**Program: BIG DATA and Database Management**

Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.

**Program Objective:** This program is designed to prepare students for Database Management/Big Data Development related positions, such as Information Systems Manager, Management Information Systems Director (MIS Director), Database Administrator (DBA), Database Analyst, and Database Programmer. This comprehensive program covers database modeling (ERD), creating and managing databases (Oracle, Microsoft SQL Server, My SQL, Apache Hadoop platform) to deploy the relational databases, and No SQL database like: MongoDB, Cassandra, HBase Redis cache and ETL processing using: Big Data and Data Warehousing solutions. This program also provides hands on experience on Apache Spark, Pig, Hive, Hue, Zookeeper, HBase and Ganglia. This program has many other courses/ modules covering Business Analysis (BA), Service Oriented Architecture (SOA), Linux, AWS EMR, Data Analytics, Excel Solver, Linear programming, Model development, AWScloud Web Services, Java, and Python (NumPy, Pandas, Machine Learning Analytics Algorithm) programming concepts. The program includes ample labs, quizzes, group discussions/ exercises, project work and internal/ external internship opportunities.

**Admission Requirements:**

* GED Credit or high School credit or college Diploma
* Basic English Communication Skill
* Basic Computer Skills with prior Computer Experience
* Apply for the program enrollment before the enrollment date
* Provide application supporting data: Driver License, Transcript, Experience Letter, Recommendation Letter
* Pay the program cost or provide Training cost voucher

**Material:** Textbook, Instructor Notes, Source code for projects.

**Evaluation:**

* Evaluation of project completed in the classroom, 40%
* Home assignments 20%
* Project 40%

**Length of Program / Program Duration:** 48 Weeks/ 480 Hours (10 hrs. per week - Theory/Labs/Practice/ In-Class and Simulation Exam)

**Fees Structure:**

* Tuition – $8000
* Books – $400
* Certifications/Tests – $1200(Linux, Oracle, AWS)
* Other Expenses – $400 (Tools, Software, and Lab Work)

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| **Institutional Calendar (Program Start and End Date):** |
| **Quarter** | **Dates** | **Events** |
| **Fall 2020** | Wednesday, September 30 | Fall Quarter Begins |
| Thursday, November 26 | Thanksgiving Break |
| Saturday, December 12 | Program Completion Celebration |
| Friday, December 11 | Fall Quarter Ends |
| Monday, December 14 – Saturday, December 26 | Program / Course Evaluations |
|   |   |   |
| **Winter 2020** | Monday, January 6 | Winter Quarter Begins - Program Orientation Day |
| Monday, January 20 | Martin Luther King, Jr. Day |
| Friday, March 20 | Winter Quarter Ends |
|   |   |   |
| **Spring 2020** | Monday, March 30 | Spring Quarter Begins |
| Monday, May 25 | Memorial Day |
| Saturday, June 06 | Program Completion Celebration |
| Friday, June 12 | Spring Quarter Ends |
| Monday, June 15 – | Program / Course Evaluations |
| Friday, June 19 |
|   |   |   |
| **Summer 2020** | Monday, June 22 | Summer Quarter Begins - Program Orientation Day |
| Saturday, July 4 | Independence Day Holiday |
| Friday, August 21 | Summer Quarter Ends |
|   |   |   |
| **Fall 2021** | Wednesday, September 30 | Fall Quarter Begins |
| Thursday, November 26 | Thanksgiving Break |
| Saturday, December 12 | Program Completion Celebration |
| Friday, December 11 | Fall Quarter Ends |
| Monday, December 14 – Saturday, December 26 | Program / Course Evaluations |

**REFUND / CANCELLATION POLICY**

1. A full refund against the tuition and fees or a credit in a comparable amount against future tuition and fees will be offered to students, who are called for active duty or active service. A full flexibility for re- enrollment and re-application will be offered to these students.
2. For students who cancel their classes from the institution maybe eligible for tuition and fee refund based on the following refund table below:

Student must make a written request for the withdrawal and request for the refund. If a student has attended the classes in person or on web or missed the classes prior to the formal request, then these weeks counts will be considered as student has taken the classes and these number of weeks will be used in determining the refund amount.



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If there is a billing balance or outstanding balance, the student may still be liable for unpaid institutional costs as well as any non-institutional costs. The school may deduct an administrative fee $100 from the amount of the total refund.

**NOTICE TO STUDENT**

* IT Expert System, Inc. is approved to operate by the Private Business and Vocational Schools Division of the Illinois Board of Higher Education.
* IT Expert System, Inc. is not accredited by a US Department of Education recognized accrediting body.
* The school does not guarantee transferability of credit and that in most cases, credits or coursework are not likely to transfer to another institution.
* COMPLAINTS IF ANY AGAINST THIS INSTITUTION MAY BE REGISTERED WITH THE BOARD OF HIGHER EDUCATION, 1 N Old State Capitol Plaza, Suite# 333, Springfield, IL 62701. The link to the IBHE is [www.ibhe.org](http://www.ibhe.org) and the complaints link is [www.complaints.ibhe.org](http://www.complaints.ibhe.org)

**STUDENT DATA:**

|  |  |  |
| --- | --- | --- |
| **Program** | **Particulars** | **Numbers** |
| Database Administration | Total students enrolled | 13 |
| New starts | 10 |
| Transferred out of program | 0 |
| Graduated/Completed | 7 |
| Placed in field of study | 6 |
| Placed in related field | 1 |
| Not available for placement due to personal reasons | 0 |
| Unemployed | 0 |
| Govt/Certification taken/passed | NA |
| Student not placed by IT Expert System | 0 |

**\*\*Approximate salary ranges from 75K – 120K**

**Module 1: Database (Oracle)**

**Overview:**The Oracle PL/SQL language is a flexible procedural extension to SQL and increases productivity, performance, scalability, portability and security. In this course, you will gain the practical knowledge to write PL/SQL programs. You will learn to build stored procedures, design and execute modular applications, and increase the efficiency of data movement.

**Course Content:**

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### PL/SQL fundamentals

* Declaring and anchoring variables to database definitions

## Flow control constructs

## DML commands: Select, Insert, Update, Delete

## DDL commands: Create, Alter Tables/Views/Sequence

## TCL commands: Grant, Revoke

## Joins

## Trigger

## Stored procedure

### Oracle 11g and 12c PL/SQL features

* PL/SQL in Oracle 11g
* Returning implicit cursor results from stored procedures in Oracle 12c

## Declaring local functions within SELECT statements in Oracle 12c

##

## Data Manipulation Techniques

### Maintaining data with DML statements

* Employing the RETURNING INTO clause

## Solving the fetch-across-commit problem

###

### Managing data retrieval with cursors

* Implications of explicit and implicit cursors
* Simplifying cursor processing with cursor FOR LOOPs

## Embedding cursor expressions in SELECT statements

###

### Cursor variables

* Strong vs. weak cursor variables
* Passing cursor variables to other programs

## Defining REF CURSORS in packages

## Developing Well-Structured and Error-Free Code

###

### Error handling using EXCEPTIONs

* Propagation and scope

## "Retrying" problem transactions with EXCEPTION processing

###

### Debugging PL/SQL blocks

* Simplifying testing and debugging with conditional compilation
* Interpreting compiler messages
* Applying structured testing techniques
* Building and applying a test bed

## Leveraging the debugging facilities in SQL Developer

## Achieving Maximum Reusability

###

### Writing stored procedures and functions

* Calling and invoking server-side logic
* Passing input and output parameters

## Implementing an autonomous transaction

###

### Coding user-written functions

* Calling PL/SQL functions from SQL

## Building table-valued functions

###

### Developing safe triggers

* Employing :OLD and :NEW variables
* Avoiding unreliable trigger constructs

## Exploiting schema and database triggers

##

## Exploiting Complex Data types

### Collection types

* PL/SQL tables, nested tables, VARRAYs

## Stepping through dense and nonconsecutive collections

###

### Bulk binding for high performance

* Moving data into and out of PL/SQL blocks
* BULK COLLECT INTO and FORALL
* BULK cursor attributes

## BULK EXCEPTION handling

## Invoking Native Dynamic SQL

###

### Finessing the compiler

* The EXECUTE IMMEDIATE statement

## The RETURNING INTO clause

###

### Types of dynamic SQL

* Building SQL statements during runtime

## Auto generating standard code

## Package Tips and Techniques

* Package structure: SPEC and BODY
* Eliminating dependency problems
* Overloading for polymorphic effects
* Evaluating application frameworks

### Declaring and using persistent global variables

**Module 2: BIG DATA**

**Overview:**Big Data will help to create new career growth opportunities for job seekers and growth for entirely new categories of companies, such as those that aggregate and analyses industry data. Many of these will be companies that sit in the middle of large information flows where data about products and services, buyers and suppliers, consumer preferences and intent can be captured and analyzed. Forward-thinking leaders across sectors should begin aggressively to build their organizations’ Big Data capabilities.

**Course Content:**

**BIG DATA Foundation**

* Database – overview  , Oracle PL/SQL
* Data warehouse, ETL [Extract Transform Load]
* Data Warehouse vs BIG DATA
* BIG DATA – Use cases, Hadoop 1.x vs 2.x overview
* OLAP vs OLTP

**Analytics - Managerial Decisions Based on Data**

* Statistic Overview
* Probably distribution – Monte Carlo (@Risk)
* Empirical Model  Preparation
* Forecasting, and Projection Algorithm [R, Excel]
* Classification, Clustering, Regression Algorithm
* Descriptive and Visual Data Analysis [Neo4J]
* Data Simulation
* Data Reports for C-executives
* Machine Learning [Mahout, R]

**BIG DATA Programming**

* Linux Shell Scripting
* R Programming
* Python Programming
* Java – Map Reduce
* Hadoop Map Reduce,
* Sqoop – data import and export
* Programing with: PIG, Hive  Data Flow Language,
* MySQL
* NoSQL
	+ MongoDB,
	+ Hive
	+ HBASE,
	+ Neo4J – Graph Database
	+ Cassandra
* Zookeeper
* Storm/Spark – Real time Analytics

**Module 3: Service Oriented Architecture**

**Course Content:**

* SOA overview
* SOA design principles
* Exercise: Case study overview
* SOA use of standards
* Exercise: Demonstration of Web services
* IBM SOA Foundation - product overview
* SOA Foundation - governance
* Exercise: Demonstration of governance
* SOA Foundation - model
* Exercise: Demonstration of service identification and specification
* SOA scenarios overview
* Exercise: Identifying and applying SOA scenarios to the case study
* SOA Foundation - assemble and deploy
* Exercise: Demonstration of service deployment and assembly using SCA
* Service management and security

**Module 4: Business Analyst**

**Overview:**This course is structured around a series of activities in which you gain practical modeling experience. In the context of a real-world case study, you apply best practices in business requirement gathering, documentation and stakeholder management to help you fulfill your crucial role as a business analyst.

## Course Content

**Introduction to business analysis**

* The rationale for business analysis
* The development of business analysis
* The scope of business analysis
* The responsibilities of a business analyst

## Competencies of the business analyst•The Business Analysis Maturity Model• The competencies of a business analyst

## Business strategy analysis•The strategic context•Strategic analysis techniques•SWOT analysis•Implementing strategy

## The Business Analysis Process Model• The lifecycle for business analysis• Creative problem-solving approach• Stages of the process model•Deliverables and techniques for each stage

## Investigation techniques• Interviewing and workshops• Observationapproaches• Scenariosandprototyping• Quantitativeinvestigationtechniques• Documenting the business situation

## Stakeholder analysis and management• Categorizing stakeholders• Analyzing stakeholders• Stakeholder management

## Modeling the business system• Soft systems methodology• Documenting business situations• Business perspectives• Business activity models• Business events and business rules• Performance measures• Gap analysis

## Modeling business processes• Organizational view of processes• Value chain and value propositions• Business process modeling techniques• Improving business processes

## Gathering the requirements• Requirements engineering framework• Actors in requirements engineering• Requirements elicitation• Requirements analysis• Requirements validation

## Documenting and managing requirements• The requirements document• The requirements catalogue• Types of requirement• Managing requirements

## Modeling requirements• Modeling functionality• Modeling data

## Delivering the requirements•Delivering the solution• Delivery lifecycles – waterfall, V model, incremental, iterative

## Making a business and financial case• The business case in the project lifecycle• Identifying options• Assessing feasibility• Structure of a business case• Investment appraisal techniques• Realizing the benefits

## Implementing business change

* The change management process
* The emotional impact of change

**Module 5: Linux System Administration**

 **Course Content:**

* Installing a Linux operating system and configuring peripherals
* Performing and modifying startup and shutdown processes
* Setting up and maintaining basic networking
* Populating the system with users and groups
* Setting specific file permissions on directories and regular files
* Performing maintenance on file systems
* Managing running processes
* Automating daily tasks
* Performing backups and restoration of files
* Troubleshooting system problems
* Analyzing and taking measures to increase system performance
* Working with the X Windows interface
* Configuring networked file systems
* Deploying a working Apache Web server configuration
* Securing Servicers
* Process optimization
* Sharing files with a Windows SMB protocol
* Configuring DHCP services
* Configuring DNS services
* Implementing security measures
* Python Programming
* Shell Programming
* EC2 cloud Instance management

**Module 6: AWS Certified Developer**

Amazon Web Services - (AWS) Certification is fast becoming the must have certificate for any IT professional working with AWS. This course is designed to help with AWS Certified Developer Associate (CDA) 2017 Exam. With this course, learner will understand AWS platform form developer perspective. This will introduce and familiarize learners to modern cloud architectures and widely used AWS environment.

**Course Content:**

* Overview
* Identity Access Management
* Setting up EC2 account
* S3 Essentials and configuration
* CORS configuration
* Building sample application
* Database Concepts
* DynamoDB and Simple Query Service
* Simple Notification Service
* Simple Workflow Service
* Using Elastic Beanstalk
* Using CloudFormation
* DNS and Routing
* Virtual Private Cloud (VPC) overview and configuration
* Certification Exam Preparation

**Module : 7 Software Programming with Java, Python and R**

Data researcher needs to pre-process the large data before they visualize the data and/or find the data patterns, based on data patterns they perform data predictions. Using Java, Python and R programming language, Analyst can write custom user define functions and perform ETL Jobs. Programming skill will help students to automate the data cleansing, processing and transformation logic.

**Course Content:**

**Java Programming**

* Introduction to Programming
* Variable, Data Types
* Complex Data Types
* Conditional Statement (IF, Switch)
* Loops (For, While, Do While)
* Array
* File I/O
* Java Util
* UML [Unified Modeling Language]
* OOP Concepts [Object Oriented Programming]
* JDBC [Java Database Connection]
* Exceptions
* Thread

**Python Programming**

Python is a general-purpose programming language that is becoming more and more popular for doing data science. Companies worldwide are using Python to harvest insights from their data and get a competitive edge. Unlike any other Python tutorial, this course focuses on Python specifically for data science.

* Data Types
* Variables
* String operations
* Control Statements
* Loops
* Functions
* File operations
* NumPy functions
* SciPy functions
* Pandas functions
* Graphics functions

**R Programming**

R for Data Analysis will introduce you to data manipulation in R programming. You will learn about analysis, manipulating data and grouping it to prepare the data. You will also learn how to take data you prepared and present it on visualizations.

* Vector creation
* Data types and Structures
* Data Statistics
* Data Frame
* Programming Structures, Functions, and Data Relationships
* R Functions
* Linear Programming
* Data Analysis
* Exploring and Visualizing Data

**Module 8: Data Analytics**

Data analytics and data science are popular terms, and skills in these areas are in great demand. Data Analytics means apply analytics/rules on data and find/organize Big Data in meaningful form for business users to make data driven decisions. In predictive modeling (also called predictive analytics) we seek to predict the value of a variable of interest (purchase/no purchase, fraudulent/not fraudulent, malignant/benign, amount of spending, etc.) by using "training" data where the value of this variable is known.  Once a statistical model is built with the training data ("trained"), it is then applied to data where the value is unknown.

**Course Content:**

* Statistics Overview
* Descriptive Statistics vs Visual Statistics
* Data Distribution: Normal, Triangular, Uniform and more
* @Risk Monte Carlo
* Linear Problem solving using Excel Solver
* Linear Regression [ANOVA], Correlation, Classification,
* Product Recommendation Techniques
* Forecasting/Prediction Techniques/Algorithms
* ETL [Extract, Transform, Load] Architecture
* R - Programming for data visualization
* Visualization tools: Tableau/Weka/Excel
* Database vs Data Warehouse vs Big Data
* OLTP vs OLAP use cases
* Case studies: data volume, velocity, varieties
* APM [Asset Performance Monitoring] use cases
* Supervised/Non-supervised learning
* Machine Learning/Predictive Analysis
* Hadoop Technology Overview
* Project work with [R, Python, MongoDB, Neo4J, @Risk]

**Module 9: PMP – PMI ACP (Agile Certified Practitioner)**

**Overview:**This three-day course provides participants with a solid foundation of the PMI-ACP® exam. During class, participants will be introduced to PMI Agile concepts and practices with banks of sample questions. Additionally, participants will apply agile principles directly to a real-world project taken directly from their industry. Participants will also engage in numerous discussion groups focusing on agile best practices. PMI-ACP is a registered trademark of the Project Management Institute, Inc.

**0- Agile Mindset**

* PMI-ACP® Exam New Topic - Agile Mindset

**1 - PMI-ACP Exam Preparation**

* PMI-ACP® Exam Particulars Overview
* PMI-ACP® Exam Particulars
* PMI-ACP® Candidate Requirements
* PMI-ACP® Candidate Fees
* PMI-ACP® Exam Application Process

**2 - Core Agile Concepts**

* Core Agile Concepts Overview
* Traditional Project Management Methodologies
* Drawbacks of Waterfall Methodologies
* Agile Approach
* Empirical Process Control
* Agile and Traditional Project Management
* Choice of Methodologies/Frameworks

**3 - The Agile Manifesto**

* The Agile Manifesto Overview
* Manifesto Contributors
* Manifesto Values
* Manifesto Principles

**4 - Common Agile Methodology Elements**

* Common Agile Methodology Elements Overview
* Project (Product; Release) Initiation
* Agile Planning
* Iteration Planning and Executing

**5 - Project Initiation**

* Project Initiation Overview
* Determine Project Justifications and Metrics
* Provide Value-Driven Delivery
* Write Project Vision Statement
* Create Project Charter
* Identify Stakeholders and Leader/Coach
* Form Project Team

**6 - Agile Teams and Team Space**

* Agile Teams and Team Space Overview
* Scrum Master/Coach
* Product Owner/Customer
* Team Members/Developers (XP)
* Trackers and Testers
* Other Roles
* Team Space
* Physical Space Recommendations

**7 - Agile Planning**

* Agile Planning Overview
* Develop Epics and Stories
* Create Stories
* Non-Customer Facing Stories
* Personas and Extreme Personas
* Story Maps
* Estimating Stories
* Prioritizing Stories
* Create Product Backlog
* Create Product Roadmap
* Conduct Release Planning
* Create Parking Lot

**8 - Iterations/Sprints**

* Iterations/Sprints Overview
* Velocity Determination
* Iteration Planning Meeting
* Iteration Planning Guidelines
* Development
* Testing
* Daily Standup Meetings
* Progress Tracking
* Velocity Tracking

**9 - Interpersonal Aspects of Agile**

* Interpersonal Aspects of Agile Overview
* Methodologies and Uncertainty
* Coach/Scrum Master
* Team Motivation
* Soft Skills
* Emotional Intelligence
* Collaboration
* Negotiations
* Active listening
* Conflict Resolution
* Speed Leas’ Model of Group Conflict
* Conducting Retrospectives
* Mindsets of Agile Coaches
* Leadership Stages
* Key Coaching Responsibilities

**10 - Agile Methodologies**

* Agile Methodologies Overview
* XP and Scrum Terms
* XP Terms and Concepts
* XP Primary Practices
* XP Corollary Practices
* Scrum
* Lean Software Development
* Seven Principles of Lean
* Seven Types of Muda
* Responsibilities
* Core Beliefs of Lean-Agile Software Development
* Other Principles of Lean-Agile Software Development
* Value Stream Mapping
* Lean-Agile Software Development Portfolio Management