Course 105: Data Manipulation and Analysis (DMA)

Course Code:	**105**
Course Title:	**Data Manipulation and Analysis**
Credit:	4
Nature of Subject:	Theory and Practical Application
Teaching per Week	4 Hours
Minimum weeks per Semester:	15 (Including Class work, examination, preparation etc.)
Review / Revision:	June, 2020
Purpose of Course:	Understand concepts of Data and storage of data. This course is aimed to impart knowledge about storing data, concepts of database, retrieval of data and manipulation of data. It is aimed to cover effective storage of data, statistical analysis of data and graphical presentation of data. It also covers concepts of database and fundamental of query languages to insert, access, and manipulate data. This course is not spreadsheet or database specific.
Course Objective:	i) Concepts of data, data storage and statistical manipulation of data. ii) Introduction of spreadsheet and data manipulation using spreadsheet. iii) Concepts of database, storage and manipulation of data using query language.
Pre-requisite:	Concepts of data.
Course Outcome:	Students will be proficiently working on data manipulation using spreadsheet, fundamentals of database and handling database using query language using SQL.
Course Content:	**UNIT-1: Concepts of worksheet: (Max.Weightage: 15%)** 1.1 Fundamentals of Worksheet: 1.1.1 Concepts of workbook, adding worksheet, cell address, formula bar, column, rows, cells, Insert, delete, format cells , cell size (row-height, column weight), rename sheet, protect sheet, lock cell. 1.1.2 Cut, copy, paste, paste special, format painter, font size, font face, fill color, font color, font alignment 1.2 Alignment, indent, Number format, percent style, coma style, increase/decrease decimal 1.2.1 Insert picture, shapes 1.2.2 Insert Textbox, Header & Footer, Symbols 1.2.3 Save, save as, save file as csv, spell check, protect sheet and Workbook, Linking spread sheets. 1.2.4 Print, Quick print, Print preview 1.2.5 Split, Hide and freeze panes in worksheet. **UNIT-2: Formulas, Chart and Data: (Max.Weightage: 15%)** 2.1 Charts : 2.1.1 Creating 2D and 3D charts (Columns, Line, Pie, Bar, Scatter) 2.1.2 Difference among columns, Line and bar charts. 2.2 Formulas: 2.2.1 sum, average, count, max, min, sumif, pmt, stddev 2.2.2 Logical (if, AND, OR, NOT, TRUE, FALSE) 2.2.3 Date and Day function : Date, day, time, now, Hour, Minute, Second, Month, Days360, weekday 2.3 Data : 2.3.1 Sort Data, Filter Data 2.3.2 Text to columns, Remove Duplication 2.3.3 Consolidated Data (sum, count, max, min, average) **UNIT-3: Concepts of Database: (Max.Weightage: 25%)** 3.1 Database characteristics: 3.1.1 Data Independence (Logical and Physical) 3.1.2 Components of Database (User, Application , DBMS, Database) 3.1.3 Database Architecture (1-tier, 2-tier, 3-tier) 3.1.3.1 Comparison, advantages and disadvantages.

	3.2 Database Models (Hierarchical, Network, E/R, Relational) 3.2.1 E/R model : Entity, Relationship, Attribute 3.2.2 E/R Diagram : One to one, one to many , many to one, many to many 3.2.3 Strong entity, weak entity 3.2.4 key attribute, derived attribute, Multi-valued attribute 3.3 Types of keys : 3.3.1 Super key, candidate key, Primary key, Composite key, Foreign key, Unique key. **UNIT-4: Normalization and Concepts of SQL: (Max.Weightage: 25%)** 4.1 Why normalization (Insertion, Updating, Deletion anomalies) 4.2 Normalization Rules: 4.2.1 Concepts of Dependency, Transitive Dependency 4.2.2 Armstrong Axioms 4.2.3 1st Normal Form, 2nd Normal Form, 3rd Normal Form, B.C.N.F. 4.3 Concepts of Structure Query Language (SQL) 4.3.1 SQL datatypes : int, float, double, char, varchar, number, varchar2, Text, date 4.4 DDL Statements : 4.4.1 Create , Drop, Truncate, Rename, Alter 4.5 DML and DQL(Data Query Language) Statements : 4.5.1 Insert, Update, Delete 4.5.2 select **UNIT-5: Queries (Single Table only) (Max.Weightage: 20%)** 5.1 Using where clause and operators with where clause: 5.1.1 In, between , like, not in, =, !=, >, <, >=, <=, wildcard operators 5.1.2 Order by, Group by, Distinct 5.1.3 AND, OR operators, Exists and not Exists 5.1.4 Use of Alias 5.2 Constraints (Table level and Attribute Level) 5.2.1 NOT NULL, CHECK, DEFAULT 5.2.2 UNIQUE, Primary Key, Foreign Key 5.2.3 On Delete Cascade 5.3 SQL Functions : 5.3.1 Aggregate Functions: avg(), max(), min(), sum(), count(), first(), last(). 5.3.2 Scalar Functions: ucase(), lcase(), round(), mid(). 5.4 Creating sequence 5.5 Views : 5.5.1 Creating simple view, updating view, dropping view. 5.5.2 Difference between View and Table.
References :	1. OpenOffice.org For Dummies - Gurdy Leete, Ellen Finkelstein, Mary Leete - Wiley Pub. 2. Beginning OpenOffice 3: From Novice to Professional - Andy Channellle - Apress Pub. 3. The OpenOffice.org 2 Guidebook - Solveig Haugland 4. Taming Apache OpenOffice: Getting Started - Jean Hollis Weber - Friends of OpenDocument Inc. 5. Open Office Basic: An Introduction - James Steinberg - Gold Turtle Pub. 6. Database System Concepts: – Henry F. Korth & Abrahim Silberschatz – McGraw Hill Education 7. Introduction to Database Management System– Bipin C. Desai – Galgotia Publication 8. Principles of database systems – Jeffery Ullman – Galgotia Publication 9. An introduction to Database Systems – C. J. Date – Addison Wesley 10. Introduction to database Management – Navin Prakash -TMH 11. Learn Open Office 3.1 Base – AZIMUTH 12. OpenOffice 3.4 Volume III: Base-Christopher N. Cain, Riley W. Walker-

	Quantum Scientific Publishing 13. Discovering SQL-A Hands-on Guide for Beginner-Alex KriegelWrox Publication 14. A Conceptual Guide to OpenOffice.org 3-R. Gabriel Gurley (Free E-book)
Teaching Methodology:	Class Work, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method:	30% Internal assessment. 70% External assessment.