learners in work environments relevant to their area of study in an attempt to learn knowledge on, productivity in, and respect for the workplace. Beyond helping students apply the principles, ideas, and theories learned in the classroom, it enables them to level up their technical skills, knowledge, and attitude towards work. The goal is to enable students to get a hang of OJT as early as possible and grab opportunities as they come. This way, they can boost their employability and put in place a professional "safety net" for after graduation.

The Key objectives of OJT-

1. To provide hands-on knowledge about a particular topic so that it becomes easy for the

	trainee to understand it practically and it can be implemented effectively. 2. Students have to submit themselves for interview, examinations and submit pertinent documents to support the application.