

COURSE CODE	COURSE TITLE	L	T	P	C
1152CS130	INTRODUCTION TO MAINFRAMES	3	0	0	3

**Course Category: Program Elective**

**A. Preamble:**

To learn the best practices for designing applications using Mainframe Technology

**B. Prerequisite Courses:**

Sl. No	Course Code	Course Name
1	1151CS103	Programming in Java
2	1151CS117	Java Programming
3	1151CS302	Java Programming Lab
4	1151CS107	Database Management System

**C. Related Courses:**

Sl. No	Course Code	Course Name
1	1156CS601	Minor Project
2	1156CS701	Major Project

**D. Course Educational Objectives:**

Students undergoing this course are expected

- To understand the importance of Legacy System.
- To role of Mainframes in infrastructure of a medium to large IT organization.
- To understand the different components of Mainframe Technology.

**E. Course Outcomes**

Students undergoing this course are able to:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
CO1	Discuss Mainframes hardware systems. Operating systems and its functions.	K2
CO2	Describe Z-operating system and Virtual Storage.	K2
CO3	Explain the need of Job Control Language Statement and Procedures on Job Processing.	K2
CO4	Develop applications using COBOL Programming	K3
CO5	Develop Mainframe applications using COBOL-DB2 programming.	K3

### F. Correlation of COs with Programme Outcomes:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	H	M											L		
CO2	M														
CO3	M	M	L	L	M						L		L	M	M
CO4		M	M	L	H			L			M			M	M
CO5	L	M	M	L	H			L			M			M	M

H- Strong; M-Medium; L-Low

### G. Course Content:

#### Unit I Evolution of Mainframe hardware, Mainframes OS and Terminology 9

Overview of Computer Architecture -Classification of Computers - micro, mini, mainframes and super computer - Mainframe computer - key features - benefits - Evolution of Mainframes - Different hardware systems. Operating systems on mainframes, Batch processing vs. online processing - mainframe operating system. - evolution - concepts of Address space, Buffer management - Virtual storage - paging - swapping - Dataset management in mainframes

#### Unit II z/OS and its features 9

Z-operating system (Z/OS) - Virtual storage - Paging process - storage Managers - Program execution modes - Address space - Multiple virtual system(MVS) , MVS address space, Z/OS address space - Dataset - sequential and partial dataset - Direct access storage device(DASD) -Access methods - Record formats - Introduction to virtual storage access methods(VSAM) - Catalog – VTOC

#### Unit III Introduction to JCL 9

Introduction to Job Control language - Job processing - structure of JCL statements - Various statements in JCL - JOB statement - EXEC statement - DD statement - JCL procedures and IBM utility programs.

#### Unit IV COBOL Programming 9

Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL. Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet. Data division – Data names, level numbers, PIC and VALUE clause, REDEFINES, RENAME and USAGE clause. Procedure Division – Input / Output verbs, INITIALIZE verb, data movement verbs, arithmetic verbs, sequence control verbs. File processing – Field, physical / logical records, file, file organization (sequential, indexed and relative) and access mode, FILE-CONTROL paragraph, FILE SECTION, file operations. File handling verbs – OPEN, READ, WRITE, REWRITE, CLOSE. Table processing – Definition, declaration, accessing elements, subscript and index, SET statement, SEARCH verb, SEARCH ALL verb, comparison. Miscellaneous verbs – COPY, CALL, SORT, MERGE, STRING, UNSTRING verbs.

## **Unit V Overview of DB2 and Mainframe Application Development Guidelines 9**

Introduction to DB2 – System Service component, Database Service component, Locking Service component, Distributed Data Facility Services component, Stored Procedure component, catalogs and optimizer. DB2 Objects and Data Types - DB2 Objects Hierarchy, Storage groups, Database, Table space, Table, Index, Clustered index, Synonyms and aliases, Views, Data Types. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, SPUFI utility. Embedded SQL programming – Host variable, DECLGEN utility, SQLCA, single/multiple row manipulation, cursors, scrollable cursors. COBOL coding standards, relation between a COBOL file handling program and JCL, Different types of ABEND codes, COBOL-DB2 program pre-compilation, DBRM (Database Request Module), Application plan/packages, program execution methods (EDIT JCL, foreground and background modes).

**Total: 45 Hours**

### **H. Learning Resources**

#### **i) Text Books**

1. Doug Lowe, “MVS JCL “, Mike Murach and Associates Inc, 2nd edition, 1994.
2. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley India Dream Tech, 2002.

#### **ii) Reference Books**

1. COBOL - Language Reference, Ver 3, Release 2, IBM Redbook.
2. COBOL - Programming Guide, Ver 3, Release 2, IBM Redbook.
3. Nancy Stern & Robert A Stern, “Structured Cobol Programming”, John Wiley & Sons, New York, 1973.
4. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, New York, 1973.
5. Newcomer and Lawrence, Programming with Structured COBOL, McGraw Hill Books, New York, 1973.
6. Craig S Mullins, DB2 Developer’s Guide, Sams Publishing, 1992.
7. Gabrielle Wiorowski & David Kull, DB2 Design & Development Guide, Addison Wesley, 1992.
8. C J Date & Colin J White, A Guide to DB2, Addison Wesley.
9. IBM Manual: DB2 Application Programming and SQL guide.

#### **iii) WEB REFERENCES**

1. <http://www-1.ibm.com/support/docview.wss?uid=pub1sa22759706>
2. [http://publibz.boulder.ibm.com/cgi-bin/bookmgr\\_OS390/BOOKS/iea2b600/CONTENT S](http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/iea2b600/CONTENT S)
3. <http://publib.boulder.ibm.com/infocenter/db2v7luw/index.jsp>