BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

5th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)
5th Semester

Sl. No.	Subject Code	Name of the Subject	T	P	C	Theory Cont. Assess	Theory Final Exam	Practical Cont. Assess	Practical Final Exam	Total
1	66651	Programming in Java	2	3	3	40	60	25	25	150
2	66652	Surveillance Security System	1	6	3	20	30	50	50	150
3	66653	Sequential Logic System	3	3	4	60	90	25	25	200
4	66654	Web Development Project	0	6	2	-	-	50	50	100
5	66655	PCB Design & Circuit Making	0	6	2	-	-	50	50	100
6	68546	Operating System application	2	3	3	40	60	25	25	150
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	-	150
Total			**10**	**30**	**20**	**200**	**300**	**275**	**225**	**1000**

66651	**Programming in Java**	**T P C**
		2 3 3

OBJECTIVES
- To develop knowledge and skill on programming Basics in Java Language.
- To develop knowledge and skill to create, compile, debug & execute a java program.

SHORT DESCRIPTION
Basics of Java Language, Data Structures in Java, Object Oriented Concepts in Java, Build and Packaging Tools, Threading, Generics, Lambda, Collections, I/O operations, networking in Java, Database communication in Java, RMI package, web server in Java, servlet;

DETAIL DESCRIPTION
Theory:

1. Understand the concept of object oriented programming (OOP)
1.1 Describe the software evolution.
1.2 Mention the drawbacks of traditional programming.
1.3 State the terms used in OOP-objects, classes, data abstraction, encapsulation, inheritance, Polymorphism, message passing, and dynamic binding
1.4 Mention the list of OOP languages.
1.5 State the benefits of OOP.
1.6 Mention the application of OOP.

2. Understand the features of Java
2.1 Describe the history of Java.
2.2 Describe Java development environment steps.
2.3 Mention the applications of Java.
2.4 Describe programming style and convention of Java.
2.5 Describe white space, identifiers, literals, comments, separators and keywords of Java.
2.6 Write the structure of Java Program

3. Understand the use of Data types, Variables, Operators, Control Statements and Array in Java
3.1 State the data types (primitives, non-primitive and literals) of Java programs.
3.2 Describe the declaration and dynamic initialization of variables in java.
3.3 State the process of accepting input from a user and option panes
3.4 Describe the control flow statements in Java.
3.5 Describe various types of operators used in Java.
3.6 Describe Array dimensions, declarations and initializations.
3.7 Write Java programs using operators, control statements and Arrays.

4. Understand Classes, Objects, Methods, and Constructors in Java
4.1 Describe the declaration (syntax) of class and object in Java.
4.2 Define Method with syntax.
4.3 State the procedure of adding Method to class.
4.4 Describe the advantages of Method.
4.5 Describe the overloading Method in java.
4.6 Describe the constructor and overloading constructor in java.

4.7 Explain the instance variable hiding, and garbage collection.

4.8 Write java programs relating to class, object, method and constructor.

5. Understand the inheritance and polymorphism

5.1 Define super class and sub class.

5.2 Describe the multilevel hierarchy of inheritance.

5.3 Describe the overridden methods in java.

5.4 Describe dynamic run-time polymorphism in java.

5.5 Describe the abstract and object classes in java.

5.6 Mention the uses of *final* and *super* keyword.

5.7 Write java programs relating to inheritance and polymorphism.

6. Understand Packages and Interfaces

6.1 Define the packages with syntax

6.2 Describe the function of packages

6.3 Mention the different levels of class member access.

6.4 Define the interfaces with syntax.

6.5 Describe the implementation of interfaces.

6.6 Explain the nested interfaces.

6.7 Describe the variables in interfaces.

6.8 Write java programs that related to package and interface.

7. Understand multithreaded programming

7.1 Define multithreaded programming with syntax.

7.2 Mention the different between processed-based and thread-based multitasking

7.3 Mention the several methods of thread class with state diagram.

7.4 Describe the way to create the several types of thread.

7.5 Describe the minimum, default and maximum thread priorities.

7.6 Describe the synchronization inter-thread communication method.

7.7 Describe the suspending, resuming and stopping threads.

7.8 Write java programs using multithreaded programming method.

8. Understanding I/O Operations

8.1 Describe the Byte stream and Character Stream Classes.

8.2 Describe the Reading Console Input and Writing Console Output.

8.3 Mention the constructors for creating File objects.

8.4 Describe the Reading and Writing files in java.

8.5 Describe flowchart of a complete java streams.

8.6 Describe the Random Access File Streams.

8.7 Write java programs relating I/O operation.

9. Database Connectivity: JDBC

9.1 Define Java Database Client/Server methodology.

9.2 Describe Two-Tier and Three-Tier Database Design.

9.3 Describe JDBC API(API Components, Applications and Applets)

9.4 Mention security considerations of JDBC.

9.5 Describe JDBC Drivers, JDBC-ODBC Bridge and Current JDBC Drivers.

9.6 Write java programs relating to JDBC.

10. Client-Server Networking in Java.

    10.1 Define network protocol

    10.2 Describe TCP and UDP.

    10.3 Describe Socket Programming and URL Processing.

    10.4 Describe steps occur when establishing a TCP connection between two computers using sockets.

    10.5 Describe Server Socket Class Methods (**java.net.ServerSocket)**

PRACTICAL:

    1 Install a Java Development Kit /Net beans software

    2 Write and execute java program for displaying text messages.

    3 Write and execute java programs using arrays and control flow statements.

    4 Write and execute java programs using class, object, method and constructor.

    5 Compile and run your program using Ant, Maven, Gradle packaging tool in Java.

    6 Write and execute java programs using inheritance and polymorphism.

    7 Write and execute java programs using package.

    8 Write and execute java programs using interface.

    9 Write and execute java programs using multithreaded programming method.

    10 Write and execute java programs using I/O operation.

REFERENCE BOOKS & URL.

1. The Complete Reference of Java- Herbert Schildt

2. JAVA How to Program- P.J. Deitel and H.M. Deitel

3. সান জাভা – ২ জাহিদ খান; মিন্টু লাল সাহা; জয়ন্ত কুমার সাহা; আব্দুল আহাদ মুরাদ

4. জাভা প্রোগ্রামিং – এএনএম বজলুর রহমান রোকন

Related URL links:

http://www.informit.com/library/content.aspx?b=STY_Java2_24hours&seqNum=24

http://java.sun.com/developer/onlineTraining/JavaIntro/contents.htmlinks

http://www.homeandlearn.co.uk/java/java.html

http://java.sun.com/ : Java Development Kit, Development tools, Java Tutorial

http://www.eclipse.org/ : A vendor-neutral open development platform and application frameworks for
    building software

http://www.uml.org/: UML resources

http://www.bruceeckel.com/ : Free electronic version of the book

http://www.javatpoint.com/java-tutorial

66652   **Surveillance Security System**   **T P C**
                                                                          1 6 3

AIMS

After completing this course, participants will be able to:

- Interact with the customer in order to identify and understand their requirements.
- Ensure customer satisfaction
- Install and Repair dysfunctional system.
- Identify dysfunctional components through visual inspection and by use of multi meter
- To understand surveillance system installation requirement in terms of equipment, system, tools, applications appropriate for a particular site
- Install and Configure access control device and software
- Select Suitable cameras & DVR/NVR to provide the better solution to the customers.
- Read and Comprehend signs, labels and warning
- Communicate effectively
- Follow behavior etiquettes while interacting with others
- Establishing good working relationships with colleagues within and outside the department by coordinating Surveillance system Installation Technician

SHORT DESCRIPTION

Basic concepts of Designing the surveillance security System, Aims of a surveillance camera system, System design elements, Conditions for equipment selections, Camera Installation, Functions of video surveillance, Types of Camera, Lens, sensors & their functions, DVR, NVR interface, Principles of remote access, networking Basic.

DETAIL DESCRIPTION

Theory:

1. **Understand the surveillance security System.**
    1.1 Understand the surveillance system
    1.2 Describe the knowledge of pro's & con's of surveillance
    1.3 Explain the facts of video surveillance
    1.4 Explain and construct various nodes of CCTV surveillance system
2. **Understand the Functions of video surveillance.**
    2.1 Construct a video surveillance system.
    2.2 Explain function of blocks and equipment required to implement a video surveillance system.
    2.3 Understanding the facts about CCTV and its interfacing devices
3. **Understand the Types of Camera, Lens, sensors & their functions.**
    3.1 Understand the various types of camera and their functionality.
    3.2 Reassembling the camera & exam the parts of camera to understand their mechanism.
    3.3 Selecting suitable camera after understanding
    3.4 Describe different types of lens and their utility.
    3.5 Differentiate & select the best camera from the same group depending on the image quality being measured by TVL chart.
    3.6 Selecting a camera for higher security application.

4. **Understand the DVR, NVR interface.**

   4.1 Define DVR and NVR.

   4.2 Explain the function of various blocks of DVR, NVR.

   4.3 Understand the recording format of a DVR**,** NVR

   4.4 DVR**/**NVR as interface to view and record the image transmitted by a camera.

   4.5 Describe different type of attendance devices and their functionalities.

5. **Understand the Principles of remote access.**

   5.1 Define remote access system

   5.2 Describe importance/need of remote access system

   5.3 Explain the nodes for remote access of a Surveillance system

   5.4 Explain minimum requirement for remote access system

6. **Video Signal and Control Signal Transmission.**

   6.1 Define data transmission media

   6.2 Describe various wired media- Coaxial Cables, Twisted-pair cable transmission
       and fiber optic cable.

   6.3 Explain Control signal circuits of transmission media.

   6.4 Describe Electrical Power Construction Requirements of video signal

   6.5 Develop a Drawings to Prepare a block diagrams for Video Signal and Control Signal Transmission

   6.6 Describe various types of CCTV drawing Symbols

7. **Understand the networking Basic**

   7.1 Define Computer Network.

   7.2 Define network topology

   7.3 Define network protocol.

   7.4 State the function of TCP/IP protocol.

   7.5 Define Network Addressing

   7.6 Define IP, IPv4 and IPv6.

   7.7 Define Subnet Masks, Gateway address, Virtual ports, Linksys Port Forwarding, D-Link Forwarding.

   7.8 State Dynamic DNS, Creating a DDNS Account

PRACTICAL:

1. **Analyze Client Requirements, prepare system diagram, Quotation and get approval from client.**

   1.1 Contact authorized person & collect requirements

   1.2 Select products against requirements

   1.3 Prepare Budge against requirements

   1.4 Prepare design diagram

   1.5 Prepare a quotation and approve your client

2. **Perform Power and Network Cable Wiring**

   2.1 Follow OSH practices

   2.2 Identify the power source, perform wiring and Install power equipments

   2.3 Collect Network diagram, perform network wiring and Install network equipments

3. **Install and configure the CCTV camera.**

   3.1 Ensure all the tools, equipments, utilities are available in good to enable installing in single visit

   3.2 Follow specification and the procedures for setting up the system

   3.3 Collect power requirement of different CCTV related equipment

   3.4 Use BNC connectors for joining cables and crimp them

      3.5   Connect all the cables from multiple cameras to the CCTV system area.

      3.6   Ensure that there are no cable joins, sharp bends during cabling.

      3.7   Ensure weather proof (UV proof) cable is used in outdoors.

4. **Install and configure IP (and PTZ) camera**

      4.1   Assign IP address for IP Cameras.

      4.2   Follow installation procedures given in the manuals

      4.3   Use power cable of specified thickness to connect CCTV system with power supply

      4.4   Mount the CCTV camera so as to cover maximum area.

      4.5   Set up the type of camera such as pan, tilt, zoom unit as per customer requirement

5. **Install and configure DVR/NVR Machine.**

      5.1 Unpack DVR/NVR as per manufacture instruction

      5.2 Check Physical status, mount DVR with appropriate place

      5.3 Install HDD

      5.4 Ensure that all cameras are connected to the DVR

      5.5 Monitor is connected (TV / PC) with video output of DVR

      5.6 Speaker is connected with audio output of DVR

      5.7 DVR link option to connect with other DVR in the network

      5.8 Connect the DVR to router, if required, to enable remote monitoring

      5.9 Connect the power supply of DVR, monitor, speakers to set up the system

      5.10   Install the appropriate software for IP network or remote monitoring

      5.11   Enter the appropriate IP address to receive the video signals through IP network / internet

      5.12 Connect all equipments and switch on to start the video capture

6. **Setup camera controls**

      6.1   Identify camera specifications such as focus, lens type, zoom

      6.2   Perform Controls of different options in camera such as rotation, speed of movement in pan / tilt camera

      6.3   Use stable mounting structure and ensure that is not disturbed by wind or rain which would affect the video quality

      6.4   Decide on the height of camera installation according to the end purpose (for example: if the visitor entering the premise is to be monitored, camera should not be placed too high and their face would not be captured)

      6.5   Ensure that cameras are protected from light while installing in outdoor.

      6.6   Ensure the intended area is covered during movement in case of tilt or pan type of camera.

      6.7   Reduce repetition of errors

7. **Survey, planning & maintenance**

      7.1 Making a good site survey and identifying the location of the camera to be fixed.

      7.2 Selecting the suitable camera depending on the coverage area required by the customer.

      7.3 Help & co- operate with the team members while taking measurement of the site.

      7.4 Interfacing & connecting the camera and synchronizing it with control room.

      7.5 Understand the recording & retrieving process of previously recorded footage to the controller of the system.

      7.6 Convince the customer about the best available camera for better surveillance.

8. **Install and Configure access control device and software**

      8.1   Follow workplace and lab/shop safety practices.

8.2 Install and configure Attendance device.

8.3 Install Attendance Device Software & Driver.

8.4 Connect device and enroll employee.

8.5 Configure attendance time table for employee.

8.6 Upload employee list in devices from software.

8.7 Generate Report and get output by software.

8.8 Data download & reports from devices.

REFERENCE

1 Digital video surveillance and security - Anthony c. caputo

2 CCTV, Third Edition.   - Vlado Damjanovske.

3 CCTV Surveillance   - Herman kruegle.

4 Digital CCTV   - Emily Harwood

5 Electronic Access Control   - Thomas L. Norman

66654	**Web Development Project**	**T P C**
		0 6 2

OBJECTIVES

At the end of this module, students will be able to -

- Prepare documentation on project works.
- Assess the requirements of a client.
- Design any web-based solution/system.
- Develop web-based practical solutions.
- Test and implement any web-based solution/system.

SHORT DESCRIPTION

Students have to develop (individually) a web-based (Online) solution from the following list (NOT Limited to) –

- Online Library Management System
- Online Student Management System
- Online Ticket Booking System
- Online Hotel Management System
- Online Shop Management System
- Online Inventory Management System
- Online Payroll Management System
- Online Members' Directory
- Online Accounts Management System
- Online Billing System for service providers
- Any other online system that will provide solutions for practical situation.

DETAIL DESCRIPTION

The Project work must demonstrate the following functional issues –

- Use of PHP, HTML, CSS, JavaScript, MySQL, Images/Graphics, Web-template etc.
- Must have a database oriented "Login" module
- At least 3 to 5 standard Forms should be designed and developed to submit data into a relational database
- Area(s) to search data to – edit, update, delete, etc.
- At least 3 Reports should be generated.
- The system (Project) must be hosted in a hosting environment (localhost using Apache) in order to demonstrate all the functional areas.
- Finally all the students must develop and submit a Project Document according to the following guidelines.

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Acknowledgement
Abstract
Table of Contents

Chapter 1: Introduction

1.1 The Project brief / Executive summery

Chapter 2: Initial Study

2.1 Introduction (importance of understanding the system/process)

2.2 Project Background (why this project is to be developed)

2.3 Description of Current System (or the manual operation/process)

2.4 Problems with the Current System (or the manual operation/process)

2.5 Boundary of the Project (functional areas to be covered in this project)

2.6 Aims/outcome of the Project

2.7 Summary

Chapter 3: Feasibility Study

3.1 Introduction (Objectives of project Feasibility)

3.2 Alternate Solution (can be more expensive)

3.3 The Proposed System (in details)

3.4 Feasibility Consideration

    3.4.1 Technical feasibility

    3.4.2 Economical feasibility

    3.4.3 Operational feasibility

3.5 Project Plan (Gantt chart) with project duration

3.6 Summary

Chapter 4: Requirement analysis & specification

4.1 Introduction (Objectives of requirement analysis & specification)

4.2 Interview Record (data collection methods with evidence)

4.3 DFD of existing system/process

4.4 Requirements catalogue/descriptor

4.5 DFD of proposed system (web based)

4.6 Elementary process description

4.7 Entity Relationship Diagram (ERD of the Project)

4.8 Entity description

4.9 Summary

Chapter 5: System Design

5.1 Introduction (importance of system design)

5.2 Logical design & description

    5.2.1 Sitemap

    5.2.2 Layout of the home page (drawing)

    5.2.3 [form 1] (field design)

    5.2.4 [form 2] (field design)

    5.2.5 [form 3] (field design)

5.3 Summary

Chapter 6: Coding

6.1 (Students will develop the entire system and demonstrate, but for the documentation - Only the code of the home page will be in the document)

Chapter 7: Testing

    7.1 Introduction (Objectives of testing)

    7.2 Unit Test

    7.3 Link Test

    7.4 Integration test

    7.5 Implementation Test

    7.6 Usability Test

    7.7 Summary

Chapter 8: Implementation

    8.1 Introduction (How the project will be implemented)

    8.2 Domain (introduction to Apache Server)

    8.3 Hosting (local host)

    8.4 Maintenance plan

    8.5 Summary

Chapter 9: Limitation and Future plan

    9.1 Limitations (of the project) or self criticism

    9.2 Future plan (further development plans)

Chapter 10: Conclusion

REFERENCES

Appendix 1

Detail of interview (Data collection evidence)

User manual

66653	Sequential Logic System	T	P	C
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AIMS

- To be able to acquire the knowledge & skill on Flip Flop, counters, shift registers and their applications
- To be able to acquire the knowledge & skill on semiconductor memories & ALU
- To be able to acquire the knowledge & skill on A/D and D/A converters
- To familiarize with PLD & simple computer (SAP-1& SAP-2)

SHORT DESCRIPTION

Sequential system concept; Flip-flops; Registers & counters; Semiconductor Memories; A/D & D/A converters; PLD and SAP-1& SAP-2.

DETAIL DESCRIPTION

Theory:

1. Understand the features of sequential logic circuits

   1.1 Define Sequential logic circuit.

   1.2 Define the synchronous and asynchronous sequential logic circuit.

   1.3 Define Clock, Timing diagram, Latch & Flip-Flop.

   1.4 State the concept of level clocking and edge triggering.

   1.5 Describe the operation of sequential logic system with block diagram.

2. Understand Flip Flops

   2.1 Define Flip Flop &list the different types of Flip Flops.

   2.2 Explain the operation of clocked SR Flip Flop.

   2.3 State the advantages of edge triggering in Flip Flop.

   2.4 Explain the operation of clocked D, T, JK and Master-slave Flip Flops.

   2.5 Describe the operation of Flip Flop as a frequency division circuit.

   2.6 State the application field of Flip Flops.

3. Understand Registers

   3.1 Define register &list the different types of registers.

   3.2 Explain the operation of serial in - serial / parallel out shift registers.

   3.3 Explain the operation of parallel in- parallel / serial out shift registers.

   3.4 Describe the operation of shift left & shift right register.

   3.5 Describe the operation of buffer register and universal shift registers.

   3.6 Mention the uses of registers.

4. Understand binary counter circuits

   4.1 Define binary counter.

   4.2 State the difference between asynchronous and synchronous counter.

   4.3 Explain the operation of asynchronous, synchronous and decade counter.

   4.4 State the modulus of a counter & describe the principle of divide - by- n counter.

   4.5 Describe the operation of a binary up / down counter.

   4.6 State the principle of ring, Johnson & Cascaded counter.

   4.7 State the application of different types of counters.

5. Understand semiconductor memories

   5.1 List the type of memories.

   5.2 Describe the principle of serial and parallel access memory.

5.3 Explain the internal organization of semiconductor memory.

5.4 Describe the technique of memory addressing.

5.5 Explain the read and write operation of semiconductor memory.

5.6 Explain the principle of static and dynamic RAM.

5.7 Describe the principle operation of ROM, PROM, EPROM and EEPROM.

5.8 Mention the maximum clock speed, bus width and bandwidth of SDRAM, RDRAM, DDR SDRAM, DDR2 SDRAM, DDR3 SDRAM & DDR4 SDRAM.

6. **Understand arithmetic logic circuit:**

   6.1 Mention the basic principle of ALU.

   6.2 List the application of ALU.

   6.3 Mention the principle of digital comparators.

   6.4 List the application of digital comparators.

   6.5 Mention the principle of binary rate multiplier with block diagram.

7. **Understand D/A converter**

   7.1 Mention the principle of level conversion/A conversion.

   7.2 Mention the types of D/A converter.

   7.3 Explain the operation of a binary weighted D/A and R-2R ladder D/A converter.

   7.4 State the terms – resolution, percentage of resolution, accuracy, offset error and settling time as specification of D/A converter.

   7.5 State the application field of D/A converter.

8. **Understand A/D converter.**

   8.1 State the general principle of A/D conversion and list the types of A/D converter.

   8.2 State the working principle of 3-bit parallel A/D converter.

   8.3 Describe the operation of Digital Ramp A/D converter

   8.4 Explain the operation of successive approximation, dual slope and Flash A/D converter.

   8.5 State the terms – resolution, accuracy, and conversion time as pecification of A/D converter.

   8.6 Describe the operation of sample & hold circuits and its application.

9. **Understand the programmable logic devices.**

   9.1 Defines PLD and the advantages of PLD.

   9.2 Describe the principle of PLD.

   9.3 Discuss simplified logic diagram of PLA, PAL and GAL.

   9.4 State the basic feature of FPGA.

   9.5 Describe the programming process SPDL

   9.6 Describe the complex programmable logic device (CPDL).

10. **Understand the organization of a SAP-1**

    10.1 State the meaning of SAP.

    10.2 State the function of each stage of SAP-1 with block diagram.

    10.3 State the function of control signals i.e. Enable, Load, Clock and Clear of each register.

    10.4 State the instruction for accessing and storing data in RAM of SAP-1.

    10.5 Describe the bus organization of SAP- 1.

11. **Understand the organization of a SAP-2**

    11.1 State the function of each stage of SAP-2 with block diagram.

    11.2 State the function of control signals of SAP-2

    11.3 Describe the bus organization of SAP-2.

    11.4 State the concept of Instruction Set of SAP-2.

    11.5 Mention the differences between SAP-1 & SAP-2.

PRACTICAL:

1. Prepare the clocked RS flip-flops and check its truth table and operation.
2. Prepare the clocked D & T flip-flops and check its truth table and operation.
3. Prepare the clocked JK & Master-slave flip-flops and check its truth table and operation.
4. Prepare the serial / Parallel in - serial / parallel out shift registers and check its working operation.
5. Prepare the left shift &right shift register and check its working operation.
6. Prepare the Decade counter and check its operation with truth table.
7. Prepare the Ring counter and check its operation with truth table.
8. Prepare the Up/Down counter and check its operation with truth table.
9. Prepare a 4 bit ALU and check the operation of ALU
10. Show the read / write operation of a 4 bit memory chip.
11. Show the D/A conversion procedure of D/A converter.
12. Show the A/D conversion procedure of A/D converter.
13. Prepare a digital clock & observed the output.

REFERENCE BOOKS

1. Digital principles and application – Albert PaulMalvino
2. Digital Computer Electronics– Albert PaulMalvino
3. Digital Systems–Ronald J.Tocci
4. Modern Digital Electronics - R. P. Jain

66655   **PCB Design & Circuit Making**   **T P C**
                                                                                0 6 2

AIMS
To provide the students with an opportunity to acquire knowledge and skills to
- Operate and practice PCB design software tools
- Perform schematic design including simulation
- Perform PCB layout design including auto routing
- Generate the output of the PCB layout design
- Build the circuit by soldering

SHORT DESCRIPTION
Basic concept of schematic design and PCB layout design; schematic design and PCB layout design; pad shape, pad size, trace width adjustment; auto routing and adding missing trace; generating output of layout; build circuit.

Practical

1. **Install a PCB design software and identify the commonly used features**
    1.1. Select a PCB design software, for example, Proteus, PCB Maker, Eagle, Board Maker, Electronic Workbench, Easy PC, KiCAD, Upvarter etc.
    1.2. Install the selected PCB design software
    1.3. Identify the commonly used actions of the PCB design software tool
2. **Create schematic symbol of an unavailable part**
    2.1. Identify an unavailable part
    2.2. Design the schematic of that part using the PCB design software
    2.3. Include the part in the software library according to the policy of the selected PCB design software tools
3. **Create and add PCB foot print of an unavailable part**
    3.1. Identify an unavailable part
    3.2. Design the schematic of that part using the PCB design software
    3.3. Access the datasheet / data handbook of those parts in order to find the required parameters.
    3.4. Measure the component size, pin size and gap between pin using measuring tools like scale, slide calipers etc.
    3.5. Design the PCB footprint of that part
    3.6. Include the part in the software library according to the policy of the selected PCB design software tools
4. **Draw a schematic of a given circuit design in paper**
    4.1. Collect a simple schematic of circuit diagram
    4.2. Interpret the schematic
    4.3. List the components and all parameters of the components
    4.4. Identify all the unavailable parts
    4.5. Creates schematic of all unavailable parts and include those in the PCB design software
    4.6. Draw the schematic using the selected PCB design software as like as the design given in the paper
    4.7. Verify the correctness of the design by checking the design given in the paper
    4.8. Add the Circuit serial number and other necessary information to schematic design

5. **Simulate a circuit**
   5.1. Collect a simple schematic of circuit diagram
   5.2. Draw the schematic using the selected PCB design software as like as the design given in the paper
   5.3. Simulate the circuit
6. **Design PCB layout of a given PCB**
   6.1. Collect a single layer PCB (Printed Circuit Board) and the schematic of that PCB
   6.2. Draw the schematic
   6.3. Draw the PCB layout design by using the selected PCB design software as like as the given PCB
   6.4. Make sure that pad shape, pad size, trace width and gaps between traces are like as given PCB
7. **Generate the 3D view of the PCB design**
   7.1. Design PCB layout of a given schematic
   7.2. Generate the 3D view the design
8. **Use auto routing feature to generate PCB layout automatically**
   8.1. Design schematic of a given design
   8.2. Set the trace line/ track width, pad size for auto-routing system
   8.3. Maintain the space gap between trace to trace, pad to pad, trace to pad and border for auto-routing system
   8.4. Use auto routing feature to generate the PCB layout automatically
   8.5. Rearrange component placement if the software can't generate the complete PCB layout
   8.6. Complete missing trace manually if any trace isn't automatically drawn by the software.
   8.7. Use jumper in order to complete the layout design if necessary
   8.8. Adjust the trace width if necessary
9. **Design a PCB layout of a given circuit**
   9.1. Draw the schematic diagram in the PCB design software
   9.2. Determine the PCB size
   9.3. Place the components on the available space/work area
   9.4. Design the PCB layout
   9.5. Add jumper if necessary.
   9.6. Trace line / trace width are set
   9.7. Adjust the pad size if necessary
   9.8. Determine and set the space gap between trace to trace, pad to pad, trace to pad and border.
   9.9. Add the PCB part number and other necessary information to PCB layout
   9.10. Check the PCB design draft for compliance with the design requirement and   design rules
10. **Make output of the PCB layout design**
   10.1. Design a PCB layout
   10.2. Generate output in industry standard file format which is accepted by the   automatic PCB manufacturing machine, for example, gerber file etc.
   10.3. Generate PDF or any other industry standard file format in order to make film   output of the PCB layout design
11. **Make the PCB from a PCB manufacturer**
   11.1. Print out the PCB layout design in tracing paper or film output
   11.2. Provide the film of tracing paper to PCB manufacturer
   11.3. Or, give the industry accepted file that can be input to automatic PCB   manufacturing   machine if available
   11.4. Receive the printed circuit board

12. Design PCB layout and make of power supply

    12.1. Collect a circuit design of a +5v regulated power supply

    12.2. Draw the schematic design

    12.3. Design the PCB design

    12.4. Collect the necessary parts

    12.5. Solder the parts and build the +5v regulated power supply

    12.6. Operate and check the power supply

13. Design PCB layout and make a microcontroller based circuit

    13.1. Collect a circuit design of a microcontroller based circuit

    13.2. Draw the schematic design

    13.3. Design the PCB design

    13.4. Collect the necessary parts

    13.5. Solder the parts and build the system

    13.6. Operate and check operation

14. Design PCB layout and make a microprocessor based circuit

    14.1. Collect a circuit design of a microprocessor based circuit

    14.2. Draw the schematic design

    14.3. Design the PCB design

    14.4. Collect the necessary parts

    14.5. Solder the parts and build the system

    14.6. Operate and check operation

REFERENCES

    1. Explore the user manual of the selected PCB layout design software

68546	**Operating System application**	T P C
		2 3 3

AIMS

- To be able to understand Computer System Structure and able to develop the skill and attitude to direct, control and manage of computer using operating system.
- To be able to understand process management in operating systems, including such topics as process definition, threads, scheduling, synchronization and deadlocks.
- To be able to understand memory management in operating systems, including such topics as main and virtual memories, memory allocation and paging and segmentation.
- To be able to understand storage management in operating systems, including such topics as file-system interface, mass storage structure and I/O systems.
- To be able to install the Windows and Linux based Operating system and develop skills to configure and customize both Windows and LINUX Operating System.
- To be able to understand distributed systems, including such topics as network-based operating systems, distributed file systems and distributed coordination.

SHORT DESCRIPTION

Basic concepts of operating system, Computer systems structure, Process Management (threads/ scheduling / synchronization / deadlocks), Memory management, Storage management (file system interface, I/O systems), Distributed Systems, File system and Linux fundamentals; windows and Linux commands and utilities

Theory

1. **Understand the general features of operating system.**
   1.1 Define Operating System.
   1.2 Describe the functions of operating system.
   1.3 Define Kernel and Kernel Data Structure.(Lists, Stacks, Queues, Trees, Hash and Maps)
   1.4 Define Computing Environments.(Traditional Computing, Mobile Computing , Distributed Systems, Client-Server Computing, Peer to Peer Computing, Virtualization, Cloud Computing, Real Time Embedded System)

   1.5 Describe the evolution (history) of operating system.
   1.6 Explain the role of operating system as an extended machine and as a resource manager.
   1.7 Define Open Source Operating System, Multiuser, Multitasking and GUI.
2. **Understand Operating System Structure.**
   2.1 Define Operating System Services.
   2.2 Describe User and Operating System Interface.
   2.3 Define System Calls and System Programs.
   2.4 Describe Types of System Calls.
   2.5 Describe Operating System Design and Implementation.
   2.6 Basic Concept of Operating System Structures. (Simple Structure, Layered Approach, Microkernels, Modules, Hybrid Systems, Mac OS X, iOS, Android)

3. **Understand the terms related to operating system.**

   3.1 Define batch processing system

   3.2 Describe the method of batch processing system.

   3.3 State the disadvantages of batch processing.

   3.4 Describe the uses of job control language for operating system.

   3.5 Describe the process of spooling.

4. **Understand the basics of process management and Threads.**

   4.1 Define Process, Threads and Process Scheduling.

   4.2 Describe the process state with diagram.

   4.3 Mention the difference between process and program.

   4.4 Describe the importance of process control.

   4.5 Explain the process Scheduling and scheduling queues.

   4.6 Describe Communication in Client Server Systems.

   4.7 Describe Process Synchronization (Re-condition, Reader-Writer problem, dining philosopher, Peterson solution, Semaphores)

   4.8 Describe Multicore Programming and Multithreading Models.

5. **Understand the concept of CPU Scheduling.**

   5.1 Define CPU Scheduling.

   5.2 Describe the Scheduling criteria.

   5.3 Describe Scheduling Algorithm. (FCFS – First come first serve, SJF – Shortest job first, RR- Round Robin, Priority)

   5.4 Define Multiple-Processor Scheduling.

   5.5 State the terms CPU and I/O burst cycle, CPU Scheduler, Dispatcher.

6. **Understand the concepts of deadlock.**

   6.1 Define Deadlock, Preempt able and Non-Preempt table resources.

   6.2 Mention the Necessary conditions of Deadlocks.

   6.3 Define Methods for Handling Deadlocks.

   6.4 Describe the Deadlock Prevention.

   6.5 Explain the Deadlock avoidance and their algorithm.

   6.6 Describe the Deadlock detection algorithm

   6.7 Explain the way of recovery from Deadlock.

7. **Understand the technique of memory management.**

   7.1 Mention the function of memory management.

   7.2 Describe the Single / Multiple partition scheme.

   7.3 Explain fixed memory partition with separate / single input queue.

   7.4 Explain the external and internal fragmentation.

   7.5 Describe re-locatable and dynamically re-locatable partitioned allocation.

   7.6 Describe Swapping.

   7.7 Describe the segmented allocation and segmented page.

   7.8 Describe the concept of virtual memory and demand paging.

8. **Understand the concept of Storage System (I/O Systems).**

   8.1 Overview of Mass Storage System.

   8.2 Describe Disk Structure, Attachment, Scheduling.

   8.3 Define RAID Structure.

   8.4 State the Characteristics and principle of I/O hardware.

   8.5 Describe the role of Operating system in I/O operation.

8.6 Describe the I/O aspects of Operating System.

8.7 Describe the goals of I/O software.

8.8 Describe the function of each layer of I/O system.

9. **Understand the concept of file system.**

9.1 Mention the concept and attributes of file.

9.2 Describe the basic file operation.

9.3 State the terms: the file pointer, file open count, disk location of file.

9.4 Mention the file types with common features.

9.5 Define file system.

9.6 Describe the organization of file system.

9.7 Describe the features of general file system.

9.8 Describe the free space management of disk space.

9.9 Describe the allocation methods of disk space.

10. **Understand the features of DOS, Windows, Unix and Linux Operating system**

10.1 Describe the features of DOS, Windows, UNIX and Linux.

10.2 State the advantages and disadvantages of Windows and Linux Operating System.

10.3 State disadvantages of Windows and Linux Operating System.

10.4 Comparison between Windows and Linux Operating System.

PRACTICAL

1. **Perform the task to install Windows Desktop Operating System**

1.1 Follow workplace health and safety – OSH

1.2 Install and configure Windows Operating System (Latest Version)

1.3 Performs necessary steps to configure Basic Desktop Experience.

1.4 Perform necessary steps to configure Network.

1.5 Perform popular Windows Commands and configure network by CMD.

1.6 Perform necessary steps to install and configure third party application.

1.7 Perform necessary steps to analyze running processes and to kill any process.

2. **Perform the task to install VMWare and Create Virtual Machines**

2.1 Install and configure VMWare Player/Workstation

2.2 Perform necessary steps to configure Virtual Machines

2.3 Configure multiple virtual machines

2.4 Configure virtual network system

2.5 Install Operating systems on virtual machines

3. **Perform the task to install Linux operating system.**

3.1 Follow workplace health and safety – OSH

3.2 Identify the purpose and functions of operating system

3.3 Install and configure Operating system

3.4 Set Boot sequence, Root password, Drive selection for installation, Drive partitioning, Necessary Packages

3.5 Use Necessary command to up Network card, Configure Browsers.

3.6 Use Basic Command for customization

3.7 Create Partition as per requirements.

3.8 Create Directories as per specifications.

3.9 Set Directories and file permission

3.10 Perform Copy and move operation.

3.11 Mount External Drive as per specifications.

3.12 Create Users and group as per instruction

3.13 Identify and Unpack Utility package

4. **Perform the task to Make partition to a Hard disk (Linux Based) with fdisk.**

   4.1 Use fdisk command to list all partition, to see each partition is being used and to change the partition.

   4.2 Delete the partition.

   4.3 Create partitions.

   4.4 Change the partition type.

   4.5 Display the partition table and exit.

   4.6 Write a reports.

5. **Perform the task to Use GRUB boot loader.**

   5.1 Boot the computer with GRUB.

   5.2 Change or Add boot options (Temporarily or permanently).

   5.3 Add a new GRUD boot image.

   5.4 Write a report

6. **Perform the task to work with Linux Desktop.**

   6.1 Log on into the Linux.

   6.2 Familiar with the Desktop.

   6.3 Check the home folder.

   6.4 Change the preferences.

   6.5 Configure the panel/desktop.

   6.6 Use the GNOME desktop.

   6.7 Use the Metacity window manager

   6.8 Use the GNOME Panel

   6.9 Use menu

   6.10 Add apllet, application launcher and drawer.

   6.11 Change panel properties.

   6.12 Choose and use KDE desktop.

   6.13 Write a report.

7. **Apply basic Linux commands and utilities.**

   7.1 Use the command options to modify the basic function of Linux commands.

   7.2 Use two or more Linux commands in tandem by using input and output redirection.

   7.3 Use the parameters with Linux commands.

   7.4 Select and use the notational shorthand used in Linux documentation.

   7.5 Use the Linux online man pages and help facilities.

   7.6 Use the wildcards.

   7.7 Check the environmental variables.

   7.8 List the processes running on the Linux system.

   7.9 Kill the processes.

   7.10 Write a report.

8. **Work with the Linux file system.**

   8.1 List the type of files and directories.

   8.2 Move one directory to another.

   8.3 Make a new file and directory.

   8.4 Move and copy files.

   8.5 Remove the files and directories.

8.6 Use chownand chgrpto change file and directory ownership.

8.7 Use chmodto change the file and directory permissions.

8.8 Use gunjip command to uncompress .gz files compressed by gzip.

8.9 Write a report.

9. **Work with bash (shell system).**

9.1 Select the most common shells used in Linux.

9.2 Enter commands into bash.

9.3 Use wildcards that bash shell supports.

9.4 Use the history command with or without options.

9.5 Use the aliases command.

9.6 Use the input/output redirection command.

9.7 Show the use of pipeline.

9.8 Modify the bash shell.

9.9 Write a report.

10. **Use file systems, disks and other derives.**

10.1   Mount the flash / optical drives

10.2   Make a new file system.

10.3   Unmount the flash / optical drives.

10.4   Use tar and gzip.

10.5   Use tar command to backup files in flash / optical drives

10.6   Write a report.

11. **Manage the users account.**

11.1   Make the root (superuser) suppresser accounts.

11.2   Make the user accounts.

11.3   Add and delete users.

11.4   Delete groups.

11.5   Write a report.

12. **Work with text editors.**

12.1   Select the text editor in Linux.

12.2   Use vi editor to enter & edit text.

12.3   Use emacs to enter & edit text.

12.4   Write a report

13. **Work with the printer in Linux.**

13.1 Select the printer to support in Linux.

13.2 Configure the printer.

13.3 Use the commands lpr, lpq, lprm and lpc for printing documents under Linux.

13.4 Write a report.

14. **Work with Process System Calls**

14.1 Write program to implement the Process System Calls

14.2 Start the Program

14.3 Declare PID and get the PID by using the getpid() method.

14.4 Create a child process by calling the fork() system call.

14.5 Check if(pid==0) then print the child process id and then print the parent process value
    Otherwise print.

14.6 Stop the program.

15. **Work with I/O System Calls**

15.1 Write program for I/O System calls.

15.2 Start the Program

15.3 Open a file for O_RDWR for R/W, O_CREATE for creating a file, O_TRUNC for truncate a file

15.4 Using getchar(), read the character and stored in the string[] array.

15.5 The string[] array is write into a file, close it.

15.6 Then the first is opened for read only mode and read the characters and displayed it and close the file.

15.7 Stop the program

16. **Work with Scheduling (FCFS, SJFS)**

16.1 Write a program to implement CPU & scheduling for scheduling

16.2 Start the program. Get the number of processes and their burst time.

16.3 Initialize the waiting time for process 1 as 0.

16.4 The processes are stored according to their busrt time.

16.5 The waiting time for the processes are calculated as follows:

Process for FCFS (i<2; i<=n;i++),wt.p[i]=p[i-1]+bt.p[i-1]

Process for SJFS (i<2;i<=n;n++),wt.p[i]=p[i=1]+bt.p[i-1]

16.6 The waiting time for all the processes is summed then average value time is calculated.

16.7 The waiting time of each process and average times are displayed

16.8 Stop the program

17. **Work with PIPE Processing**

17.1 Write a program to create a PIPE processing

17.2 Start the program. Declare variables.

17.3 Read the Choice.

17.4 Create a piping processing using IPC

17.5 Assign the variable lengths

17.6 "strcpy" the message lengths

17.7 To join the operation using IPC

17.8 Stop the program

18. **Work with File Manipulation**

18.1 Write a program for file manipulation for displays the file and directory in Memory

18.2 Start the program

18.3 Use the pre-defined function list out the files in directory

18.4 Main function is used to check the file present in the directory in root

18.5 Using the file pointer in the file to that the argument is less than a times means print

18.6 By using if loop check in file, open two means print error

18.7 Stop the program

19. **Simulate for Deadlock Prevention**

19.1 Start the program

19.2 Attacking Mutex condition.

19.3 Attacking preemption.

19.4 Attacking hold and wait condition: make a process hold at the most 1 resource

19.5 At a time. Make all the requests at the beginning.

19.6 Attacking circular wait: Order all the resources. Make sure that the requests are issued in the

19.7 Correct order so that there are no cycles present in the resource graph. Resources numbered 1 ... n.

19.8 Resources can be requested only in increasing

19.9 Order resources.

19.10 Stop the program

REFERENCE BOOKS

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2. Operating Systems - By - Achyut S. Godbole - Publication - Tata McGraw-Hill
3. Modern Operating Systems By - Andrew S. Tanenbaum, Publication - Prentice Hall of India
4. Computer Fundamentals By- P.K.Sinha
5. Red Hat Fedora Linux 2 bible By – Christopher Negus
6. Learning Red Hat Linux By – Bill Mc Carty

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65851   **Accounting Theory & Practice**   **T   P   C**

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AIMS
  • To be able to understand the principles and practices of book keeping and accounting.
  • To be able to understand the procedures of general accounting, financial accounting and their
     applications.
  •To be able to understand the concept of income tax , VAT & Public works accounts.

Course Outlines

Concept of book keeping and accounting; Transactions; Entry systems; Accounts;
Journal; Ledger; Cash book; Trial balance; Final accounts; Cost account & financial
accounting; Income Tax; Public works accounts.

DESCRIPTION;

Theory

1. Concept of book keeping and accounting.
   1.1 Define book keeping and accountancy.
   1.2 State the objectives & of book keeping.
   1.3 State the advantages of book keeping.
   1.4 Differentiate between book keeping and accounting.
   1.5 State the necessity and scope of book keeping and accounting.

2. Transactions Analysis.
   2.1 Define transactions and business transaction.
   2.2 Describe the characteristics of transaction.
   2.3 Discuss the classification of transaction.

3. Entry system of Accounting.
   3.1 State the aspects of transactions.
   3.2 Define single & double entry system ..
   3.3 Discuss the principles of double entry system.
   3.4 Distinguish between single entry and double entry system of book keeping.
   3.5 Justify whether double entry system is an improvement over the single entry system.

4. Classification of accounts.
   4.1 Define accounts.
   4.2 State the objectives of accounts.
   4.3 Illustrate different type of accounts with example.
   4.4 Define "Golden rules of Book keeping".
   4.5 State the rules for "Debit" and "Credit" in each class of accounts.
   4.6 Define accounting cycle.

5. Journal.
   5.1 Define Journal.
   5.2 State the functions of Journal.
   5.3 Mention the various names of Journal.
   5.4 Interpret the form of Journal.

6. **ledger.**

   6.1 Define ledger.

   6.2 Interpret the form of ledger.

   6.3 State the functions of ledger.

   6.4 Distinguish between Journal and Ledger.

   6.5 Explain why ledger is called the king of all books of accounts.

   6.6 Explain the following terms: Balance, Balancing; Debit balance; credit balance.

7. **Cash book & Its Classification.**

   7.1 Define cash book.

   7.2 Classification of cash book.

   7.3 Explain cash book as both Journal and Ledger.

   7.4 Define discount.

   7.5 Explain the different types of discount.

8. **Trial balance.**

   8.1 Define trial balance.

   8.2 State the object of a trial balance.

   8.3 Discuss the methods of preparation of a trial balance.

   8.4 Explain the limitations of a trial balance.

   8.5 Prepare trial balance from given ledger balance. (practical)

9. **Final accounts.**

   9.1 State the components of final account.

   9.2 Distinguish between trial balance and balance sheet.

   9.3 Select the items to be posted in the trading account, profit & loss account and the balance sheet.

   9.4 State the adjustment to be made from the given information below or above the trial balance.

   9.5 Explain the following terms: revenue expenditure; capital   expenditure; depreciation; annuity method demnishing balance method, machine hour method

10. **Cost and financial accounting.**

    10.1 Define financial accounting.

    10.2 State the objectives of financial accounting.

    10.3 Define cost accounting.

    10.4 State the elements of direct cost and indirect cost.

    10.5 Discuss the capital budgeting

    10.6 Explain the following terms:

    a. Fixed cost b. Variable cost c. Factory cost d. Overhead cost e. Process   cost f. Direct cost g. Operating cost h. Standard cost

11. **Income Tax**

    11.1 Define Income Tax.

    11.2 State the objects of Income Tax.

    11.3 Classification of assesses.

    11.4.Taxable income of assesses.

    11.5 Tax rebate.

    11.6 Explain the following terms: Income tax year; assessment year,NBR.

12. Public works accounts.

    12.1 State the important aspects of public works accounts.

    12.2 Describe the main features of public works accounts.

    12.3 Define Value Added Tex (VAT)

    12.4 State the merits and demerits of VAT.

    12.5 Explain the following terms :Revenue ; Grant ; Bill; Voucher.

PRACTICAL

1. Identify the transaction from given statements stating reasons.
2. Determine Debtor (Dr) and Creditor (Cr.) from given transactions applying golden rules.
3. Journalize from given transactions.
4. Prepare ledger from given transactions.
5. Prepare double column cash book from given transactions showing balances.
6. Prepare triple column cash book from given transaction and find out the balances.
7. Prepare analytical and imprest system of cash book.
8. Prepare trial balance from the given ledger balance.
9. Prepare trading account, profit & loss account and balance sheet from the given trial balance & other information.
10. Prepare cost sheet showing prime cost, factory cost, cost of production, total cost and selling price.

REFERENCE BOOKS

1. Book-keeping & Accounting   -   Prof. Gazi Abdus Salam

2. Principles of Accounting   -   Hafiz uddin

3. Cost Accounting   - Prof. Asimuddin Mondol

8. হিসাবরক্ষণ ও হিসাববিজ্ঞান   - পরেশ মণ্ডল

৫. উচ্চ মাধ্যমিক হিসাববিজ্ঞান   - হক ও হোসাইন

৬. আয়কর   - ড. মনজুর মোরশেদ