Content for MCC

**Back-end**

Our Full-Stack Development Course is thoughtfully designed to provide you with the vital skills and comprehensive knowledge needed to create dynamic, high-impact web applications. Whether you're just starting or looking to elevate your existing expertise, this all-encompassing course covers both the fundamental and advanced topics necessary to become a proficient full-stack developer.

You'll delve into Python to master foundational programming and advanced concepts, Flask for developing sleek web applications and APIs, Django for building robust and scalable web solutions, and MySQL for effective database management and integration. By gaining expertise in these pivotal back-end technologies, you'll be exceptionally well-prepared to excel in the web development industry.

**Curriculum**

**Module 1: Introduction to Python**

* Overview of Python
* Understanding Python syntax and indentation
* Basic concepts of Python (data types, operators, type conversion, input, and output)
* Control structures like conditional statements, loops, and loop control statements.
* Data structures (Lists, tuples, dictionaries, sets)
* Defining and Calling Functions
* Function Arguments and Return Values
* Lambda Functions
* Scope and Lifetime of Variables
* Modules and packages
* File handling: reading and writing files, working with file modes, handling exceptions during file operations
* Error and Exception Handling: understanding, raising, and custom exceptions.
* OOPs (class and object, attribute and methods, inheritance, polymorphism, encapsulation)
* Advanced topics in Python like (list comprehensions, generators, iterators, decorators, and context managers.
* Working with libraries and frameworks like Pandas.
* Data Analysis with Pandas
* CRUD Operations
* Using SQLAlchemy for Database Operations
* Introducing and making APIs.

**Module 2: Introduction to Flask**

* Overview of Flask and its features
* Setting up a Flask development environment
* Basic of flask like routing, templates, and jinja2.
* Working with forms, validation with WTForms
* Flask-SQLAlchemy
* Database model and CRUD operations
* User authentication
* RESTful APIs with Flask
* Overview of popular Flask extensions (e.g., Flask-WTF, Flask-Mail)
* Configuring and deploying a Flask application
* Presenting and reviewing the project

**Module 3: Introduction to Django**

* Overview of Django and its architecture
* Django models (Django ORM), relationships.
* Django views and templtes: FBVs,CBVs, DTL
* Django forms and Django admin
* User authentication and authorization
* Django rest frameworks and building APIs with Django REST Framework (DRF)
* Django middleware
* Advanced topics in Django like Django signals, and task queues with celery.
* Presenting and reviewing the project

**Module 4: Introduction to MySQL**

* Overview of MySQL and its features
* Database design and understanding of relational database concepts, ER diagrams, normalization, and denormalization.
* Mysql data types
* Basic SQL queries
* Advanced SQL (joins, subqueries, aggregation function, and grouping data)
* Data manipulation, transaction, and ACID properties
* Constraints and indexes
* Views and stored procedures
* Triggers and events, working with events
* Backup and recovery
* Performance tuning and optimization, monitoring and tunning MySQL performance
* Integration with programming languages
* Executing SQL queries from programming languages
* Designing and Implementing a MySQL Database Project