TATA CONSULTANCY SERVICES

Experience certainty. IT Services
Business Solutions
Outsourcing

TATA

Pre-Initial Learning Program

Version 1.1

Course Plan, July, 2009

Phase II

1 Pre-ILP Schedule and Curriculum

The Pre-ILP phase enables the participants to learn about the basics of Computers, Programming, Software Engineering, Web Technologies and Relational Database Management Systems.

Table 1: Pre-ILP Schedule

		Week1	Week2-Week6	Week7-Week 8	Week9 – Week 11	Week12
Pre-ILP						
	Basics of Computers	🟦				
	Basics of Programming		🟧			
	Software Engineering and Database Concepts			🟧		
	Web Technologies Exercises				🟨	
	Databases – SQL and Exercises					🟨

Towards the end of Pre-ILP, the participants should be able to

a) Find solutions for any given problem using programming concepts.

b) Solve computational logic and record processing problems in C.

c) Write simple queries to access data from multiple tables in a database

d) Design web pages and build websites with images, text content, forms and basic validations using CSS, Java script , HTML and XML

e) Understand Software Engineering, Operating Systems and Data Structures

Participants are expected to follow the timelines as per the phases mentioned in the following sections.

1.1 Pre-ILP Phase II

The objective of this course is to introduce the programming concepts and software engineering to all participants. This includes details on the various programming constructs and software process and software modelling.

1.1.1 Basics of Programming

Participants are expected to read and understand the basics of programming including variables, strings and control statements and loops.

The content available at the following sites provides an overview of the basics of programming:

- http://www.programmingbasics.org/
- http://ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/index.htm

  (Course numbers 6.00, 6.001, 6.004, 6.006)

1.1.2 Programming Concepts

Participants are expected to read and understand all the basic programming concepts available at:

- http://greenteapress.com/thinkapjava/thinkapjava.pdf

Read the following chapters from the above link:

- Chapter 1 - The way of the program
- Chapter 2 - Variables and types
- Chapter 3 - Methods
- Chapter 4 - Conditionals and recursion
- Chapter 5 - Fruitful methods
- Chapter 6 - Iteration
- Chapter 7 - Strings and things
- Chapter 8 - Interesting objects
- Chapter 9 - Create your own objects
- Chapter 10 - Arrays
- Chapter 11 - Arrays of Objects

- The Practice of Programming by Brian W. Kernighan and Rob Pike
  - Chapter 1 - Style
  - Chapter 2 - Algorithms and Data Structures
  - Chapter 3 - Design and Implementation
  - Chapter 4 - Interfaces
  - Chapter 5 - Debugging
  - Chapter 6 - Testing
  - Chapter 7 - Performance
  - Chapter 8 - Portability
  - Chapter 9 - Notation

- Essentials of Programming Languages by Daniel P. Friedman, Mitchell Wand. 3rd ed. MIT Press, c2008.
  - Chapter 1 - Inductive Sets of Data
  - Chapter 2 - Data Abstraction
  - Chapter 3 - Expressions
  - Chapter 4 - State
  - Chapter 5 - Continuation-Passing Interpreters
  - Chapter 6 - Continuation-Passing Style
  - Chapter 7 - Types
  - Chapter 8 - Modules
  - Chapter 9 - Objects and Classes

1.1.3 C Programming

Refer to the following book and work out all the exercises associated with the below mentioned chapters

- C Programming Language, 2/E Brian W. Kernighan, Dennis Ritchie
    - Chapter 1 - A Tutorial Introduction
    - Chapter 2 - Types, Operators, and Expressions
    - Chapter 3 - Control Flow
    - Chapter 4 - Functions and Program Structure
    - Chapter 5 - Pointers and Arrays
    - Chapter 6 - Structures
    - Chapter 7 - Input and Output

1.1.4 Software Engineering

Participants are expected to read and understand the approach to Software Engineering from one of the books and chapters listed below.

- Software Engineering: A Practitioner's Approach - Roger S Pressman – Sixth Edition
    - Introduction to Software Engineering
    - Part One – The Software Process
        - Generic view of process
        - Process models
    - Part Two – Modelling
        - Software Engineering Practice
        - System Engineering
        - Requirements Engineering
        - Building the Analysis Model
        - Design Engineering
        - Creating and Architectural Design
        - Modelling Component Level Design
        - Performing User Interface Design
        - Testing Strategies
        - Testing Tactics
    - Part Four – Managing Software Projects
        - Project Management
        - Quality Management
        - Change Management

- Software Engineering: A Practitioner's Approach - Roger S Pressman – Fourth Edition (Use this edition if the sixth edition is not available)
    - Part 1 – Products and Processes (Chapters 1 and 2)
    - Part 2 – Managing Software Projects (Chapters 3, 8 and 9)
    - Part 3 – Conventional Methods of Software Engineering (Chapters 10, 11, 12, 13, 14, 16, 17, 20)

Participants are expected to summarize the learning on Software engineering by reading the notes (http://www.scribd.com/doc/8286615/Software-Engginering-Roger-Pressman)

1.1.5 Database Concepts

Participants are expected to gain an understanding of Relational Databases and develop the ability to write Structured Query Language (SQL) – Data Definition Language (DDL) and Data Modification Language (DML).

Participants are expected to read and understand the mentioned chapters in the following books:

- Database System Concepts, Fifth Edition by Silberschatz, Henry F Korth
    - Chapter 1 - Introduction
    - Chapter 2 - Relational Model
    - Chapter 3 - SQL
    - Chapter 4 - Advanced SQL
    - Chapter 6 - Integrity Constraints
    - Chapter 7 - Relational Database Design
    - Chapter 11 - Indexing and Hashing
    - Chapter 12 - Query Processing
    - Chapter 13 - Transaction Processing
    - Chapter 14 - Concurrency Control

- Introduction to Database Systems, 7 edition CJ Date
    - Part I - Preliminaries
        - Chapter 1 - An Overview of Database Management
        - Chapter 2 - Database System Architecture
        - Chapter 3 - An Introduction to Relational Databases
        - Chapter 4 - An Introduction to SQL
    - Part II - The Relational Model
        - Chapter 5 - Types
        - Chapter 6 - Relations

- Chapter 7 - Relational Algebra
- Chapter 8 - Relational Calculus
- Chapter 9 - Integrity
- Chapter 10 - Views

1.1.6 Phase II Learning Schedule

Participants are expected to learn:

- Basics of Programming, Programming Concepts and C Programming between Week 2 – Week 6 of the Pre-ILP phase
- Software Engineering and Database Concepts between Week 7 – Week 8 of the Pre-ILP phase

TATA CONSULTANCY SERVICES

www.tcs.com