BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

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

DATA TELECOMMUNICATION & NETWORKING TECHNOLOGY

TECHNOLOGY CODE: **684**

5th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

DATA TELECOMMUNICATION & NETWORKING TECHNOLOGY (684)

5th 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	68451	Mobile Communication Networks	3	3	4	60	90	25	25	200
2	68452	Graphics Design	0	6	2	0	0	50	50	100
3	66651	Programming in Java	2	3	3	40	60	25	25	150
4	66664	Database Management System	2	3	3	40	60	25	25	150
5	69452	Telecom Measuring & Equipments Testing	3	3	4	60	90	25	25	200
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
Total			**14**	**21**	**21**	**280**	**420**	**200**	**150**	**1050**

68451-Mobile Coummunication Networks

T	P	C
3	3	4

AIMS

- To be able to understand mobile Communication and Network.
- To be able to understand digital cellular mobile systems.
- To be able to understand cordless Communication system.
- To be able to understand Mobile data Communication system.
- To be able to understand telecommunication management network (TMN) and signaling system
- To be able to understand TDMA cellular mobile communication
- To be able to understand CDMA cellular mobile communication
- To be able to understand global mobile satellite system.
- To be able to understand numbers and identities for mobile communication.
- To be able to understand Traffic Engineering and tracking system.

SHORT DESCRIPTION

Concept of mobile communication and network; Cellular concept and its initial implementations; Digital cellular mobile systems; Cordless communications systems (CT2, DECT, PACS and PHS); Mobile data communication systems; Third generation mobile communication system; telecommunication management network (TMN) and signaling system; concept of TDMA cellular mobile communication; concept of CDMA cellular mobile communication; Global mobile satellite systems; Numbers and identities for mobile communication services; performance benchmarks for mobile; Traffic engineering and tracking system.

DETAIL DESCRIPTION

Theory:

1. Understand the concept of mobile communication and network.

1.1 Define the concept of mobile communication and mobility
1.2 Define the terms of terminal mobility, personal mobility, service portability and MNP
1.3 Describe the GSM mobile communication system and mention frequency bands.
1.4 Describe the basic concept of past, present and future mobile communication.
1.5 Describe the idea of related network aspects of mobile communication.
1.6 Describe the general objectives & architecture of GSM public land mobile networks (PLMN).
1.7 Describe the subsystems and interfaces of GSM system.

2. Understand the cellular concept, its initial implementation and the features of radio link in GSM system,

2.1 Describe the frequency reuse concept in cellular mobile systems.
2.2 Describe the multiple access technologies for cellular mobile system.
2.3 Describe the procedure of location updating and call setup.
2.4 Describe the procedure of hand-off.
2.5 Describe the initial implementations off the cellular concept (Analog cellular system).
2.6 Mention the base station identity code (BSIC) signal and quality level in GSM.
2.7 Define the terms Cell splitting, Sectoring and Repeater for range extension.
2.8 Describe the advantages and disadvantages of GSM system.

3. Understand the concept of digital cellular mobile system

3.1 Mention the advantages of digital cellular systems
3.2 Describe GPRS, EDGE, UMTS, HSPA, HSPA+ and LTE.
3.3 Mention the initial global system for mobile communication (GSM) standards.
3.4 List the services supported by GSM.
3.5 Describe the reference architecture and signaling interfaces of GSM.
3.6 Mention the deferent characteristics for GSM radio aspects and security aspects of GSM.

3.7 Describe the typical call flow sequences in GSM.

3.8 Describe the evolutionary directions for GSM cellular systems (1G, 2G, 3G, 4G, 5G)

4. Understand the concept of Cordless communications systems.

4.1 List the radio specifications for cordless telecommunication system (CT2, DECT, PACS & PHS)

4.2 Describe the main application environment and radio aspects for cordless telephone system.

4.3 Describe the signaling layers of cordless telephone system.

4.4 Describe the functional model structure for digital enhanced cordless telecommunication (DECT).

4.5 Describe the layered architecture and network aspects of DECT.

4.6 Describe the logical channels and Frame structure of GSM.

4.7 Describe the inter-networking architecture of DECT/GSM.

5. Understand the concept of mobile data communications and security in GSM.

5.1 List the applications and ranges of mobile data communication system.

5.2 Describe the features of specialized packet data and mobile radio networks.

5.3 Describe the techniques for circuit switched data services on cellular (analog& digital) network.

5.4 Describe the technique for high speed circuit switched data services on cellular networks.

5.5 Describe the technique for packet data service in analog cellular networks.

5.6 Describe the mechanism used for privacy and security in GSM systems.

5.7 Describe the authentication requirements in GSM network.

5.8 Mention the types of SIM card used in GSM.

6. Understand the concept of management of GSM network and signaling system.

6.1 Define traditional approaches to network management (NM).

6.2 Describe the layers of telecommunication management network (TMN).

6.3 Describe the concept of IMEI, IMSI, MSISDN and TMSI.

6.4 Describe OSI systems management.

6.5 Describe the architecture and interfaces of network management.

6.6 Describe the functionality of NMS, NMC, OMC and NOC.

6.7 Describe the different types of signaling system.

6.8 Describe the signaling format of SS7.

7. Understand the concept of TDMA cellular mobile communication.

7.1 Define the TDMA architecture of cellular mobile system.

7.2 Describe the terms reverse channel and forward channel in TDMA systems.

7.3 Describe the cluster planned hierarchal architecture of TDMA system.

7.4 Describe the advantages and disadvantages of TDMA system.

8. Understand the concept of CDMA cellular mobile communication.

8.1 Define the CDMA architecture of cellular mobile system.

8.2 Define Capacity of cellular CDMA and it types.

8.3 Describe the terms reverse link, forward link capacity and imperfect power control.

8.4 List the features and services of IS-95 CDMA systems.

8.5 Describe the call processing procedure for mobile and base station in CDMA system.

8.6 Describe the principle of wide band CDMA mobile system.

8.7 Describe the terms diversity, hand-off of IS-95 CDMA systems.

9. Understand the features of global mobile satellite systems.

9.1 Describe the trends towards use of satellite for global mobile personal communication.

9.2 Describe the satellite orbits, high-level network architecture and call flow process for the iridium systems.

9.3 Describe the network architecture and call setup procedure in the global star system.

9.4 Describe the overall configuration and call setup procedure for the intermediate circular orbits (ICO).

9.5 Mention the features of teledesic system.

9.6 List the general characteristics of Iridium, Global star, ICO and teledesic systems.

10. Understand the concept of numbers and identities for mobile communication services.

10.1 List the numbering related activities in international view.
10.2 Mention the role of mobile / PCS station numbering and identities.
10.3 Mention the international recommendations on numbering and identities.
10.4 Describe the numbering plan for geographic areas.
10.5 Describe the identification plan for terminals and mobile users.
10.6 Describe the numbering plan for mobile networks.
10.7 Describe the application of IMSI, IMEI and TMSI for location update in GMS.
10.8 Describe the numbering plan for UPT.

11. Understand the concept of performance benchmarks for mobile communication systems and networks and the concept of telecommunication traffic engineering.

11.1 Mention the key factors that influence the quality of services (QOS) in wireless network.
11.2 Describe the traffic performance for the quality of services in wireless network.
11.3 Describe the transmission performance for the quality of services in wireless network.
11.4 Mention the service levels for telecommunication traffic.
11.5 Define the parameters of a traffic usage.
11.6 Describe different traffic measurements units with problem.
11.7 Describe different types of call and call capacity.
11.8 Mention the typical traffic distribution for mobile application.
11.9 List the categories of data collection.

PRACTICAL:

1. Perform the frequency reuse concept of cellular mobile system.

1.1 Collect the mobile trainer
1.2 Connect the equipments of mobile trainer
1.3 Test the connection of equipment by applying proper power supply
1.4 Write a report

2. Establish the procedure of location updating and call setup.

2.1 Identify the equipments
2.2 Connect the equipments
2.3 Test the connection of equipment by applying proper power supply
2.4 Write a report

3. Perform the different hand off procedure in mobile communication.

3.1 Use simulator software
3.2 Draw the layout
3.3 Run the software
3.4 Write a report

4. Perform the call processing procedure for mobile and base station in CDMA system.

4.1 Use simulator software
4.2 Draw the layout
4.3 Run the software
4.4 Write a report

5. Perform the operation of different types of mobile antenna.

5.1 Identify the antennas
5.2 Perform Antennas operation
5.3 Draw the Antenna pattern
5.4 Write down the Antenna calculation
5.5 Write a report

6. Perform the interference reducing mechanisms in GSM system.

6.1 Go to Simulation -> New -> LTE/LTE-A

6.2 Click & drop 2 eNB's, 1 MME and 4 UE's onto the Simulation Environment. Connect the 2 eNB's with MME using Wired Link.

6.3 To add application, drop the Application icon. Edit the Application properties as given in table. All other properties are default.

6.4 Click on Run Simulation icon and set simulation time = 100s

6.5 See the Output and write a report

7. Perform the typical call flow sequence in GSM.

7.1 Use simulator software

7.2 Draw the layout

7.3 Run the software

7.4 Write a report

8. Observe the numbering plan for mobile network.

8.1 Mobile Country Code (MCC)

8.2 Mobile Network Code (MNC)

8.3 Mobile Subscriber Identification Number (MSIN)

8.4 Write a report

9. Visit mobile station (BTS, BSC and MSC etc) and prepare a report

9.1 Identify the equipments

9.2 Connect the equipments

9.3 Test the connection of equipment by applying proper power supply

9.4 Write a report

REFERENCE BOOKS

1. Mobile and Personal Communication System and Services - RAJPANDYA
2. Principle & Applications of GSM - Vijay K. Grag.
3. Principles of Mobile Communication - Gordon L Stuber
4. GSM System Introduction - Ericson
5. GSM System Survey - Ericson
6. Mobile Communications - Jochen H. Schiller

68452 Graphic Design

T	P	C
0	6	2

AIMS

- Separate and compose Images.
- Create basic designs using illustration software
- Manipulate image using image processing Software.
- Create professional designs using Illustration software.

DETAIL DESCRIPTION

Specifies the knowledge, skills and attitude to develop technical and conceptual skills required to separate and compose Images. Covers the knowledge, skills and attitude required to create basic designs using illustration software.

PRACTICAL

1. Separate and compose Images

1.1 Follow OSH practices

1.1.1 Safe work practices are observed according to workplace procedures

1.1.2 OSH hazards and incidents are reported to appropriate personnel.

1.2 Identify image source

1.2.1 Appropriate Image separation software is identified.

1.2.2 Image sources are identified

1.2.3 Image separation tools are identified.

1.2.4 Images are successfully imported from appropriate source.

1.3 Identify image standards

1.3.1 Image properties are identified

1.3.2 Image resolution are identified and demonstrated.

1.3.3 Image format are identified and selected.

1.4 Separate Images using magic wand tools

1.4.1 Magic wand tool is selected

1.4.2 Image is selected

1.4.3 Image is separated

1.5 Separate Images using lasso tools

1.5.1 Lasso tool is selected

1.5.2 Image is selected

1.5.3 Image is separated

1.6 Separate Images using pen tools

1.6.1 pen tool is selected

1.6.2 Image is selected

1.6.3 Image is separated

1.7 Create layer and compose

1.7.1 New document is created

1.7.2 Images are pasted for edit

1.7.3 Layers are created and selected.

1.7.4 Images are edited and arranged.

1.8 Evaluate own work

1.8.1 Constructive criticism from others is applied to improve own work.

1.8.2 Own work is evaluated against planned Strategy for own practice.

1.8.3 Work processes and practice are adjusted as necessary to improve technical,conceptual and commercial outcomes.

2. Create basic designs using illustration software

2.1 Create basic designs

2.1.1 Required designs are specified.

2.1.2 Appropriate shape and size are identified

2.1.3 Content area is defined

2.1.4 Contents are inserted and composed

2.1.5 Shapes are modified as per requirements.

2.1.6 Typographical design is applied as per requirements.

2.1.7 Font attributes are applied per requirements.

2.1.8 Design and colour are applied per requirements.

2.1.9 Design is saved in appropriate file format

2.2 Create Outline and transfer.

2.2.1 Design is reviewed and finalized

2.2.2 Outline is created and grouped

2.2.3 Outline is created and grouped

2.2.4 Final design is saved in appropriate file format

2.2.5 Final design is transferred to the recipients

2.3 Develop conceptual skills and ideas

2.3.1 Working with others to develop basic design ideas is demonstrated.

2.3.2 Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.

2.3.3 A range of opportunities to develop own practice and keep informed about current design practice are identified and used for basic design guidelines.

2.4 Evaluate own work

2.4.1 Constructive criticism from others is applied to improve own work.

2.4.2 Own work is evaluated against planned strategy for own practice.

2.4.3 Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

3. Manipulate image using image processing Software

3.1 Retouch Image.

3.1.1 Appropriate retouch tools are identified

3.1.2 Tools are calibrated as required

3.1.3 Layers are created and preserved

3.1.4 Different retouch tools are used as per requirement

3.1.5 Images are corrected and saved in appropriate file format

3.2 Colour Correction

3.2.1 Different colour correction methods are identified

3.2.2 Appropriate image mode is selected

3.2.3 Various colour correction methods are used

3.2.4 Compare image enhancement with the original one

3.2.5 Save in appropriate file format

3.2.6 Transfer the image to recipient

3.3 Apply Effect

3.3.1 Identify appropriate effect options

3.3.2 Proper image mode is selected

3.3.3 Different Effects are applied to images as per requirements

3.3.4 Compare and adjust effects

3.3.5 Save in appropriate file format

3.3.6 Transfer the image to recipient

3.4 Evaluate own work

3.4.1 Constructive criticism from others is applied to improve own work

3.4.2 Own work is evaluated against planned strategy for own practice

3.4.3 Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

4. Create professional designs using Illustration software.

4.1 Prepare design

4.1.1 Required Professional Design works are selected.

4.1.2 Appropriate Tools, Palette and arrange them as needed are identified.

4.1.3 Ruler/unit/Grids/Guides/Smart Guides as per requirement are set

4.1.4 Key Drawing / Design Layout are prepared

4.1.5 Various Marks.

4.1.6 Layer lock is applied

4.2 Create Design

4.2.1 Insert Contents are inserted.

4.2.2 Colour/Design/Pattern is applied.

4.2.3 Pathfinder to create complex Objects are used

4.2.4 Font Attributes as per requirement Applied

4.2.5 Zoom In-Out and Panning are used

4.2.6 Design for further use is Saved

4.3 Review and Finalize

4.3.1 Artwork and Preview is used

4.3.2 Layer Hide-Unhide option is used

4.3.3 Outline and Group Created

4.3.4 Appropriate File Format Saved

4.3.5 The image to recipient Transferred

REFERENCE BOOKS

1. Adobe Photoshop CC Classroom in a Book- Andrew Faulkner, Conrad Chavez
2. http://www.fcekg.com/downloads/illustrator.pdf
3. CBLM ITGD1010A1 Separate and compose Images.
4. CBLM ITGD1011A1 Create basic designs using illustration software.
5. http://www.mediafire.com/file/bvqp3vai01teb1n/Photoshop+e-book.pdf

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

66664 Database Management System

T	P	C
2	3	3

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
www.docs.oracle.com

69452 Telecom Measuring &Equipments Testing

T	P	C
3	3	4

AIMS

To provides the students with an opportunity to develop knowledge, skill and attitude in the area of Telecom measuring and testing equipment with the special emphasis on:

- Qualities of Measurements
- Analog and digital meters
- Voltmeters
- Digital display system
- Digital instruments
- Oscilloscope
- Special types of measuring Instruments
- Signal Generator
- Wave Analyzer and Recorders
- Special types of Testing Equipments
- Measurement of Sound and data Acquisition system

DETAIL DESCRIPTION

Theory

1. Understand qualities of measurements

1.1 Define the term measuring instruments.
1.2 Explain the static Characteristics with classifications.
1.3 Discuss the static errors.
1.4 State the Dynamic Characteristics.
1.5 Describe the different types of error in measurements with problem solutions
1.6 Explain the source of errors.
1.7 Define the factors validity, reliability, repeatability, accuracy, precision and resolution etc.

Understand the basic features of Analog and digital meters

2.1 Mention the different types of analog measuring instruments.
2.2 Describe the working principles of permanent magnet moving coil (PMMC) instruments.
2.3 Describe the working principles of permanent magnet moving Iron instruments.
2.4 Describe the operation of multi meter (AVO meter).
2.5 Describe the operation of digital multi meter.
2.6 Describe the operation of Clip on meter.
2.7 State the operation of electronic counter.
2.8 State the operation of digital frequency meter (Microwave range).
2.9 Explain the extension of range for Ammeter and Voltmeters.
2.10 Solve the problems on range extension for Ammeter and Voltmeters.

3. Understand the basic features of Voltmeter

3.1 Describe the basic principle of D.C Voltmeter.
3.2 Describe the operation of multi range Voltmeter.
3.3 Describe the operation of Transistor Voltmeter (TVM).
3.4 Describe the operation of differential Voltmeter.
3.5 Describe the operation of AC milli voltmeter with block diagram.

4 Understand the features of digital display system.

4.1 Mention the different types of digital display system.
4.2 Describe the construction of Liquid Crystal Display.
4.3 Describe the construction of Light Emitting Diode.
4.4 Explain the function of multi digit display system.
4.5 Describe the construction of Segmental displays using LEDs.
4.6 Explain the function of Dot matrix and LASER displays.
4.7 Describe the construction of Liquid vapour display (LVD).

5. Understand the features of Oscilloscope

5.1 State the basic principles Cathode Ray Tube (CRT).
5.2 Explain the function of Block diagram of Oscilloscope.
5.3 Explain the function of Dual Beam CRO and Dual trace Oscilloscope.
5.4 Describe the block diagram and function of the Digital Storage Oscilloscope (DSO).
5.5 Explain the measurement procedure of voltage by the Oscilloscope.
5.6 Explain the measurement procedure of Frequency and phase angle by Lissajous Method.
5.7 Describe function of the different types of probes.

6. Understand the features of special types of measuring Instruments

6.1 Describe the construction and operations of the Megger.
6.2 Explain the pH measurements using Hydrogen Electrodes.
6.3 Describe the construction and operations of the RX meter.
6.4 Describe the construction and operations of the Q meter.
6.5 Explain the measurement of characteristic impedance (Zo) of a transmission line using Q meter.
6.6 Describe the construction of LCR Bridge (Skeleton type).
6.7 Describe the basic principles of VSWR meter.
6.8 State the operation of Transistor tester and IC tester.

7. Understand the features of Signal Generator

7.1 Describe the construction and operations of the Conventional standard Signal Generator.
7.2 State the operation of AF sine and Square wave Signal Generator.
7.3 Describe the construction and operations of the Function Generator.
7.4 State the Block diagram and the function of a pulse Generator.
7.5 State the Block diagram of the Wobbluscope.

8. Understand the features of Wave Analyzer and Recorders

8.1 Describe the operations of the basic wave analyzer.
8.2 Describe the construction and operations of the Frequency Selective wave analyzer.
8.3 Describe the construction and operations of the RF heterodyne wave analyzer.
8.4 Describe the construction and operations of the RF Spectrum wave analyzer.
8.5 Describe the construction and operations of the basic strip chart Recorder.
8.6 Describe the construction and operations of the Potentiometric Recorder.
8.7 State the Block diagram and the function of X- Y Recorder.
8.8 State the basic components of a tape recorder and Magnetic Recording.

9. Understand the features of special testing equipments

9.1 Describe the construction and operations of the Bit Error Rate (BER) meter.
9.2 Describe the construction and operations of the Mobile /Cellular Test set.
9.3 List the common faults occurring in mobile set and its Remedy.
9.4 Describe the operations of Pulse Code Modulation (PCM) Analyzer.

9.5 Describe the operations of Optical Signal Generator (Optical Source) meter.
9.6 Describe the operations of Optical Signal measurement (Optical Power) meter.
9.7 Describe the operations of Wireshark for network analyzing.

10. Understand the Measurement of sound and Data acquisition systems

10.1 Describe the measuring process of sound using Microphones.
10.2 Describe the Measurements of thickness using ultrasonic Vibrations.
10.3 Explain the process of generalized data acquisition systems.
10.4 List the components of data acquisition systems.
10.5 Describe the digital data recording system using Analog/Digital Recorder.

PRACTICAL

1 Perform the measurement of voltage, Time period and frequency using a Cathode Ray Oscilloscope (CRO)

1.1 Select a Cathode Ray Oscilloscope (CRO) with circuit diagram and required tools & materials
1.2 Observe the current Wave and measure the current
1.3 Observe the frequency wave
1.4 Prepare the report

2 Perform the measurement of the Frequency using Digital Frequency Counter.

2.1 Select a Digital Frequency Counter with circuit diagram and required tools & materials
2.2 Connect the equipments through the Electric Line
2.3 Observe the required frequency
2.4 Prepare the report

3 Perform the Operation of a Function Generator.

3.1 Select a Function Generator with circuit diagram and required tools & materials
3.2 Connect the equipments through the Electric Line
3.3 Select proper channel
3.4 Observe the generated frequency
3.5 Prepare the report

4 Perform the measurement of the Resistance, Inductance and Capacitance using RLC Bridge.

4.1 Select a RLC Bridge with circuit diagram and required tools & materials
4.2 Connect the equipments through the Resistance, Inductance and Capacitance
4.3 Adjust the bridge properly
4.4 Observe the Resistance, Inductance and Capacitance
4.5 Prepare the report

5 Perform the measurement of optical fiber power with Optical Power meter.

5.1 Select a Optical Power meter and required tools
5.2 Connect the Optical Power meter through the line connecting Optical fiber
5.3 Select the proper wave length (850 nm or 1310nm)
5.4 Then observe the dBm power of the cable
5.5 Prepare the report

6 Observe the operation of a Digital Display Unit.

6.1 Select a Digital Display Unit and required tools

6.2 Connect the equipments through the Electric Line

6.3 Observe the display system

6.4 Prepare the report

7 Perform the measurement of the separate Resistive and Reactive components by RX meter.

7.1 Select a RX meter with circuit diagram and required tools & materials

7.2 Connect the equipments through the Resistance, Inductance or Capacitance

7.3 Observe the meter

7.4 Observe the Resistance and Reactive components of the Inductance or Capacitance

7.5 Prepare the report

8 Perform the operation of Insulation Tester.

8.1Select a Insulation Tester with circuit diagram and required tools & materials

8.2Connect the equipments through the Cable conductor and insulator

8.3Observe the meter

8.4Observe the Insulation Resistance

8.5Prepare the report

9 Perform the operation of the Mobile /Cellular Test set.

9.1 Select a Mobile /Cellular Test set

9.2 Connect the equipments through the Mobile Trainer

9.3 Observe the operation of the Mobile /Cellular Test set

9.4 Prepare the report

10 Observe the operation of the Wave Analyzer.

10.1 Select a Wave analyzer and required tools

10.2 Connect the equipments through the Electric Line

10.3 Observe the analyzing system

10.4 Prepare the report

11 Observe the operation of the Jperf.

11.1 Download and setup the jperf software in computer

11.2 Connect the two Computers through the LAN cable

11.3 Set the Computer as a server and client

11.4 Measure the Bandwidth, Packet loss, delay and jitter of the line

11.5 Prepare the report

REFERENCE BOOKS:

1 Electronic Instrumentation - Second Edition, HS kalsi

2 Electrical and Electronic Measurements and Instrumentation - A K Sawhney

3 Mechanical and Industrial Measurement - R K Jain

69054 Environmental Studies

T	P	C
2	0	2

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, Sauders golden sunburst series.

65851 Accounting Theory & Practice

T	P	C
2	3	3

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

4. হিসাবরক্ষণ ও হিসাববিজ্ঞান - পরেশ মণ্ডল

5. উচ্চ মাধ্যমিক হিসাববিজ্ঞান - হক ও হোসাইন

6. আয়কর - ড. মনজুর মোরশেদ