IBM VTU Internship Program Day 1 - Orientation

Welcome to the IBM VTU Internship Program!

We're excited to embark on this journey with you.

Day 1: Orientation

1 **Introductions**

Get to know about various courses

2 **Program Overview**

Explore the internship program's structure, goals, and expectations.

3 **Learning Resources**

Discover the tools, materials, and support systems available to you.

4 **Project Overview**

Learn about the exciting projects you'll be working on.

IBM offers five tracks as part of the VTU internship program for 7th-semester students, allowing them to choose from technologies such as Cloud, DevOps, AI, Data Quality Analysis, Machine Learning, and Fullstack Development.

Students will have the opportunity to work on projects within these courses, with IBM trainers conducting phase-wise evaluations.

This program aims to bridge the gap between academic learning and industry requirements, providing students with valuable hands-on experience using IBM tools and software.

VTU Internship Tracks

- AI Data Quality Analysis
- Machine Learning Engineer
- DevOps Engineer
- Cloud Application Developer
- FullStack Developer

Our Courses

AI Data Quality Analyst

Course 1

AI Data Quality Analyst

MODULES

- Program Orientation
- Pre-Project Development Courses
- Pre -Requisites of AI
- Introduction to Data Quality
- Data Preprocessing and Cleaning
- Data Quality Metrics and Measurement
- Quality in Data Engineering and Machine Learning
- Advanced Data Quality Strategies
- PROJECTS

Course 1: Modules

PROGRAM ORIENTATION

Provide a comprehensive introduction to the program, outlining the curriculum, learning objectives, and career outcomes.

PRE-PROJECT DEVELOPMENT COURSES

Equip learners with foundational skills and knowledge needed before starting AI or data quality projects.

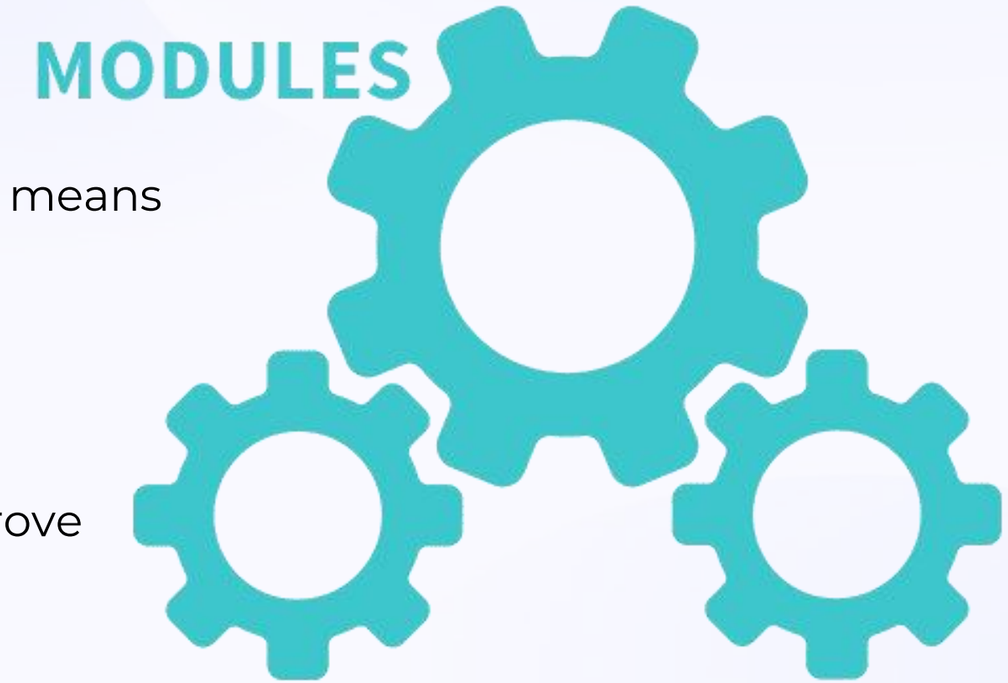
PRE-REQUISITES OF AI

Cover the foundational knowledge and skills required for understanding and working with AI.

Course 1: Modules

INTRODUCTION TO DATA QUALITY

Provide a broad understanding of what data quality means and its importance in AI and machine learning.



DATA PREPROCESSING AND CLEANING

Teach techniques to prepare and clean data to improve its quality before feeding it into AI models.

DATA QUALITY METRICS AND MEASUREMENT

Learn to quantify and assess the quality of data using various metrics.

Course 1: Modules

QUALITY IN DATA ENGINEERING & MACHINE LEARNING

Focus on ensuring data quality throughout the data engineering pipeline and during the development of machine learning models

ADVANCED DATA QUALITY STRATEGIES

Explore sophisticated techniques and strategies for maintaining and improving data quality in complex AI systems.

PROJECT

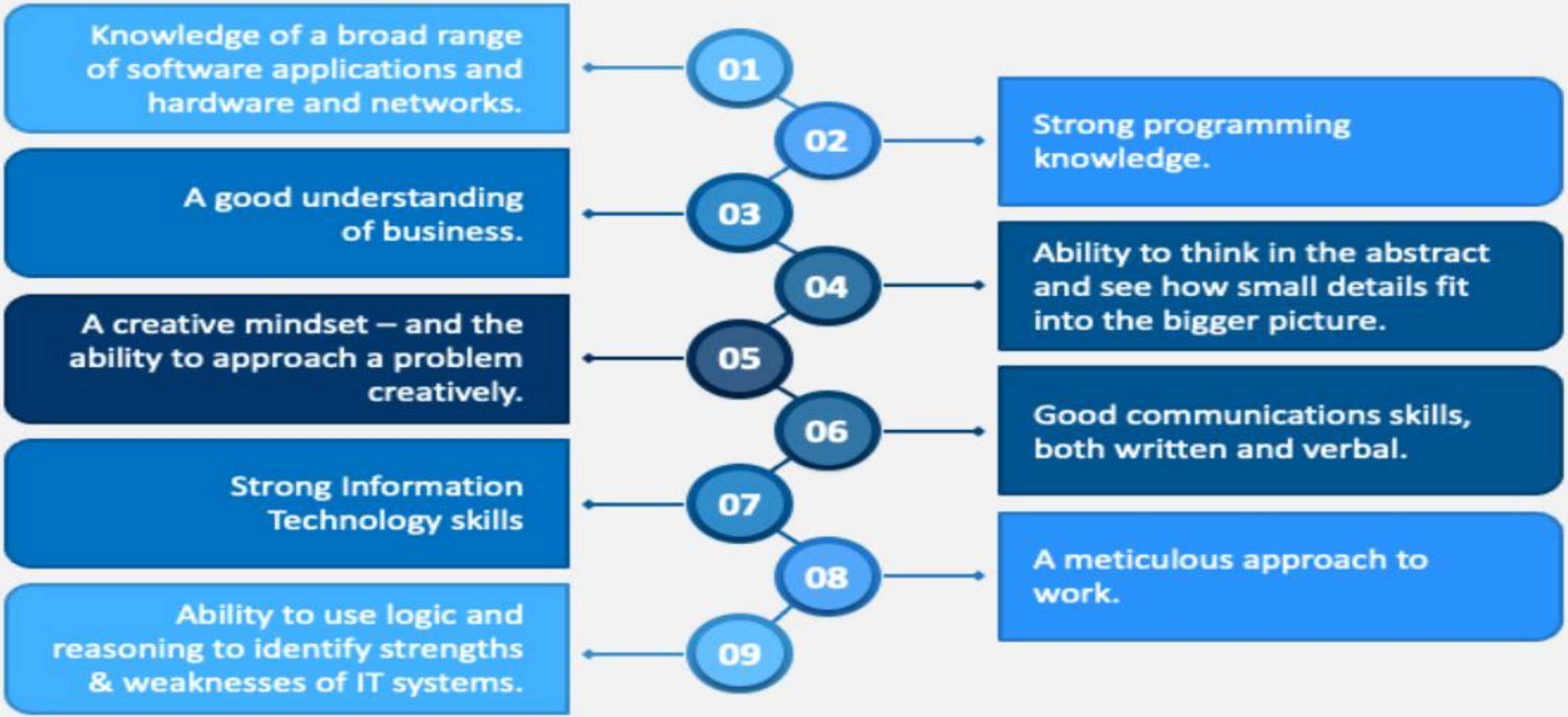
Learn to quantify and assess the quality of data using various metrics.

QUALITY ANALYST

Responsibilities of a Quality Analyst

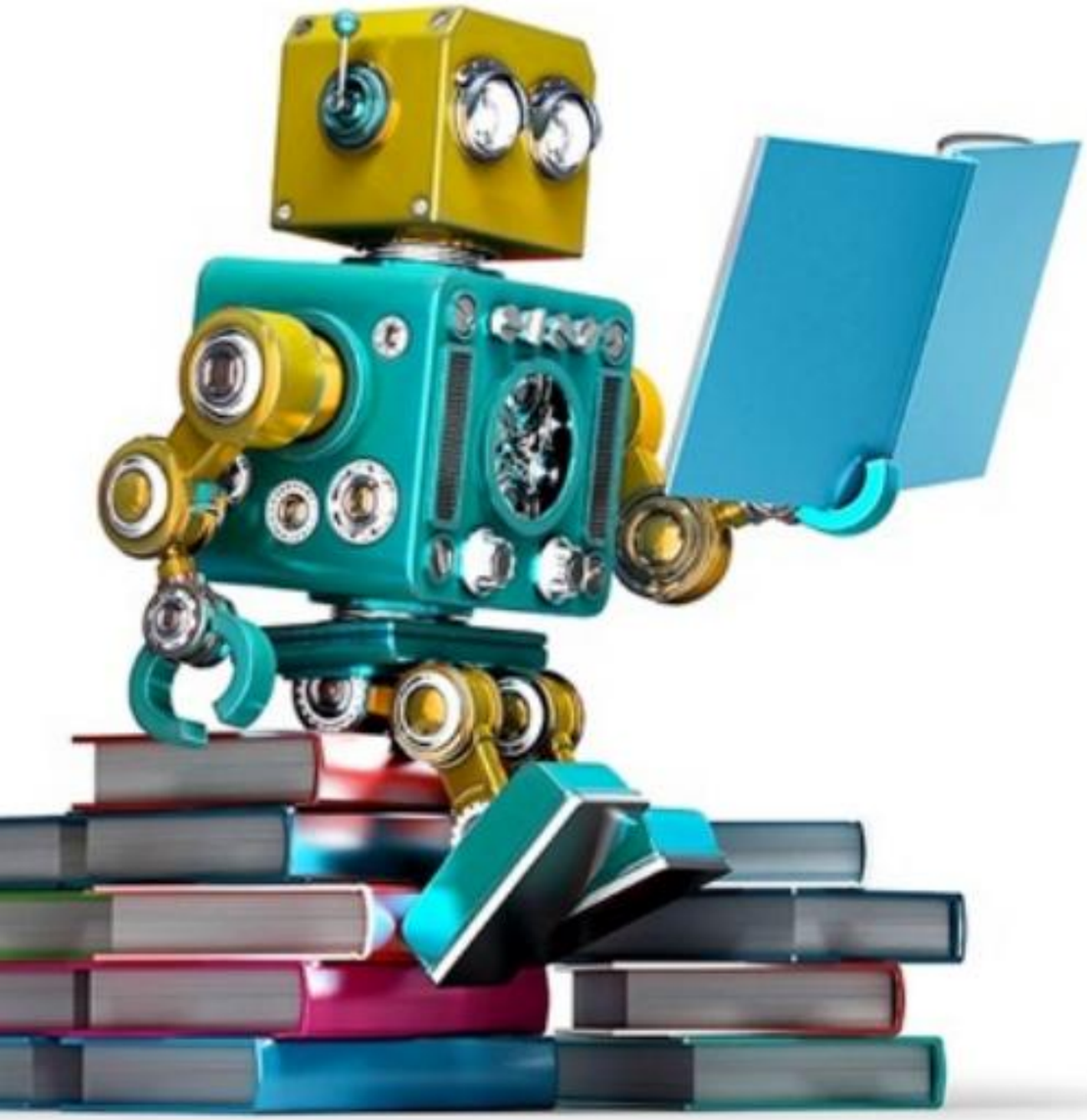
QUALITY ANALYST

Key Skills for Working as a QA Analyst



Tools and Softwares

- ✓ Matplotlib: Data visualization and plotting.
- ✓ Seaborn: Statistical data visualization.
- ✓ Pandas: Data manipulation and analysis.
- ✓ NumPy: Numerical computations and array processing.
- ✓ OpenRefine: Data cleaning and transformation.
- ✓ Scikit-learn: Machine learning and data preprocessing.
- ✓ TensorFlow / PyTorch: Building and training machine learning models.
- ✓ Apache Airflow: Workflow scheduling and monitoring.
- ✓ Jupyter Notebook: Interactive coding and visualization.
- ✓ Git/GitHub: Version control and collaboration.

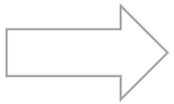


Machine Learning

Course 2

MACHINE LEARNING

MODULES



- Pre-Project Development
- Machine Learning Basics
- Introduction to Machine Learning and IBM Watson
- Exploratory Data Analysis (EDA)
- Supervised Learning - Regression and Classification
- Data Quality Metrics and Measurement
- Unsupervised Learning and Neural Networks
- Natural Language Processing (NLP) and Model Evaluation
- PROJECTS

Module 1: Pre-Project Development

Agile Principles

Iterative and collaborative development

Scrum Framework

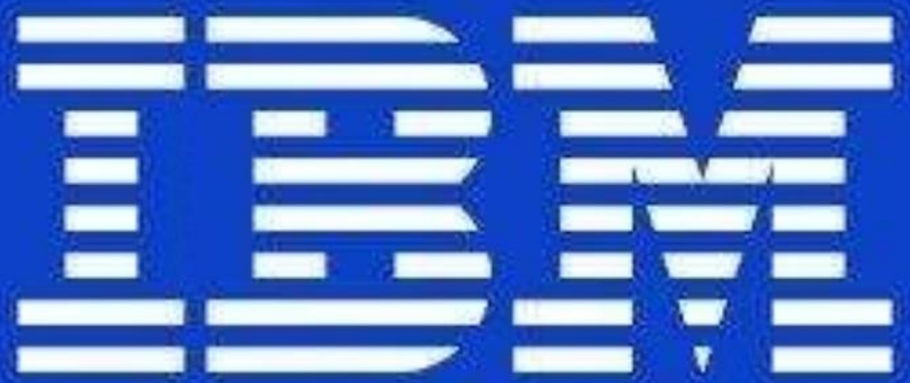
Structured approach to project management

User Stories

Understanding user needs and requirements

Problem-Solving Techniques

Developing critical thinking skills



Course 2: Modules

Pre-Project Development

Agile principles, Scrum Framework, user stories, code reviews, pull requests, problem-solving techniques, and creative thinking.

Machine Learning Basics

Data science overview, evaluation metrics, supervised and unsupervised learning, and key concepts like bias and variance.

Introduction to ML & IBM Watson

Machine learning types, Watson Studio, Watson Machine Learning, and real-world applications.

Course 2: Modules

Exploratory Data Analysis (EDA)

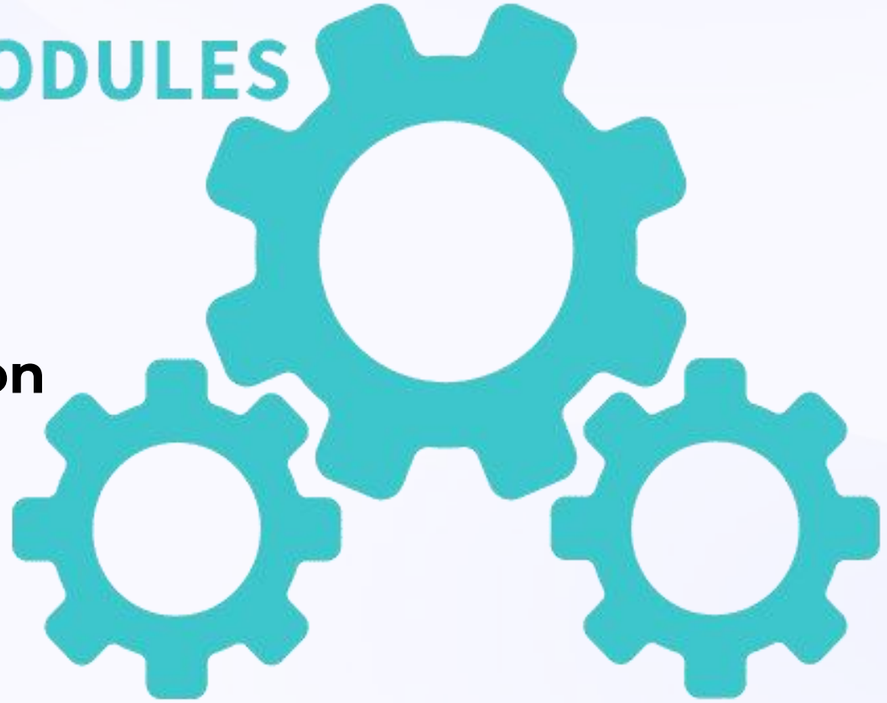
Data sources, data cleaning, data transformation, feature engineering, and data visualization techniques.

Supervised Learning - Regression & Classification

Linear regression, logistic regression, classification algorithms, and model evaluation metrics.

Unsupervised Learning and Neural Networks

Clustering algorithms, dimensionality reduction, neural network architecture, and deep learning concepts.



Course 2: Modules

Natural Language Processing (NLP) and Model Evaluation

Text preprocessing, NLP pipelines, sentiment analysis, classification techniques, and model evaluation metrics

Project Work

Project planning, execution, and presentation of findings.

APPLICATIONS OF MACHINE LEARNING

Tools and Softwares

- ✓ Python → General-purpose programming language for data science and machine learning
- ✓ Scikit-learn → Machine learning library for building and training models
- ✓ Pandas → Data manipulation and analysis library
- ✓ NumPy → Library for numerical computations and working with arrays
- ✓ Matplotlib →Plotting library for creating visualizations
- ✓ Seaborn → Statistical data visualization library
- ✓ IBM Watson → Suite of AI services, including machine learning tools
- ✓ Jupyter Notebook → Interactive environment for writing and running code

DevOps
Engineer

DevOps Engineer

A DevOps Engineer is responsible for automating and streamlining the software development and deployment process. They work closely with developers and operations teams to ensure that software is delivered quickly and reliably.

Key Skills

DevOps Engineers need a strong understanding of software development, system administration, and automation tools. They should also be comfortable working in a collaborative environment and have excellent communication skills.

Course 3

DEVOPS ENGINEER

MODULES

- Pre-Project Development Courses
- Software Development and IT Operations / CICD
- Virtualization and Containerization
- Networking
- Introduction to DevOps Concepts
- DevOps Tools and Automation
- Docker
- Kubernetes
- Security in DevOps
- Advanced DevOps Implementation
- PROJECTS

MODULES

1

Pre-Project Development Courses

Agile methodologies, Scrum Framework, user stories, code reviews, pull requests, problem-solving techniques, and creative thinking.

2

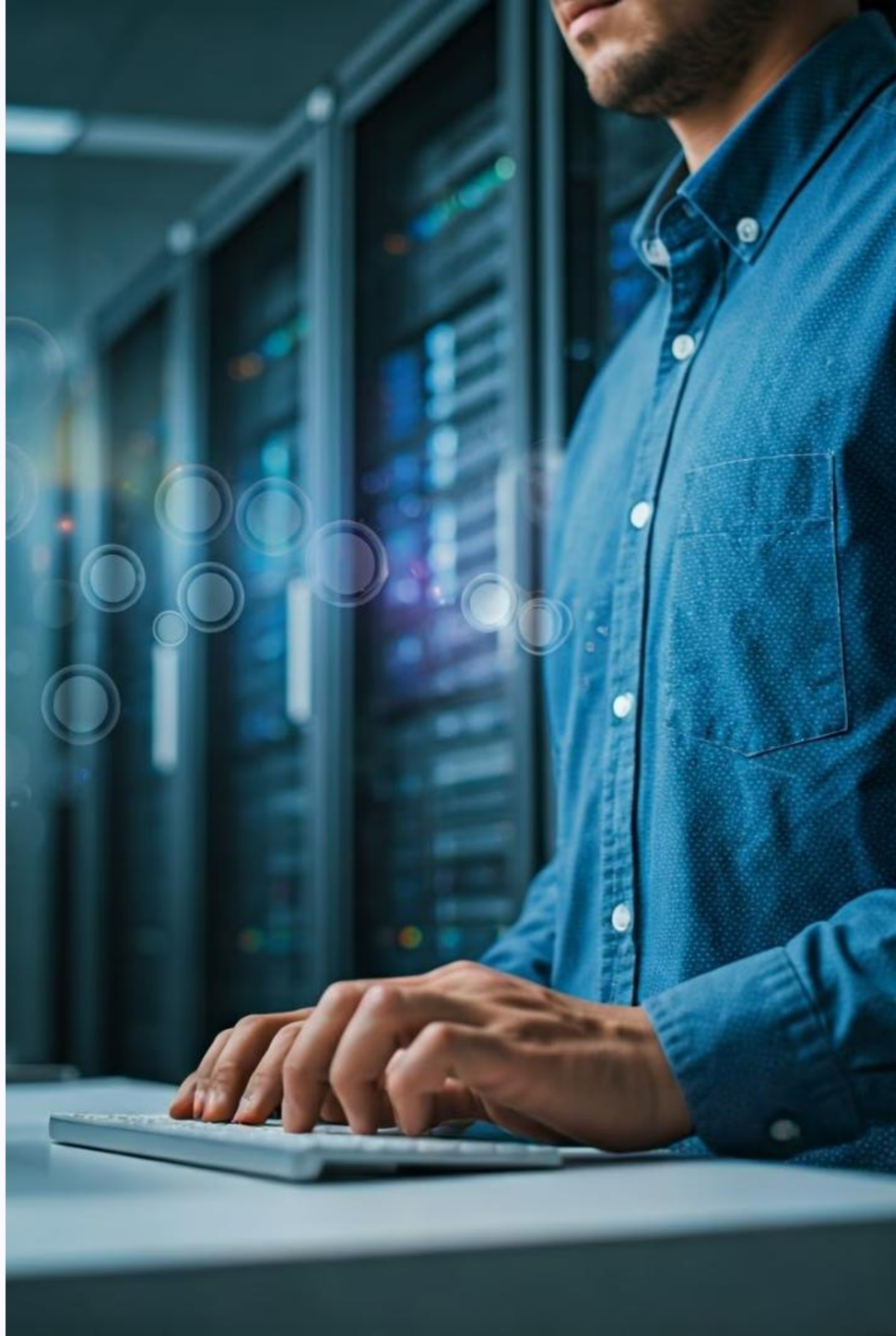
Development and IT Operations / CICD

System administration, networking, integration, CICD pipelines, and DevOps culture.

3

Virtualization and Containerization

Clustering algorithms, Cloud computing concepts, containerization, Docker, and Kubernetes. reduction, neural network architecture, and deep learning concepts.



MODULES

Networking

4

IP addresses, DNS, networking protocols, and network infrastructure.

Introduction to DevOps Concepts

5

DevOps culture, collaboration, automation, and tools like Git, Jenkins, and GitLab.

DevOps Tools and Automation

6

Version control systems, CI/CD pipelines, containerization, and deployment strategies.

MODULES

Docker&Kubernetes

7

Docker images, containers, Dockerfiles, and Docker Compose. Managing deployments, scaling, and rolling updates with Kubernetes.

Cloud-Native Development and DevOps

8

DevOps culture, Cloud platforms, cloud-native architecture, and DevOps practices in the cloud. Security in DevOps, automation, and tools like Git, Jenkins, and GitLab.

Advanced DevOps Implementation

9

Cloud migration, DevOps methodologies, and implementing DevOps in organizations.

DevOps Roles

Product Owner

The intersection between the DevOps team and customer.

DevOps Developer

Transforms the customers business goals into solution

Quality Assurance Engineer

Review test design and process feedback.

Operations Engineer

Monitors and maintains the product environment and infrastructure.

Information Security Engineer

Ensure adequate system and data security.

Release Manager

Manages and coordinates the deployment and release processes.

DevOps Project Manager

Verifies compliance with customer expectations.

TOOLS AND SOFTWARES

Git	Version control system for tracking changes to files over time
Jenkins	Automation server for building, testing, and deploying software
GitHub	Cloud-based platform for hosting and managing Git repositories
GitLab	Alternative platform to GitHub with additional features
Docker	Platform for building, shipping, and running applications in containers
Docker Compose	Tool for defining and running multi-container Docker applications
Kubernetes	Container orchestration platform for managing containerized applications
IBM Cloud	Cloud computing platform offering various services and infrastructure

Cloud Application Development

Cloud Application Developer

Course 4 provides a comprehensive understanding of cloud applications and development.

1 Key Skills

This course will equip you with the necessary skills to develop, deploy, and manage cloud applications.

2 Industry Standards

You will learn about industry best practices for building secure, scalable, and reliable cloud applications.

3 Hands-On Experience

Practical exercises will allow you to gain hands-on experience with real-world cloud development scenarios.

4 IBM Cloud Platform

You'll get familiar with IBM Cloud, a leading cloud platform.

Course 4

CLOUD APPLICATION DEVELOPER

MODULES

- Pre-Project Development Courses
- Basic Understanding of Cloud Computing Concepts
- Containerization and Virtualization
- Introduction to IBM Cloud Computing and IBM Cloud
- Cloud Application Development
- REST, Watson AI, and IBM Cloud Services
- Advanced Cloud Application Management
- IBM Cloud DevOps Services
- Cloud Data Management and Management
- PROJECTS

Course Modules

The course is divided into modules covering different aspects of cloud application development.

Pre-Project Development

Agile methodologies, Scrum Framework, user stories, code reviews, pull requests, problem-solving techniques, and creative thinking.

Basic Understanding of Cloud Computing and Concepts

Basic Understanding of Cloud Computing Concepts. Cloud models (IaaS, PaaS, SaaS), networking protocols, storage options, and web development basics.

Containerization and Virtualization

Containerization and Virtualization. Cloud computing concepts, containerization, Docker, and Kubernetes.

Course Modules

The course is divided into modules covering different aspects of cloud application development.

Introduction to IBM Cloud

Introduction to IBM Cloud Computing and IBM Cloud. IBM Cloud infrastructure, platform overview, key services, and comparison with other cloud providers (AWS, Azure, Google Cloud)

Cloud Application Development

Cloud-native development practices, application architecture, deployment strategies, and using IBM Cloud services.

REST, Watson AI & IBM Cloud Services

Understanding REST architecture, integrating Watson AI into applications, and utilizing IBM Cloud services like storage, databases, and analytics.

Course Modules

The course is divided into modules covering different aspects of cloud application development.

Advanced Cloud Application Management

Containerization with Docker and Kubernetes, application management best practices, and using IBM Cloud tools for management.

IBM Cloud DevOps Services

IBM Cloud DevOps Services. CI/CD pipelines, automation, and using IBM Cloud services for DevOps.

Cloud Data Management

Cloud Data Management and Management. Data governance, data security, data migration, and using IBM Cloud data management tools.

Cloud Applications: Examples

Cloud applications are software programs that are designed to run on cloud computing platforms.

SaaS

Software as a Service, like Google Workspace or Salesforce.com

PaaS

Platform as a Service, like AWS Elastic Beanstalk or Google App Engine.

IaaS

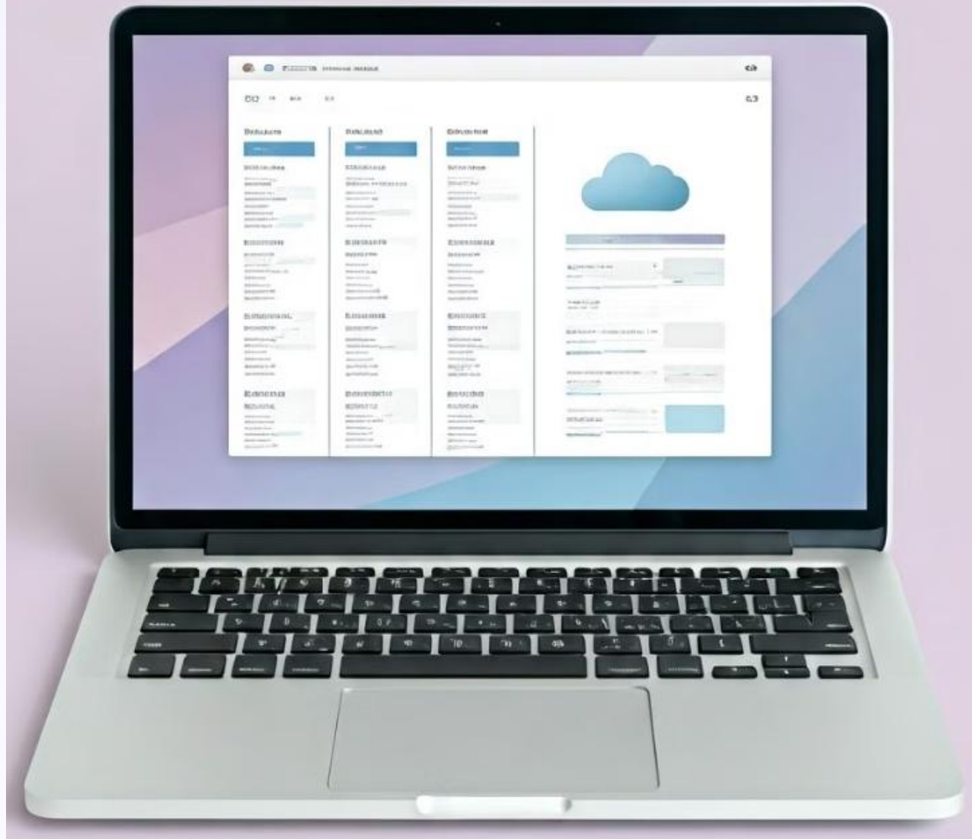
Infrastructure as a Service, like Amazon EC2 or Microsoft Azure Virtual Machines.

CLOUD APPLICATIONS

Tools and Software

This course involves using various tools and software for cloud development.

Tool	Purpose
IBM Cloud	Comprehensive cloud platform for various services and infrastructure
Docker	Platform for building, shipping, and running applications in containers
Kubernetes	Container orchestration platform for managing containerized applications at scale
Watson AI	Suite of AI services from IBM for building intelligent applications

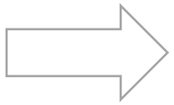


Full Stack Developer

Course 5

FULLSTACK DEVELOPER

MODULES



- Pre-Project Development Courses
- Front End Basics
- React JS for UI
- Back End Basics
- Server-Side Development and RESTful APIs
- Advanced Topics (JavaScript, Node.js, MongoDB)
- User Authentication, Authorization
- User Deployment
- Cloud Computing
- PROJECTS

Course Modules

The course is divided into modules that cover different aspects of full-stack development.

Pre-Project Development

Agile methodologies, version control (Git), project planning, problem-solving, and teamwork.

Frontend Fundamentals

HTML, CSS, JavaScript, DOM manipulation, and basic web page structure.

REACT JS for UI

React JS for UI. Components, state management, hooks, data binding, and component-based development.

Course Modules

The course is divided into modules that cover different aspects of full-stack development.

Backend Basics

Node.js, Express.js, databases (MySQL, MongoDB), server setup, and RESTful API design.

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Server Side Development & RESTful API’s

Node.js, Express.js, MongoDB, API design principles, HTTP methods, and data handling.

Advanced Topics

Advanced JavaScript concepts, asynchronous programming, performance optimization, and MongoDB database operations.

Course Modules

The course is divided into modules that cover different aspects of full-stack development.

User Authentication, Authorization, Deployment

JWT (JSON Web Tokens), authentication mechanisms, authorization strategies, and deployment to cloud platforms.

Cloud Computing

Cloud providers (AWS, GCP, Azure), cloud infrastructure, cloud deployment, and cloud-based services

Project

Project planning, development, testing, deployment, and presentation of the final product.

FULL STACK DEVELOPMENT

Full Stack Web Development

TOOLS AND SOFTWARES

Tool	Purpose
Git	Version control system for tracking changes to code
HTML	Structure and content of web pages
CSS	Styling and layout of web pages
JavaScript	Client-side scripting language for interactive web elements
React.js	JavaScript library for building user interfaces
Node.js	JavaScript runtime environment for server-side development
Express.js	A Node.js web application framework
MySQL	Relational database management system
MongoDB	NoSQL document-oriented database
JWT	JSON Web Tokens for authentication and authorization
Cloud services (e.g., AWS, IBM Cloud, Azure)	Platforms providing cloud computing resources like servers, storage, and databases

Project Evaluation

CATEGORY	PHASES	METRICS	MARKS
Technical	Phase 1	Project Part 1: Problem definition, design thinking, innovation and problem-solving	10
	Phase 2	Project Part 2: Import the dataset and perform data cleaning & data analysis	10
	Phase 3	Project Part 3: Perform data visualization	10
	Phase 4	Project Part 4: Model Development & Evaluation	10
	Phase 5	Project Part 5: Project Documentation & Submission	10
Final Submission			

Thank You


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