



P.G.DEPARTMENT OF COMPUTER SCIENCE, GCW, PARADE GROUND,
JAMMU

SEMESTER-3rd

Course No: UBCATC-301

Course: Fundamentals of Operating System

Total Marks: 100

Internal Assessment: 20

Semester Exam: 80

Duration of Examination: 1 Hr.

Credits: 04(Theory) 04(Practical)

Learning Outcomes(LO):

LO1 Describe the important computer system resources and the role of operating system in their management policies and algorithms.

LO2 To understand various functions, structures and history of operating systems and should be able to specify objectives of modern operating systems and describe how operating systems have evolved over time.

LO3 Understanding of design issues associated with operating systems.

LO4 Understand various process management concepts including scheduling, synchronization, and deadlocks.

LO5 To have a basic knowledge about multithreading.

LO6 To understand concepts of memory management including virtual memory.

LO7 To understand issues related to file system interface and implementation.

LO8 To understand and identify potential threats to operating systems and the security features design to guard against them.

LO9 To have sound knowledge of various types of operating systems including Unix

LO10 Describe the functions of a contemporary operating system with respect to convenience, efficiency, and the ability to evolve.

UNIT-I

Introduction to Operating System, Definition, Types of operating systems, Functions of Operating System, Process Management: Process, process states, Swapping, Scheduling Criteria, Scheduling: Preemptive and Non-Preemptive, Scheduling Algorithms: FIFO, UFO, Round Robin, Shortest Job First, Shortest Remaining Time, Priority Scheduling, Gantt Charts, Scheduling Algorithm Performance: processor utilization, Throughput, Waiting time, response time

10 HRS

UNIT - II

Inter-Process communication(IPC): Introduction to IPC, Resource Sharing, Process Synchronization & concepts : race condition, Critical Section problem: its solution, Semaphore concept, types and limitations

Deadlocks: Criteria, Deadlock avoidance, Detection and recovery

10 HRS

UNIT-III

Memory Management: Memory Allocation: contiguous and Non contiguous, Fixed and variable partitions, compaction, checker boarding, Partition Selection Algorithms, Virtual Memory Concepts: Simple Paging & Simple Segmentation Virtual memory, demand memory, page replacement algorithms



P.G.DEPARTMENT OF COMPUTER SCIENCE, GCW, PARADE GROUND,
JAMMU

UNIT - IV

.File System Management: Files, directories, file types and operations, File Allocation Methods: Continuous allocation, Chained allocation and indexed allocation. Disk Scheduling Algorithms: FCFS, SSTF, SCAN, C-SCAN, LOOK 10 HRS

UNIT - V

DOS commands: (internal (DIR, DATE, TIME, CLS, CD, RD, MD, PATH, TYPE, DEL, ECHO, COPY, REN, PROMPT, VOL, VER), external (ATTRIB, CHKDSK, DTSKCOPY, DISKCOMP, XCOPY, TREE, DEL TREE, DOSKEY, FORMAT, FIND, SORT, FDISK, MORE, SYS)), Concept of files & directories, Wild card characters, Redirection operators 10 HRS

Suggested Readings:

1. Operating system Principles by A. Silberschartz, P. Galvin and G. Gagne- WSE wiley.
2. Modern operating systems by Andrew. S. Tanenbaum, Pearson Prentice Hall
3. An Introduction to operating system by H. M. Deitel- Addison-Wesley publications
4. Operating Systems by William Stallings-Pearson Education
5. Operating System-A design oriented approach by C. Crowley-Pearson Education

SEMESTER-3rd

Course No: UBCATC-302

Course: Database Management System

Total Marks: 100

Internal Assessment:20

Semester Exam:80

Duration of Examination:1 Hr.

Credits:04(Theory)04(Practical)

Learning Outcomes(LO):

LO1: Gain knowledge of database systems and database management systems software.

LO2: Ability to model data in applications using conceptual modelling tools such as ER Diagrams and design data base schemas based on the model.

LO3: Formulate, using SQL, solutions to a broad range of query and data update problems.

LO4: Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

LO5: Be acquainted with the basics of transaction processing and concurrency control.

LO6: Familiarity with database storage structures and access techniques.

LO7: Compare, contrast and analyse the various emerging technologies for database systems such as SQL.

LO8: Analyse strengths and weaknesses of the applications of database technologies to various subject areas.



P.G.DEPARTMENT OF COMPUTER SCIENCE, GCW, PARADE GROUND,
JAMMU

UNIT - I

Overview of DBMS: Data & information, Entity & attributes, Records, files & their types, Database, views, relationships among entities, DBMS: its evolution, components advantages and disadvantages. Architecture of DBMS.

10 HRS

UNIT - II

Relational DBMS: definition, concept of table, keys [primary, unique, candidate, foreign, conjugate] role of database administrator. Data models [traditional, semantic, hierarchical, network, relational] E-R diagram.

10 HRS

UNIT - III

Normalization: Anomalies and data redundancies in Database, Dependencies [functional, fully functional and minimal/irreducible set], Normal forms [1st, 2nd, 3rd, BCNF,]

10 HRS

UNIT - IV

Overview of SQL, Data types in SQL, Table creation, insertion, deletion, alteration and retrieval of data from table, Table deletion, simple & nested queries using DOL, DML and DCL commands, SQL queries using conditions like where, where-like, order by, greater than, less than, if-then, if- then-else, if-then else if, data integrity constraints, views, joins.

10 HRS

UNIT - V

Security issues: Data security issues, risks, data tampering, data theft, unauthorized access, password related threats, data security requirements [confidentiality, integrity, availability] granting and revoking of privileges and roles, definition of Encryption and Decryption.

10 HRS

Suggested Readings:

1. Bipin C.Desai: An Introduction to Database Systems, West-publishing company.
2. Elmasri, Navathe, Somayajulu, Gupta: Fundamentals of Database Systems, Pearson Education.
3. Date, C.J.: An Introduction to Database Systems Addison Wesley Pearson Education.
4. Narayan S Umanath, Richard W Scamell : Data Modelling and Database Design, Thomson Course Technology India Edition.
5. R.A. Parida, Vinod Sharma: The power of Oracle 9i, Firewall Media Publications.
6. Bayross Ivan: SQL, PLISQL the programming language of Oracle, PB publication



B:Practicum(credits:04)

Students are required to practice the concepts learnt in the theory by designing and querying a database for a chosen organization (Like Library, Transport etc). The teacher may devise appropriate weekly lab assignments to help students practice the designing , querying a database in the context of example database. Some indicative list of experiments is given below.

Experiment 1: E-R Model

Analyze the organization and identify the entities, attributes and relationships in it. .

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any).

Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion.

Experiment 4: Normalization

Apply the First, Second and Third Normalization levels on the database designed for the organization

Experiment 5: Installation of Mysql and practicing DDL commands

Installation of MySQL. Creating databases, How to create tables, altering the database, dropping tables and databases if not required. Try truncate, rename commands etc.



Experiment 6: Practicing DML commands on the Database created for the example organization

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

Experiment 7: Querying

practice queries (along with sub queries) involving ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Experiment 8 and Experiment 9: Querying (continued...)

Practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN),

GROUP BY, HAVING and Creation and dropping of Views.

Experiment 10: Triggers

Work on Triggers. Creation of, insert trigger, delete trigger, update trigger. Practice triggers using the above database.

SEMESTER-3rd

Course No: UBCATS-301

Course: PC Assembly

Total Marks: 100 Theory (Int :10, semester Examination:40) Practical: 50(Int:25, Ext:25)

Duration of Examination: 1 Hr.

Credits:04 (Theory+ Practical)

Learning Outcomes:

1. To make students understand the basic structure, operation and characteristics of digital computer.
2. To familiarize the students with various unit inside a processor as well as the concept of theconcept of pipelining.
3. To familiarize the students with hierarchical memory system including cache memories and virtual memory.
4. To make students know the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT- I

Introduction to Computer System, Difference Between Hardware and Software, Different input and output devices, CPU (Central Processing Unit)- ALU and control unit, Memory & Its

K. Jammu



Types- Static RAM and Dynamic RAM, ROM, PROM, EPROM, EEPROM, Optical Storage: CD, DVD, BLUE RAY DISC. SMPS, UPS (Online/Offline), Computer ports, controller cards, AGP card, display cards: CGA VGA SVGA, sound Card, FAX/Modem Cards, TV Tuner Cards, LAN Cards, Ethernet cards. 15 HRS

UNIT - II

Study of different types of Motherboards, Motherboard Configuration, Types of Processors- Intel Pentium IV, Dual core, Core 2 Duo, Quad processor etc, Booting concept of computer in DOS and Windows environment, Different types of Application Software, Basic LAN concepts, Network Topology, Types of cable, Twisted cable, UTP, STP, Fibre optics, Coaxial cable. Connectors: RJ 45, BNC, T- Connector, Hub, Switch, Router, Bridges, Gateways, Repeater 15 HRS

Practical

1. Assembling and Disassembling of the system, Replacement of components etc
2. Formatting/Partitioning of Hard Disk
3. Installation of Operating System
4. Application Software Installation, (Antivirus Software Installation. Installation of Drivers for Printers, Scanners, Web Camera)
5. Troubleshooting with PC: POST (Power on Self Test)
6. BIOS Errors
7. Windows file repairing
8. Use of system tools like Disk defragmentation, Disk clean up, Scan disk etc.
9. Use of open source data recovery tools.
10. Use of CD ROM and DVD Drivers
11. Working with different control panel option of windows.
12. Network set up

Suggested Readings:

1. P.K Sinha&PritiSinha, Computer Fundamentals, BPB Publications.
2. R.K. Taxali, PC Software for Windows
3. -Singh & Singh, Computer Hardware Course, Computech Publications Limited.
4. Wikibooks contributors, How to Assemble A Desktop PC, Platypus Global Media
5. Jacob Beckerman, How to build a computer, A step by step guide, JIBB Publishing.
6. Mark L. Chambers, Build your own PC Do-It-yourself for dummies.
7. N.S. Reddy, PC Hardware - Theory and Practical, In Depth step by step, Neo publishing house
8. Diagram Books of different types of Mother Boards.

SEMESTER-3rd

Course No: UBCATC-352

Course: Free and Open System Software

Total Marks: 100

Internal Assessment:20

Semester Exam:80

Duration of Examination:1 Hr.

Credits:04(Theory+Practical)

R. Jammu



Learning outcomes:

LO1:How to differentiate a licensed software from a free software

LO2:Understanding the concept of FOSS

LO3:Understanding the concept of data recovery software and antivirus software

LO4:MOOCs content availability and their use

Unit – I

Introduction to FOSS, History, Need of Free and Open Sources, Advantages and Disadvantages of FOSS, Brief understanding of Software Development Life Cycle, Development and maintenance of Free and Open Source Software. 15HRS

Unit – II

Open Source vs Proprietary Software, Benefits of Open/Community based Software, Requirements for being open, free software, open source, FOSS Licensing Models: GPL, AGPL, LGPL, FDL.

15HRS

Practical:

1. Salient features of some FOSS like (Libre Open Office, Android OS, Apache HTTP Server, MySQL) Applications of Open Source Operating System LINUX: - Introduction, General Overview
2. Kernel Mode and Usermode – Process and Scheduling, Development with Linux.
3. Open Source Software Organizations
4. Some Free and Open Data Recovery Softwares (e.g PhotoRec, TestDisk, FreeRecover etc)
5. Introduction to Open Learning Management System (LMS)/Content Management Systems(CMS) (e.g. Working on MOODLE
6. Working on WordPress

Suggested Reading:

1. Philosophy of GNU URL: <http://www.gnu.org/philosophy/>.
2. Linux Administration URL: <http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/>.
3. The Python Tutorial available at <http://docs.python.org/2/tutorial/>.
4. Perl Programming book at <http://www.perl.org/books/beginning-perl/>.
5. Ruby programming book at <http://ruby-doc.com/docs/ProgrammingRuby/>.
6. Version control system URL: <http://git-scm.com/>.
7. Samba: URL : <http://www.samba.org/>.
8. Libre office: <http://www.libreoffice.org/>.
9. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a Nutshell”, Sixth Edition, OReilly Media, 2009

R. Jammu



SEMESTER-4th

Course No: UBCATC-401

Course: Software Engineering

Total Marks: 100

Internal Assessment: 20

Semester Exam:80

Duration of Examination: 1 Hr.

Credits: 04(Theory)04(Practical)

Learning Outcomes:

1. Basic knowledge and understanding of the analysis and design of complex systems.
2. Ability to apply software engineering principles and techniques.
3. To produce efficient, reliable, robust and cost-effective software solutions.
4. Ability to work as an effective member or leader of software engineering teams.
5. To manage time, processes and resources effectively by prioritising competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.

UNIT-I

Software Engineering: Evolving Role of Software, Software Engineering, Changing nature of Software, Software Myths, and Terminologies, Role of management in software development Software Process and desired Characteristics. Software Life Cycle Models: Build & Fix Model, Water Fall Model, Incremental Process Model, Evolutionary Process Models, Component-based development, Formal methods model, Unified Process, Selection of appropriate development process.

10 HRS

UNIT - II

Software Requirements Analysis & Specifications: Requirements Engineering tasks, Data Modeling Concepts, Flow-Oriented Modeling. Software Project Planning: Size estimation, Cost Estimation, COCOMO, COCOMO-II, Software Risk Management.

10 HRS

UNIT-III

Software Design Engineering: Design concept and Design models, Software architecture and data design, mapping data flow into s/w architecture, Designing class-based components. SQA Tasks, Goals and Metrics, Software Review Techniques: Informal reviews-Formal Technical Reviews, Software Reliability, Software risk management.

10 HRS

UNIT-IV

Software Testing: approach to Software Testing, Test strategies for conventional software, Validation Testing, System Testing, Debugging. Software Testing Fundamentals, Black-Box and White Box testing, Basis Path Testing, Object- Oriented Testing Methods, Testing for Real Time System

10 HRS

UNIT- V

Introduction: Clean room Software Engineering, Formal Methods, Reengineering; Business process reengineering, software reengineering, reverse reengineering, restructuring, forward reengineering, Computer-Aided Software Engineering: Building blocks for CASE, taxonomy of CASE tools.

10 HRS



REFERENCE BOOKS:

1. PankajJalote, "An Integrated Approach to Software Engineering", 3rd Edition, Narosa Publishing House, 2005.
2. K.K. Aggrawal and Yogesh Singh, "Software Engineering", 3rd Edition, New Age International (P) Ltd, 2008.
3. Pressman, R.S., "Software Engineering - A Practitioner's Approach", sixth Edition, McGraw Hills, 2008.
4. Mall Rajib, "Fundamentals of Software Engineering", PHI, New Delhi, 2005.
5. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hills.



SEMESTER-4th

Course No: UBCATC-402

Course: Object oriented Programming Structures

Total Marks: 100

Internal Assessment: 20

Semester Exam: 80

Duration of Examination: 1 Hr.

Credits: 04(Theory)

Learning Outcomes:

1. Learn the concepts of data, abstraction and encapsulation
2. Be able to write programs using classes and objects, packages.
3. Understand conceptually principles of Inheritance and Polymorphism and their use and program level implementation.
4. Learn exception and basic event handling mechanisms in a program
5. To learn typical object-oriented constructs of specific object oriented programming language

UNIT - I

Paradigms of Programming Languages, Procedural programming, Need of OOP, Evolution of OOP Methodology and C++, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Applications of OOPs, Objects, classes, encapsulation, abstraction, inheritance, reusability, polymorphism and overloading.

10HRS

UNIT - II

Basic program construction, Data types, reference variables, Input output statements, comments, escape sequence, manipulators, type conversion, arithmetic logical and relational operators, For loop, while loop & do loop and if, if.. else, switch & other control statements, arrays and Strings, new and delete operator.

10HRS

UNIT - III

Functions: passing arguments to functions, returning values from functions, reference arguments, static functions, inline functions, default arguments, variables and storage class and returning by reference, Class and visibility modes, C++ objects, this pointer, object as function argument, function overloading, Operator overloading, Overloading unary and binary operators.

10HRS

UNIT - IV

Constructors and its types, overloaded constructors, copy constructors, destructor, Memory management, passing and returning Objects from functions, Structures and classes, static class members, Inheritance: derived class and base class, derived class constructors, types of inheritance: single level, multiple, multi level, hierarchical, hybrid inheritance, function overriding,

10HRS

UNIT - V

Exception handling, file handling, Streams stream classes, stream errors, disk file I/O with streams, file pointers and their manipulations, file handling in text and binary modes.

10HRS

Suggested Readings:

1. Herbert Schildt, C++ The Complete Reference, McGraw Hill.
2. Robert Lafore, Object Oriented Programming In C++, Galgotia publ.



3. H.M. Deitel and P.I. Deitel, C++: How to Program, Prentice Hall.
4. Bjarne Stroustrup, The C++ Programming Language, (3rd edition), Addison Wesley.
5. Object Oriented Programming and C++, Balaguruswamy, TMH

Practicum (04credits):

Students are required to understand the object-oriented concepts using C++. They are required to practice the concepts learnt in the theory. Some of the programs to be implemented are listed as follows:

Part A

1. Number of vowels and number of characters in a string.
2. Write a program demonstrating function Demonstration of array of object.
3. Using this pointer to return a value (return by reference).
4. Demonstration of virtual function.
5. Demonstration of static function.
6. Accessing a particular record in a student's file.
7. Demonstration of operator overloading.

Part B

Write a program to create a database for students that contains Name, Enrolment no, Department, Programme using Constructors, destructors, input and output functions ; input and output for 10 people using different methods.

Create a class holding information of the salaries of all the family members (husband, wife, son, daughter). Using friend functions give the total salary of the family.



Course No: UBCATC-401	SEMESTER-4th	Course: Java Programming
Total Marks: 100	Internal Assessment:20	Semester Exam:80
Duration of Examination: 1 Hr.	Credits:04(Theory+Practical)	

Learning Outcomes:

1. Knowledge of the structure and model of the Java programming language,
2. Use the Java programming language for various programming technologies
3. Develop software in the Java programming language,
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements

UNIT - I

Introduction to Java, Object Oriented concepts, Application of object oriented programming, Features of java programming, Java Virtual Machine, Primitive Data Type and Variables, Java Keywords, Java Operators, Expressions, Control Statements and Arrays.

10 HRS

UNIT - II

Class and Objects, Constructors, Method Overloading, Static methods, Inheritance, Access Control, Method Overriding, Garbage Collection, Abstract Classes, Polymorphism Packages, Interfaces

10 HRS

Practical :

1. Programs on Data type handling
2. Programs on class and object
3. Exceptions Handling,
4. Types of Exceptions, try-throw construct,
5. Writing Exception Subclasses, Multithreading, Synchronization in Java.

10

Suggested Readings:

10 HRS

1. Herbert Scheldt - "Java2 The Complete Reference", Tata McGraw Hill.
2. E. Balagurusamy - " Programming with JAVA", Tata McGraw Hill
3. Steven Holzner - "Java2 Black Book", Dreamtech Press.
4. Dietel &Dietel- "Java How to Program", Pears on Education.
5. Grant Palmer - "Java Programmer's Reference", Wrox.



SEMESTER-4th		
Course No: UBCATS-402	Course: Python Programming	
Total Marks: 100	Internal Assessment:20	Semester Exam:80
Duration of Examination: 1 Hr.	Credits:04(Theory+Practical)	

Learning Outcomes:

1. Develop and Execute simple Python programs.
2. Structure a Python program into functions.
3. Using Python lists, tuples to represent compound data
4. Develop Python Programs for file processing

Unit I - (Introduction to Python, Data Types and Operations)

Introduction to Python, Features of Python, How to Run Python, Identifiers, Reserved Keywords, Variables, Input, Output and Import Functions, Operators- Arithmetic, Relational, Assignment Logical, Bitwise, Membership and Identity Operators

Data Types - Numbers: Mathematical Functions, Trigonometric Functions, Random Number Functions, String: Escape Characters, String Formatting Operator, String Formatting Functions, Lists: Built-in List Functions, Built-in List Methods, Tuple: Built-in Tuple Functions, Dictionary: Built-in Dictionary Functions, Built-in Dictionary Methods, Data Type Conversions

Unit II - (Flow Control and Functions)

Decision Making: *if* statement, *if ... else* statement, *if .. elif .. else* statement, Nested *if* statement, Loops: *for* loop, *for* loop with *else*, *while* loop with *else* statement, Nested Loops, Control Statements: *break* statement, *continue* statement, *pass* statement, Types of Loops - Infinite Loop, Loops with condition at the top, Loops with condition in the middle, Loops with condition at the bottom. Functions- Definition, Function calling,

Practical:

1. Programs on operators handling
2. Modules & Packages - Creating Modules
3. function, Packages. File Handling - Opening a File, Closing a File, Writing to a File, Reading
4. Methods,
5. Renaming a File,
6. Deleting a File,
7. Directories in Python

Suggested Readings:

1. Downey, A. et al., "How to think like a Computer Scientist: Learning with Python", John Wiley, 2015
2. Core Python Programming by Wesley J. Chun, 2nd Edition, Pearson Education
3. Jeeva Jose, "Taming Python by Programming", Khanna Publishers, New Delhi.
4. Programming in Python 3 by Mark Summed!

Jamuna