

# COBOL Application Development for

-  **System Programmers**
-  **System-Related Staff**

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## **1 Training Module Objectives**

Upon completion of this module participants will know about the origins and importance of the COBOL programming language. They will be able to independently develop and test programmes within a mainframe environment using the programming language COBOL.

A skilful handling of TSO/ISPF will be required. TSO/ISPF is also one of the EMA blended learning module and can be booked as a package deal together with the COBOL module.

Further requirements are a good knowledge of programming logic and of algorithms. Participants already know how to programme and have some practical experience of at least one other programming language.

## **2 Information on EMA Blended Learning**

There are two groups of training modules: mandatory and elective ones. Mandatory subjects are relevant for examination. Hence, in order to receive a certificate at the end of the training module, there has to be sufficient command of the knowledge imparted to be evaluated in tests, examinations and practical work.

Elective subjects can be studied on a voluntary basis and of course there will be qualified staff to answer corresponding questions. The average study workload for mandatory subjects is about ten hours a week, amounting to about 140 hours for a three-month module:

- Presence workshops ca. 15 hours
- Virtual classroom ca. 25 hours
- E-Learning ca. 60 hours
- Exercises ca. 40 hours

## **3 Content**

Below the individual modules are described in detail. Numbers in brackets relate to the average amount of time needed for study.

### **3.1 Kick-off Workshop (1 day)**

#### **Presence Workshop**

This one-day workshop serves as the basis for a successful cooperation during the entire training period. Depending on the participants' country of origin it takes place in Germany, Switzerland or Austria.

**Duration**        **1 day**

**Date**            **TBA**

**Place**            **TBD**

#### **Workshop Objectives**

The presence workshop aims at three things:

- Participants and key-lecturers
- Participants get to know the most important e-learning tools, especially the virtual classroom.
- Participants get an initial overview of the seminar content.

#### **Content**

##### **Introduction**

Introducing participants  
Introduction to the topic

##### **Learning Efficiency**

Learning and neurobiology research  
Efficient learning

##### **E-Learning & Blended Learning**

Significance of e-learning  
Advantages of Blended Learning  
Integration of Web 2.0  
Overview e-learning tools

##### **Moodle Learning Platform**

Learning platform overview  
Structure of learning platform

##### **Virtual Classroom**

VC-Session objectives  
How VC differs from traditional classrooms  
Using the virtual classroom

##### **Access to the Mainframe**

EMA infrastructure  
Accessing the IBM Computer

##### **COBOL History and Background**

How COBOL was developed  
Significance of COBOL  
Comparison with other languages  
COBOL on the EMA-System under z/OS

##### **Basic Structure and COBOL Programme Structure**

Divisions, Sections, Paragraphs, Sentences  
Hello World with COBOL

### **3.2 COBOL Data Declarations and Programme Constructs (ca. xx hours)**

#### **Sub-Module Objectives**

Participants will know the basic structure of the COBOL Programme. They know how to define variables literals and constants, and they know the essential data types in COBOL. They know how to deal with the programme constructs in COBOL and they know the opportunities for applying selections und iterations.

#### **Content**

##### **Review COBOL Basic Structure**

Divisions, sections, paragraphs, sentences and statements

##### **Data Declaration in COBOL (Basics)**

Variables, literals and constants  
Data types  
Picture clause

##### **Programme Constructs**

Simple in/outputs in COBOL  
Assignments with MOVE  
Arithmetic in COBOL

##### **Control Structures**

Selection in COBOL  
Iterations with COBOL

### **3.3 Handling of Files and Extended Declarations (ca. xx hours)**

#### **Sub-Module Objectives**

Participants already know the possibilities to access sequential data. They know how to effectively use extended declarations. They know the possibilities VSAM offers, especially the processing of indexed-sequential file formats. They know how to create tables and search table content by programming. They identify and make use of the advantages in structuring programmes and they can integrate internal and external subroutines.

#### **Content**

##### **Handling Sequential Files**

Introduction to sequential files  
Processing sequential data files

##### **Data Declaration in COBOL (Advanced)**

Edited pictures  
USAGE clause  
Writing into sequential files

##### **Direct and Indexed File Access**

Introduction to VSAM  
Handling KSDS and RRDS Files

##### **Tables**

Handling tables  
Creating tables  
Searching in tables

##### **Structured Programming**

Handling subroutines (internal / external)

### **3.4 COBOL and the Access to DB2 Database (ca. xx hours)**

#### **Sub-Module Objectives**

Participants can describe the most essential DB2 for z/OS key functions in connection with applications. They know the SQL basics and are able to set up a database environment interactively with SPUFI. They are able to access, retrieve and change DB2 data using COBOL programmes.

#### **Content**

##### **DB2 Database Applications**

Introduction to DB2

##### **Introduction to SQL**

Historical development

SQL Syntax

SELECT, INSERT, UPDATE, DELETE

##### **Interactive SQL**

Handling and using DB2I

SQL Processing Using File Input (SPUFI)

RDBMS interfaces

Static vs. dynamic SQL

Embedded SQL

##### **Embedded SQL in COBOL**

DB2 API for COBOL Programme

EXEC SQL and END-EXEC

Host variables in SQL statements

Host structures in COBOL

Handling DCLGEN

Preparing DB2 applications  
(precompile, bind, compile)

Executing DB2 applications

##### **Stored Procedures**

Stored procedures concepts

SPs definition and execution

### **3.5 COBOL and Transactions with CICS (ca. xx hours)**

#### **Sub-Module Objectives**

Participants will know how to plan and create CICS transactions using COBOL Programmes CICS. They are able to access DB2 databases with CICS transactions.

#### **Content**

##### **Transaction Monitors**

What are Transaction Monitors?  
Market survey

##### **Customer Information Control System (CICS)**

Significance of CICS  
CICS under z/OS  
CICS components  
CICS internal transaction  
Resource definitions

##### **CICS Applications**

Applications and CICS  
Basic mapping support  
CICS and COBOL  
CICS programme preparation  
Test and debug

##### **CICS und DB2**

CICS-DB2 interfaces  
Working with databases



### **3.6 Final Workshop (1 day)**

#### **Presence Workshop**

During this one-day workshop we summarize results and answer open questions.

**Duration**      **1 day**

**Date**            **TBA**

**Location**      **TBD**

#### **Workshop Objectives**

- Essential subjects and focal points are summarised.
- Participants answer comprehension questions asked by coaches / instructors in order to determine the current state of knowledge.
- Participants ask questions that came up during training.