IICIS

1-Year Advanced Diploma

Data Science & Analytics

www.iicis.org

48 Weeks (1 Year)

Industry-ready professional skilled for Data Analyst, Business Analyst, Data Scientist, and BI Developer roles.

Instructor-led + Hands-on Labs + Case Studies + Capstone Project

Module	Module Title
1	Foundations of Data Science & Analytics
2	Excel & Advanced Analytics
3	SQL & Databases for Analytics
4	Python for Data Science
5	Statistics & Probability for Data Science
	Revision & Internal Assessment
6	Data Visualization & Business Intelligence
7	Machine Learning Fundamentals
8	Advanced Data Science Topics
9	Big Data & Cloud Analytics
10	Capstone Project & Career Preparation
	Final Evaluation

Semester 1 (Month 1–6)
Foundations of Data Analytics & Programming

Module 1: Foundations of Data Science & Analytics (Month 1)

Content:

- Introduction: Data Science vs Data Analytics vs Business Intelligence
- Data Lifecycle: Collection → Processing → Analysis → Visualization → Decision Making
- Types of Data: Structured, Semi-Structured, Unstructured
- Data Roles: Data Analyst, Data Scientist, BI Engineer
- Business Problem Solving with Data

Labs:

1. Explore sample datasets (CSV, JSON, Excel)
2. Generate basic summary statistics and visualizations
3. Perform data cleaning for missing/null values
4. Create initial reports for decision making

Module 2: Excel & Advanced Analytics (Month 2)

Content:

- Advanced Excel Functions (INDEX, MATCH, VLOOKUP, Nested IF, Text Functions)
- Pivot Tables & Data Summaries
- Power Query & Power Pivot for ETL-like operations
- Building Interactive Dashboards in Excel
- Data Storytelling Principles

Project:

- Create a Sales Dashboard with Excel & Power Query

Labs:

1. Consolidate multiple datasets and perform transformations
2. Build interactive Pivot Tables & Charts
3. Apply conditional formatting and KPIs
4. Automate data refresh using Power Query

Module 3: SQL & Databases for Analytics (Month 3)

Content:

- SQL Basics: SELECT, WHERE, GROUP BY, ORDER BY
- Joins, Subqueries, Common Table Expressions (CTEs)
- Window Functions & Aggregations
- Database Design Concepts & Data Warehousing Overview
- Real-World Case Studies: Customer Segmentation, Sales Analysis

Labs:

1. Query large datasets using SELECT & JOINs
2. Perform aggregations & window functions
3. Analyze marketing, sales, and churn datasets
4. Create reports for decision support

Module 4: Python for Data Science (Month 4–5)

Content:

- Python Programming Basics: Variables, Loops, Functions, OOPs
- NumPy & Pandas for Data Handling
- Data Cleaning & Preprocessing Techniques
- Visualization: Matplotlib, Seaborn, Plotly
- Exploratory Data Analysis (EDA) & Feature Engineering

Project:

- Perform EDA on an e-commerce dataset

Labs:

1. Clean and preprocess messy datasets
2. Perform statistical summaries and correlation analysis
3. Visualize data trends with Matplotlib/Seaborn
4. Create interactive plots with Plotly
5. Feature engineering for ML models

Module 5: Statistics & Probability for Data Science (Month 6)

Content:

- Descriptive & Inferential Statistics
- Probability Distributions & Sampling Techniques
- Hypothesis Testing & Confidence Intervals
- Correlation vs Causation
- A/B Testing & Business Experiments

Labs:

1. Simulate A/B tests for marketing campaigns
2. Calculate mean, median, variance, and standard deviation
3. Conduct hypothesis tests using Python (SciPy)
4. Perform probability distribution analysis for decision making

Semester 2 (Month 7–12)
Advanced Analytics, Machine Learning & BI

Module 6: Data Visualization & Business Intelligence (Month 7)

Content:

- Principles of Data Storytelling & Visualization
- Power BI: Data Cleaning, DAX Functions, Interactive Dashboards
- Tableau: Interactive Visualizations, Parameters, Storytelling
- Choosing the Right Chart for Business Problems

Project:

- Build a Business Performance Dashboard (Tableau/Power BI)

Labs:

1. Connect Power BI/Tableau to sample datasets
2. Create interactive dashboards with filters & slicers
3. Implement calculated fields & DAX measures
4. Present insights through storytelling

Module 7: Machine Learning Fundamentals (Month 8–9)

Content:

- Introduction to ML Pipeline: Data → Model → Evaluation → Deployment
- Supervised Learning: Regression & Classification (Logistic, Decision Trees, Random Forest, SVM)
- Unsupervised Learning: Clustering (K-Means, DBSCAN), PCA
- Model Evaluation: Accuracy, Precision, Recall, ROC-AUC
- Hands-on ML with Scikit-learn

Project:

- Predict customer churn or loan default using ML models

Labs:

1. Train supervised ML models using Scikit-learn
2. Evaluate models with confusion matrix & ROC curves
3. Perform clustering & PCA on sample datasets
4. Optimize models with hyperparameter tuning

Module 8: Advanced Data Science Topics (Month 10)

Content:

- NLP Basics: Text Preprocessing, Sentiment Analysis, Text Classification
- Time Series Forecasting: ARIMA, Prophet, Basics of LSTMs
- Introduction to Deep Learning: Neural Networks, TensorFlow/PyTorch basics
- Recommendation Systems: Content-based & Collaborative Filtering

Project:

- Build a movie recommendation system or Sales forecasting model

Labs:

1. Text cleaning, tokenization, and feature extraction
2. Perform sentiment analysis on social media datasets
3. Build a simple feedforward neural network
4. Implement a recommendation engine with collaborative filtering

Module 9: Big Data & Cloud Analytics (Month 11)

Content:

- Big Data Fundamentals: Hadoop, Spark Overview
- Cloud Platforms for Data Science: AWS, Azure, GCP
- Data Lakes & Warehousing: Snowflake, Redshift, BigQuery
- ETL (Extract, Transform, Load) Processes
- MLOps Basics & Model Deployment

Labs:

1. Analyze datasets using Google BigQuery / AWS S3
2. Load and transform data in Hadoop/Spark
3. Build ETL pipelines using Python & SQL
4. Deploy a ML model in cloud environment

Module 10: Capstone Project & Career Preparation (Month 12)

Content:

- End-to-End Capstone Project (Choose 1):
    1. Customer Churn Prediction with ML & BI Dashboard
    2. Fraud Detection using ML & Big Data Tools
    3. Social Media Sentiment Analysis with NLP
    4. Sales Forecasting & Recommendation Engine
- Report Writing & Presentation
- Resume Building & Interview Prep (SQL, Python, Case Studies, ML Concepts)
- Certification Mapping: Google Data Analytics, IBM Data Science, Power BI, Tableau, AWS/Azure/GCP certs

Labs/Projects:

1. Perform full-cycle data analysis & ML modeling
2. Build dashboards & visualizations for business insights
3. Present findings & actionable recommendations
4. Prepare professional portfolio for interviews