



**BANGLADESH TECHNICAL EDUCATION BOARD**  
Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM  
SYLLABUS (PROBIDHAN-2016)

# **COMPUTER SCIENCE & TECHNOLOGY**

TECHNOLOGY CODE: **685**

5th SEMESTER

DIPLOMA IN ENGINEERING  
PROBIDHAN-2016

## COMPUTER SCIENCE & TECHNOLOGY (685)

### 5<sup>th</sup> SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total
						Theory		Practical		
						Cont. assess	Final exam	Cont. assess	Final exam	
1	68552	Content Management System	0	3	1	0	0	25	25	50
2	66644	Data Communication System	2	6	4	40	60	50	50	200
3	66651	Programming in Java	2	3	3	40	60	25	25	150
4	66662	Microprocessor & Interfacing	2	3	3	40	60	25	25	150
5	66664	Database Management System	2	3	3	40	60	25	25	150
6	69054	Environmental Studies	2	0	2	40	60	0	0	100
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	0	150
<b>Total</b>			<b>12</b>	<b>21</b>	<b>19</b>	<b>240</b>	<b>360</b>	<b>200</b>	<b>150</b>	<b>950</b>

**68552**

## **Content Management System**

**T P C**  
**0 3 1**

### **AIMS**

- To be able to acquire the knowledge and skill in the Content Management System concept.
- To be able to familiarize with dash board & various tools in Content Management systems.
- To be able to acquire the knowledge and skill in the widgets, plugins, themes in CMS.
- To be able to acquire the knowledge and skill in the Integrity & security of website.
- To be able to acquire the knowledge and skill in the Web publishing, Backup & user control and Database management in web.

### **SHORT DESCRIPTION**

Content Management System concept, CMS dashboard & tools, web media, web menu, page & post, widgets & Plugins, themes, user, comments, web database, web hosting, publishing & maintenance.

### **DETAIL DESCRIPTION**

#### **Practical:**

#### **1. Familiar with Content Management System (CMS).**

- 1.1 Study on CMS.
- 1.2 Identify the functions of CMS.
- 1.3 List of popular CMSs.
- 1.4 Identify of features of WordPress, Joomla, Drupal.

#### **2. Work on Dashboard & CMS tools.**

- 2.1 Identify Dashboard components including: Admin Bar, Sidebar Menu, Dashboard Widgets, lists and available links.
- 2.2 Identify your site's status information.
- 2.3 Recognize and use tabular lists that appear on many administrative pages.

#### **3. Work on text editor & media.**

- 3.1 Identify text editor & its component.
- 3.2 Write a paragraph using text editor.
- 3.3 Insert an image into a body of text.
- 3.4 Add a title, caption, alternative text, and description.
- 3.5 Change what the image links to (media file, attachment page, custom URL, or none).
- 3.6 Insert an audio file into a post or a page.
- 3.7 Add a title, artist, album, caption, and description.
- 3.8 Choose between "Embed Media Player", "Link to Media File" or "Link to Attachment Page".
- 3.9 Insert a video file into a post or a page.
- 3.10 Add a title, caption, and description.
- 3.11 Choose between "Embed Media Player", "Link to Media File" or "Link to Attachment Page".

#### **4. Work on Menu management.**

- 4.1 Describe how menus support website navigation.
- 4.2 Manage the primary menu in WordPress.
- 4.3 Create a custom menu.
- 4.4 Modify a menu by adding and removing items.

- 4.5 Automate new menu items.
- 4.6 Organize menu items by order and level.
- 4.7 Place a menu in a secondary theme location.
- 4.8 Utilize the “Custom Menu” widget.

## **5. Work on Page, Post & Category management.**

- 5.1 Study Posts & Pages.
- 5.2 Add your Site Content.
- 5.3 Add a New Page and New Post.
- 5.4 Set up a static home page.
- 5.5 Create a blog page to display all Posts (articles).
- 5.6 Add Content with the Visual Editor.
- 5.7 Switch to the Text Editor.
- 5.8 Change your Post Format.
- 5.9 Create category.
- 5.10 Add a post in a specific category.
- 5.11 Add Tags within Post.

## **6. Work on widgets& Plugins.**

- 6.1 Identify the purpose and functions of widget areas.
- 6.2 Practice the steps of adding a widget area to a theme.
- 6.3 Add widgets and content to a new widget area in a site.
- 6.4 Identify the purpose and functions of plugins.
- 6.5 Practice the steps of adding some plugins to a theme.
- 6.7 Practice on updating and deletion plugins.
- 6.6 Practice the SEO plugin.
- 6.7 Add WordPress Security plugin.

## **7. Work on Themes Management.**

- 7.1 Find and assess Themes.
- 7.2 Upload and Install Themes.
- 7.3 Configure installed Themes.
- 7.4 Update Themes.

## **8. Work on User, Comments & Database.**

- 8.1 Create a new user account.
- 8.2 Enable/Disable the ability for users to register their own account.
- 8.3 Use the search, filter, and batch modification tools within the users table to find and/or modify existing users.
- 8.4 Add and remove permissions (via Roles and Capabilities) for individual users.
- 8.5 Reset a user’s password& update user profile.
- 8.6 Disable a user without deleting them.
- 8.7 Delete a user.
- 8.8 Reassign a deleted user’s content to another user.
- 8.9 Manage Comments.
- 8.10 Create a Database.

## **9. Project work.**

- 9.1 Create a simple CMS based website project.

## **10. Work on Web Hosting-Local, remote& cloud.**

- 10.1 Installing & configuration local web server.
- 10.2 Set up a domain and hosting account.
- 10.3 Set up a MySQL database on their server.
- 10.4 Install CMS on the MySQL database.
- 10.5 Select, install, and activate a theme.
- 10.6 Publish a website in a web server.
- 10.7 Create backup for a published web server.

## **11. Work on Updating & Maintenance.**

- 11.1 Control spam.
- 11.2 Update WP and themes.
- 11.3 SEO.
- 11.4 Create Database backup.
- 11.5 Create whole website Backup.
- 11.6 Setup automated backup.
- 11.7 Migrate website to a new host.
- 11.8 Create database backup for cloud storage.

## **REFERENCE BOOK & Web Site**

1. Content Management Bible, Bob Boiko, Wiley Publishing Inc, 2005. (ISBN: 0764573713).
2. WordPress for Dummies, *Lisa Sabin-Wilson*
3. WordPress. 1001 Trucos, Fernando Tellado
4. [www.wordpress.com](http://www.wordpress.com)
5. <https://www.joomla.org/>
6. <https://www.drupal.org/>

**AIMS**

- To be able to acquire the knowledge on data communication Basics.
- To be able to provide the knowledge and to develop skill on signal and data transmission systems and transmission media.
- To be able to acquire the knowledge on Digital communication and computer networks.
- To be able to provide the knowledge and to develop skill on network topologies and protocols.
- To be able to provide the knowledge and to develop skill on MODEM, Hub, Switch, NIC and Repeater.
- To be able to establish and implement a LAN to provide Network services.

**SHORT DESCRIPTION**

Communication Basics; Analog and Digital Modulation and Demodulation; Analog and Digital communication; Transmission media and connectors; LAN, Network fundamentals; Peer-peer & Client-Server techniques; Topologies and protocols; NIC; Network Addressing; IP address and Subnet Mask.

**DETAILS DESCRIPTION****Theory:****1. Understand the communication basics.**

- 1.1 Define Electronic Communication.
- 1.2 Mention the basic elements of a communication system.
- 1.3 Describe communication system with a simple block diagram.
- 1.4 State the terms: Frequency, Wavelength, Spectrum, Bandwidth, Throughput, Propagation speed, Propagation time, Noise figure & SNR
- 1.5 Mention the difference between bandwidth and data rate.
- 1.6 Describe simplex, half-duplex and full duplex modes of communication.
- 1.7 Describe synchronous and asynchronous communication techniques.

**2. Understand Analog Communication Systems**

- 2.1 Define Modulation and Demodulation.
- 2.2 State the necessity of modulation.
- 2.3 Mention the types of modulation.
- 2.4 Describe Amplitude, Frequency and Phase modulation with necessary waveform.
- 2.5 State the difference between analog and digital modulation
- 2.6 State the advantage and disadvantages of ASK, FSK and PSK (BPSK)

**3. Understand Digital Communication Systems**

- 3.1 Define digital modulation.
- 3.2 Describe Digital communication system with block diagram.
- 3.3 Define Line Coding and Block Coding.
- 3.4 Mention the Line Coding Schemes.
- 3.5 State unipolar Line coding with timing diagram.
- 3.6 Describe NRZ-I Line Coding scheme using 4B/5B Block Coding.
- 3.7 Describe different types of polar encoding with necessary timing diagram.

**4. 4. Understand the transmission media and connectors.**

- 4.1 Mention the categories of transmission media
- 4.2 Describe the construction of Twisted-pair (STP, UTP) Co-axial and Fiber optic cable.
- 4.3 State the characteristics of Twisted-pair (STP, UTP), Co-axial and Fiber optic cable.
- 4.4 State the advantage and disadvantages of each type of cables.
- 4.5 Define Wireless Media and Propagation.
- 4.6 Describe Wireless Propagation Modes with diagram.
- 4.7 Describe the method of Radio, Microwave and Infrared communication system.
- 4.8 State the characteristics of Radio, Microwave and Satellite communication system.

**5. 5. Understand multiplexing techniques**

- 5.1 Define Multiplexing and De-multiplexing process of communication system.
- 5.2 State the necessity of multiplexing.
- 5.3 Mention the categories of multiplexing.
- 5.4 Define Frequency division multiplexing.
- 5.5 Describe Frequency division multiplexing and de-multiplexing technique with block diagram
- 5.6 Describe the Wave division multiplexing and De-multiplexing technique with block diagram
- 5.7 Define Time division multiplexing and of Code division multiplexing system
- 5.8 State difference between baseband and broadband transmission.

**6. 6. Understand computer network basics.**

- 6.1 Define Computer Network
- 6.2 State the concept of computer Network.
- 6.3 Mention elements of computer network.
- 6.4 Describe the advantages of Computer network.
- 6.5 Describe the application of computer network.
- 6.6 Describe client / server and peer-to-peer network.
- 6.7 Describe the general features of LAN, MANs and WANs.
- 6.8

**7. 7. Understand the network topologies.**

- 7.1 Define network topology.
- 7.2 Mention the difference between physical and logical topology.
- 7.3 Describe the physical connection of bus, ring, star, mesh and hybrid topologies.
- 7.4 Mention the advantages and disadvantages of bus, ring, star, mesh and hybrid topologies.
- 7.5 Describe the factors to select a particular topology.
- 7.6 Describe the logical topologies of a token ring network.

**8. 8. Understand network protocols.**

- 8.1 Define network protocol.
- 8.2 Describe the main elements of protocol.
- 8.3 Describe the characteristics of protocol.
- 8.4 Describe the functions of protocol.
- 8.5 List different types of network protocols.
- 8.6 State the function of TCP/IP protocol.

**9. 9. Understand IP addressing.**

- 9.1 Define Network Addressing.
- 9.2 Define IP and IPv4
- 9.3 Describe the IP address formats of class A,B,C,D &E with example.

- 9.4 Describe subnet and subnet masks.
- 9.5 State CIDR format of subnet.
- 9.6 Define IPv6.
- 9.7 Describe the address format of IPv6.

#### **10. 10. Understand Network Interface Cards (NIC)**

- 10.1 State the role of NIC.
- 10.2 Describe the format of Physical address (MAC Address) of NIC.
- 10.3 Mention the points that agree both the sending and receiving NICs.
- 10.4 State the importance of base memory address for NIC.
- 10.5 Mention the important points to maintain the compatibility among NIC, bus and cables.
- 10.6 Describe the NIC related factors that enhanced the performance of network.

#### **11. 11. Understand the connectivity devices**

- 11.1 List the connectivity devices used in networking.
- 11.2 Describe function of MODEM.
- 11.3 Describe MODEM types and Standard.
- 11.4 Describe the features of ADSL and Digital MODEM.
- 11.5 Describe the functions of Hubs, Repeaters and switches in network.
- 11.6 Describe the important features of Repeaters and switches.
- 11.7 Describe the functions of Router and Gateway

### **PRACTICAL:**

#### **1. Identify different types of guided communication media.**

- 1.1 Twisted Pair Cable- Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP)
- 1.2 Co-axial Cable- Thick net and Thin net
- 1.3 Fiber Optic Cable- Single mode and Multi mode
- 1.4 Constructional features of UTP, STP, Co-axial Cable and Fiber Optic Cable.

#### **2. Identify different types of connectors**

- 2.1 Twisted Pair Cable- RJ45 Connectors and their constructional features.
- 2.2 Co-axial Cable- BNC Connectors and their constructional features.
- 2.3 Fiber Optic Cable- MT-RJ and their constructional features.

#### **3. Identify other Network hardware's**

- 3.1 Network Interface Cards/LAN cards/ Network Adaptor.
- 3.2 Cable Tester, Crimper and Accessories
- 3.3 Modems, Hubs, Repeater, Switch & Router

#### **4. Connect RJ45 Connector with UTP Cable**

- 4.1 Make a straight through cable
- 4.2 Make a Cross over cable
- 4.3 Make a console cable

#### **5. Establish a Peer to Peer/Workgroup LAN**

- 5.1 Install Network Interface Card (NIC) into the PC
- 5.2 Check the MAC address of the Network Interface Card (NIC)
- 5.3 Connect straight cable or cross over cable among PCs, Hub or Switch
- 5.4 Configure the TCP/IP in each PC
- 5.5 Test the connectivity among PCs using Ping Command.



**6. Perform the task to Work with a Peer/Workgroup LAN environment for simple data communication.**

6.1 Share the folders, Pen drive and Secondary memory.

6.2 Share a printer, DVD Drive or any other resources.

**7. Establish a Client–Server Local Area Network**

7.1 Install Windows server 2012 into a server PC

7.2 Configure TCP/IP to server and client PCs

7.3 Perform the task to configure the Active Directory

7.4 Perform the task to configure The DNS.

7.5 Perform the task to configure the DHCP

7.6 Perform the task to Work with a Client–Server LAN environment for simple data communication and Administrative functions.

**REFERENCE BOOKS**

1. Data communications and Networking – Behrouz A. Forouzan.
2. Fundamentals of Communication-M. Shamim Kaiser and associates
4. Data and Computer Communications-William Stallings
5. Local Area Networking – S. K Basandra.
6. MCSE Windows & Networking Essential – Joe Casad

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

<http://java.sun.com/developer/onlineTraining/JavaIntro/contents.html#links>

<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>

**AIMS**

- To be able to acquire the knowledge on microprocessor, microcomputer.
- To be able to develop the knowledge and skill on the architecture and assembly language programming of 16- bit microprocessor
- To be able to acquire the knowledge and skill on memory, interrupt and I/O interfacing.

**SHORT DESCRIPTION**

Basic conception of microprocessor and microcomputer; Architecture and addressing mode of Intel 8086 $\mu$ p; Instruction timing of Intel 8086  $\mu$ p; Memory, input /output and interrupt interfacing of Intel 8086  $\mu$ p; Interfacing principle and peripheral devices; programming of Intel 8086/8088; Intel x86 family, multi-core processor idea;

**DETAIL DESCRIPTION****Theory:**

- 1. Understand the concept of microprocessor and microcomputer.**
  - 1.1. Define the microprocessor and microcomputer.
  - 1.2. Distinguish between microprocessor and microcomputer.
  - 1.3. Distinguish between microprocessor and microcontroller.
  - 1.4. Describe the block diagram of simple microcomputer.
  - 1.5. Evaluation of microprocessor (4, 8, 16, 32 & 64 bit microprocessor)
- 2. Understand the architecture of 8086 microprocessor.**
  - 2.1. Mention the general features of 8086/8088 microprocessor.
  - 2.2. Describe the pin and signal diagram of 8086/8088 microprocessor.
  - 2.3. Distinguish between maximum and minimum mode of 8086/8088 microprocessor
  - 2.4. Describe the architecture of 8086 microprocessor.
  - 2.5. Describe the register structure of 8086 microprocessor.
  - 2.6. Mention the difference between 8086 and 8088 microprocessor.
- 3. Understand the memory interface of the 8086 microprocessor.**
  - 3.1. Sketch the 8086 system memory interface.
  - 3.2. State the meaning of even & odd address boundaries.
  - 3.3. Describe the hardware organization of the memory address space of 8086.
  - 3.4. Describe the memory read and write bus cycle of 8086 microprocessor. Explain the technique to de-multiplex the system bus.
- 4. Understand the 8086 addressing mode and programming concept.**
  - 4.1. Describe the addressing mode of 8086 microprocessor.
  - 4.2. Describe the software model of the 8086 microprocessor.
  - 4.3. Describe the 8086 instruction set.
  - 4.4. Explain the instruction format of 8086 microprocessor.
- 5. Understand the input / output interface and peripheral devices of the 8086 microprocessor.**
  - 5.1. Describe the 8086 system I/O interface.

- 5.2. Describe the I/O address space of the 8086 system.
  - 5.3. Describe the I/O read and I/O write bus cycle of 8086 microprocessor.
  - 5.4. Define programmable peripheral Interface.
  - 5.5. Mention the commonly used support chips and purpose of those.
  - 5.6. Describe the operation of PPI with block diagram.
  - 5.7. Configure the control word of the control register of PPI for simple I/O operations.
- 6. Understand the interrupt interface of the 8086 microprocessor.**
- 6.1. Mention the types of interrupts.
  - 6.2. Describe the common features of different types of interrupts.
  - 6.3. Sketch the map of interrupt vector table.
  - 6.4. Describe the external hardware interrupt interface of the 8086 microprocessor.
- 7. Understand the assembly language programming of 8086 family.**
- 7.1. Define the assembler pseudo instructions.
  - 7.2. Describe the use of assembler directives (i. e. SEGMENT, ENDS, ASSUME, DUP, etc.)
  - 7.3. Describe the use of program development tools (i.e. editor, assembler, linker, locator debugger and emulator.)
  - 7.4. Explain the sequential, IF-THEN-ELSE, WHILE-DO and REPEAT-UNTILL structure in 8086 assembly language with pseudo code and flow chart.
  - 7.5. Write assembly language programs.
- 8. Understand the features of advanced microprocessors.**
- 8.1. List the names of other x86 family processors including Pentium series and state the brief specification.
  - 8.2. Describe the real and protected mode memory addressing technique.
  - 8.3. State the function of BIST in Pentium processor.
  - 8.4. State multiprocessing and parallel processing.
  - 8.5. Define multi-core processors (i.e. Dual core, Quad core, core ix).
  - 8.6. Write down the advantages of multi-core processors.
- 9. Understand the real world interfacing**
- 9.1. Describe the interfacing of LED Display with program to the microprocessor.
  - 9.2. Describe the interfacing of seven segment LED display with program to the microprocessor.
  - 9.3. Describe the interfacing of Multiple Digit Display with program to the microprocessor.
  - 9.4. Describe the method of interfacing of stepper motor to the microprocessor.

**Practical:**

1. Perform the task to develop and execute an assembly language program for solving arithmetic problems using 8086/88 $\mu$ p trainer or MASM type tools or software simulator.
2. Perform the task to develop and execute an assembly language program for solving logical problems using 8086/88 $\mu$ p trainer or MASM type tools or software simulator.

3. Perform the task to develop and execute an assembly language program to compute 1's or 2's complement of binary number using 8086/88 $\mu$ p trainer or MASM type tools or software simulator.
4. Perform the task to transmit data from a microprocessor to an I/O using Intel 8086/8088 based microprocessor trainer or MASM type tools or simulator software.
5. Perform the task to receive data from an I/O to the microprocessor using Intel 8086/8088 based microprocessor trainer or MASM type tools or simulator software.
6. Perform the task to develop and execute an assembly language program/ Subroutine to produce time delays of different durations using 8086/88 $\mu$ p trainer or MASM type tools or software simulator.
7. Perform the task to develop and execute assembly language programs that implement the branching and looping structures using 8086/88 $\mu$ p trainer or MASM type tools or software simulator.
8. Build a simple computer prototype using 8086/8088 processor with memory, I/O interface and simple I/O devices

**Reference Books:**

1. Digital Computer Electronics - Malvino- Brown
2. Microprocessor And Microcomputer Based System Design - Mohamed Rafiquzzaman..
3. Microprocessors and Interfacing: Programming and Hardware - Douglas V. Hall
4. The Intel Microprocessors - Barry B. Brey
5. Microprocessor & Interfacing - A.P. Godse & D.A. Godse
6. The 8086 and 80286 Microprocessor - Avatar Singh

**AIMS**

- To be able to acquire the knowledge and skill in the database system concept.
- To be able to familiarize with data models in database systems.
- To be able to acquire the knowledge and skill in the Relational databases
- To be able to acquire the knowledge and skill in the Integrity & security.
- To be able to acquire the knowledge and skill in the Data storage, Transactions & concurrency control and Database system architecture.

**SHORT DESCRIPTION**

Database system concept; Data models; Relational databases, Integrity & security, Data storage, Transactions & concurrency control, cursor and Database system architecture.

**DETAIL DESCRIPTION****Theory:****1. Understand the basic concept of database system.**

- 1.1 Define database management system.
- 1.2 Explain the purpose of database management system.
- 1.3 Mention the difference between conventional file system and database management system.
- 1.4 Mention the advantages & disadvantages of database management system.
- 1.5 Define data abstraction, instances and schemas.
- 1.6 Mention the types of schema.
- 1.7 Data type concept.

**2. Understand the concepts of database languages, users, manager and administrator.**

- 2.1 Describe the database languages with examples.
- 2.2 Describe the basic operation of DDL, DML and data dictionary.
- 2.3 Describe the different types of database system users.
- 2.4 Example the different tasks of database manager.
- 2.5 Describe the functions of a database administrator.
- 2.6 Describe the functional components of a database system.

**3. Understand the data models.**

- 3.1 Define the entity, entity set and data model.
- 3.2 Mention the meaning of E-R diagram symbol.
- 3.3 Describe the E-R diagram for different mapping constrains.
- 3.4 State different types of attribute uses in E-R diagram.
- 3.5 State the techniques to convert E-R diagram to table.
- 3.6 Describe the different types of data models with examples.
- 3.7 Describe the constraints in entity-relationship (mapping, cardinalities and existences) with diagrams..
- 3.8 State the meaning of different types of keys in RDBMS (primary key and foreign key, super key, candidate key).
- 3.9 Distinguish between strong and weak entity sets.



3.10 Describe the schema diagram with example.

**4. Understand the relational database Query language.**

4.1 Define query language.

4.2 Mention the different among SQL, QBE and Datalog.

4.3 Describe the fundamental operations of relational algebra(**select, project, union, set difference, Cartesian product, rename, set intersection, natural joint, division and assignment**).

**5. Understand the SQL and PL/SQL.**

5.1 Mention the several parts of SQL and PL/SQL.

5.2 Explain five clauses of SQL expression (**select, from, where, group by and having**).

5.3 Describe the uses of SQL set operations (**union, intersect, and except**).

5.4 Describe the uses of SQL aggregate functions (**avg, min, max, sum, count, upper, lower, initcap, string operation etc.**).

5.5 Describe the technique to add, remove and change information with SQL (**delete, insert, and update**).

**6. Understand the integrity and security.**

6.1 Define integrity constraint.

6.2 Describe the referential integrity in SQL.

6.3 Describe the assertions in RDBMS.

6.4 Define the triggers and need for triggers in RDBMS.

6.5 Define the security in RDBMS.

6.6 Describe the protection of database.

6.7 Define encryption and authentication in database.

6.8 Mention the technique of encryption.

**7. Understand the relational database design.**

7.1 Define the normalization.

7.2 Mention the need for normalization.

7.3 Describe the term redundancy in RDBMS.

7.4 Explain the three stages/rules of normalization in database management system (1NF, 2NF, and 3NF)

7.5 Describe the overall database design process.

**8. Understand the data-storage media.**

8.1 List the physical storage media.

8.2 Describe the storage-device hierarchy used for database storage.

8.3 Define the RAID.

8.4 Describe the different levels of RAID.

8.5 Describe the choice of RAID levels.

**9. Understand the Transactions and concurrency controls.**

9.1 Define transaction and concurrent execution in DBMS.

9.2 Mention the properties of the transaction.

9.3 Explain the transaction state with diagram.

9.4 Mention the reasons for allowing concurrency.

**10. Understand the database system architecture.**

10.1 Define centralized, parallel and distributed database system.

10.2 Explain the homogeneous and heterogeneous databases.

10.3 Explain the structure of server (Centralized and client server), parallel and distributed database system architecture.

10.4 Describe the advantages and disadvantages of server, parallel and distributed database system architecture.

### **11. Understanding the cursor statement**

11.1 Declare a cursor that defines a result set in a stored procedure

11.2 Open the cursor to establish the result set.

11.3 Fetch the data into local variables as needed from the cursor, one row at a time.

11.4 Close the cursor when done.

### **12. Database Backup and Restoring System.**

#### **PRACTICAL:**

1. Arrange the necessary hardware and operating system for installing MS-Access, SQL Server or Oracle.
2. Create a new database for the result process application using MS-Access, SQL server or Oracle.
3. Create tables such as Student Information, Department Information, Subject Information, Year information and Mark Information (including):
  - I. Create a new user/database and permission assign.
  - II. Create a table space.
  - III. Create a new table with appropriate data types.
  - IV. Define primary key, Foreign key, candidate key and different constraints.
  - V. Drop primary key and foreign key.
  - VI. Save the table structure
  - VII. Edit a table structure
  - VIII. Insert a record, Update the record and Delete the row.
  - IX. Alter a field with Field Name, DataType, Length etc.
  - X. Change or remove a key field
4. Create relationship among tables using inner join or outer join.
  - I. Create a query involving only one table.
  - II. Query linked tables and create a form from a query.
  - III. Create a total query to find the GPA of each student of particular year.
5. Create data entry form for entering data in Student Information, Department Information, Subject Information, Year Information and Mark Information tables.  
Then apply Normalization (1NF, 2NF and 3NF) on result process database.
6. Use Auto Report to create table reports of result process. Use the report wizard to create a grade sheet /mark sheet/transcript, Merit list and tabulation sheet.
7. Perform the task to install Oracle Database Language and Invoking SQL Plus.
8. Perform the task to manipulate data in data base management system (select, project, union, set difference, cartesian product, rename, set intersection, natural joint, division and assignment).
9. Perform the task to view, delete and update data into a table (delete, insert, and update) and perform the task to modify the structure of a table.
10. Perform the task to work with grouping data from tables and manipulate dates by SQL in Oracle
11. Perform the task to work with Sub Queries, JOINS, Indexes, Trigger, transaction, process, Parameterized cursor, 'DUAL' and SYSDATE, functions, different Type of constraints in PL/SQL.

12. Perform the task to work with View, sequences and Security in SQL including user and administrative level.
13. Create a stored procedure, declare some variables, create a cursor and use it by writing some query statement in the looping area after open the cursor. Then close the cursor.
14. Perform the task to work with Concurrency Control (Implicit and explicit lock) and error handling in PL/SQL
15. Backup a database and Restore it after taking the backup.

## **REFERENCE BOOK**

1. Database System Concepts – Henry F. Korth.
2. Successful projects in ACCESS - P.M Heathcote
3. SQL, PL/SQL
4. Introduction To Oracle 10g SQL Volume-1
5. Introduction To Oracle 10g SQL Volume-2
6. Introduction To Oracle 10g PL/SQL Volume-1
7. Introduction To Oracle 10g PL/SQL Volume-2

References Web Site:-

[www.java2s.com/Tutorial/Oracle/CatalogOracle.htm](http://www.java2s.com/Tutorial/Oracle/CatalogOracle.htm)

[www.docs.oracle.com](http://www.docs.oracle.com)

**AIMS**

- To be able to understand the basic concepts of environment and environmental pollution.
- To be able to understand the concepts of ecology and ecosystems
- To be able to understand the basic concepts of environmental degradation relating to industrial production.
- To be able to understand the major environmental issues and problems.
- To be able to understand legislative measures to protect environment.

**SHORT DESCRIPTION**

Basic concepts of environment; natural resources; biogeochemical cycling; ecology and ecosystem; air; water; soil; solid waste management; development and environment; global environmental challenges; legislative protection of environment.

**DETAIL DESCRIPTION****1. Understand the multidisciplinary nature of environmental studies.**

- 1.1. Define environment, nature, pollution, pollutant, contaminant.
- 1.2. Describe the scope of environmental studies.
- 1.3. Describe the importance of environmental studies.
- 1.4. Describe the formation and structure of the Earth.
- 1.5. Describe the earth's natural system.
- 1.6. Describe the changing attitudes to the natural world.
- 1.7. Mention the main components of environment.
- 1.8. Define natural and man-made environment.
- 1.9. Distinguish between natural and man-made environment.

**2. Understand the natural resources.**

- 2.1. Define natural resources.
- 2.2. Classify natural resources.
- 2.3. Describe forest resources.
- 2.4. Describe water resources.
- 2.5. Describe mineral resources.
- 2.6. Describe food resources.
- 2.7. Describe energy resources.
- 2.8. Describe land resources.
- 2.9. Describe environmental problem relating to resources use.
- 2.10. Describe the role of an individual in conservation of natural resources.

**3. Understand the biogeochemical cycling.**

- 3.1. Define biogeochemical cycle.
- 3.2. Describe hydrologic cycle.
- 3.3. Describe carbon cycle.
- 3.4. Describe nitrogen cycle.
- 3.5. Describe oxygen cycle.

3.6. Describe phosphorus cycle.

3.7. Describe sulfur cycle.

3.8. Describe nutrient cycle.

**4. Understand the ecology and ecosystem.**

4.1. Define ecology and ecosystem.

4.2. Structure and function of an ecosystem.

4.3. Describe the components of ecosystem.

4.4. Explain the stability of ecosystem.

4.5. Describe ecological factors.

4.6. Describe interdependency between abiotic and biotic component.

4.7. Describe the meaning of following terms: species, population, community, ecological succession, community periodicity, climax community, ecological niche, habitat, plankton, nekton, ecological indicator, evolution, adaptation, producers, consumers, decomposers, food chains, food webs, ecological pyramids, bio-concentration, bio-magnification, biodiversity, threatened species, endanger species, extinct species, exotic species, biodiversity conservation and biogeography.

4.8. Describe energy flow in the ecosystem.

4.9. Describe the ecosystem of pond, ocean, estuary, grassland, cropland, forest, desert and mangrove.

**5. Understand the air as a component of environment.**

5.1. Define air.

5.2. Describe the composition of the clean dry atmospheric air at ground level.

5.3. Describe the atmospheric structure.

5.4. Define air pollution.

5.5. Describe major air pollutants and their impacts.

5.6. Describe the sources of air pollutants.

5.7. Explain the formation of photochemical smog and its effects.

5.8. Describe the effects of air pollution on vegetation, animal, human health and materials and resources.

5.9. Define sound and noise.

5.10. Describe the classification of sound.

5.11. Describe the effects of noise.

**6. Understand the water as a component of environment.**

6.1. Define water.

6.2. Describe the characteristics of water.

6.3. Describe the sources of water.

6.4. Describe the uses of water.

6.5. Explain that the water is a universal solvent.

6.6. Define water pollution, biological oxygen demand (BOD), effluent treatment plant (ETP).

6.7. Describe the sources of water pollution.

6.8. Describe the effects of water pollution.

**7. Understand the soil as a component of environment.**

7.1. Define soil.

7.2. Describe the constituents of soil.

7.3. Define soil pollution.

7.4. Describe causes soil degradation.

7.5. Describe the sources of soil pollution.

7.6. Describe the effects of soil pollution.

**8. Understand the concept of solid waste management.**

8.1. Define solid waste, refuse, garbage, rubbish, trashes, demolition and construction waste, e-waste, agricultural waste, pathological waste, radioactive waste, hazardous waste, 3R, 4R.

8.2. List the sources of solid waste.

8.3. Mention the classification of solid waste.

8.4. Mention the methods of collection of solid waste.

8.5. Describe the recycling of solid wastes.

8.6. Describe resource recovery from solid waste.

8.7. Describe the potential method of disposal of solid waste.

8.8. Describe control measures of urban and industrial wastes.

**9. Understand the development and environment.**

9.1. Define environmental ethics and environmental stress.

9.2. Describe environmental stress.

9.3. Define sustainable development.

9.4. Define urbanization.

9.5. Describe the causes of urbanization.

9.6. Describe the effects of urbanization on environment.

9.7. Define industrialization.

9.8. Describe the causes of industrialization.

9.9. Describe the effects of industrialization on environment.

**10. Understand the global environmental challenges.**

10.1. Define greenhouse gas and greenhouse effects.

10.2. Make a list of greenhouse gases and their contribution on greenhouse effects.

10.3. Describe the causes and consequences of greenhouse effects.

10.4. Describe acid rain.

10.5. Describe importance of ozone layer.

10.6. Define ozone depleting substances (ODS).

10.7. Describe ozone layer depletion mechanism.

10.8. Describe hazardous waste.

10.9. Describe chemicals pesticides.

10.10. Describe radioactive pollution.

10.11. Describe natural disaster.

## **11. Understand the legislative protection of environment.**

- 11.1. Define environmental impact assessment (EIA) and environmental auditing (EA).
- 11.2. Mention environmental act and legislations prescribed for air, noise, water, soil and wild life protection.
- 11.3. Describe environmental conservation act 1995 in Bangladesh.
- 11.4. Describe the environment conservation rule 1997 in Bangladesh.
- 11.5. Describe the environmental framework in Bangladesh.
- 11.6. Describe The Montreal Protocol and The Kyoto Protocol.
- 11.7. Describe role of an individual in prevention of pollution.

## **REFERENCES:**

1. Fundamentals of Environmental Studies, Mahua Basu and S. Xavier, Cambridge.
2. Ecology and Environment, P.D. Sharma, Rastogi Publications.
3. Basics of Environmental Science, Michael Allaby, Routledge.
4. Environmental Science, Jonathan Turk and Amos Turk, Saunders golden sunburst series.

**65851**

**Accounting Theory & Practice**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

**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 diminishing 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 Tax (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
৪. হিসাবরক্ষণ ও হিসাববিজ্ঞান - পরেশ মন্ডল
৫. উচ্চ মাধ্যমিক হিসাববিজ্ঞান - হক ও হোসাইন
৬. আয়কর - ড. মনজুর মোরশেদ