FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Science (Information Technology)

Semester: II

Course Code: 101410231

Course Title: Databases – Beginner to Professional

Course Group: Core Courses

Course Objectives:

- Implement different features of Databases based on software application
- It helps to developer to build applications, administrators to protect data integrity and build fault-tolerance environments
- Exploring knowledge of Relational Databases and NoSQL Databases.
- Application of RDBMS and NoSQL

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100 / 40

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Basics** Introduction, History **Getting Started** Architectural Fundamental, Creating Database, Accessing Database, Introduction Concepts of SQL Language **The SQL Language – I [PostgreSQL]** **SQL Syntax** Lexical Structure, Value Expression, Calling Function **Data Types** Numeric, Monetary, Character, Binary, Date/Time, Boolean, Enumerated, Geometric, Network Address, Bit String, Text Search, UUID, XML, JSON, Arrays, Composite, Range, Domain, Object Identifier, pg_lsn, Pseudo **Data Definition** Table Basics, Default Values, Generated Columns, Constraints, System Columns, Modifying Tables, Privileges, Row Security Policies, Schemas, Inheritance, Table Partitioning, Foreign Data, Other Database Object **Data Manipulation** Insert, Update, Delete, Returning Data from Modified Rows	15

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2	**The SQL Language – II [PostgreSQL]** **Queries** Table Expression, Select Lists, Combining Query, Sorting Rows, LIMIT and OFFSET, Values List, WITH Queries **Operators & Built-in Functions** Logical Operators, Comparison Operators, Mathematical Functions and Operators, Mathematical Functions and Operators, String Functions, Data Types Formatting Functions, Date / Time Functions	**15**
3	**NoSQL** Introduction, Definition, History, ACID vs BASE, Advantages and Disadvantages, SQL vs NoSQL, Categories of NoSQL **Mongo DB** Introduction, History, Design Philosophy, Compare with SQL, Data Model, Installation and configuration **Mongo DB Shell** Basic Querying, Conditional operators, Regular expression, MapReduce, Relational data modeling approach and normalization, Document data model approach	**15**
4	**Mongo DB Architecture** Core processes: mongod, mongo, mongos, Mongo DB tools, Standard deployment, Replication, Sharding, Production cluster architecture **Mongo DB** Data storage engine, Data file, Reads and writes, Data written using Journaling, GridFS – Mongo DB File System, Indexing **Administering Mongo DB** Tools, Bakup and Recovery, Importing and Exporting, Managing the server, Monitoring	**15**

Reference Books:

1	PostgreSQL 15.3 Documentation, The PostgreSQL Global Development Group, https://www.postgresql.org/docs
2	PostgreSQL – A comprehensive guide to building, programming, and administering PostgreSQL databases, Korry Douglas, Susan Douglas, SAMS
3	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
4	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island

Supplementary learning Material:	
1	https://spoken-tutorial.org/
2	https://swayam.gov.in/explorer
3	MongoDB Documentation
4	MongoDB Tutorial (w3schools.com)
5	MongoDB Tutorial: What It is and Features - javatpoint

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

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The weightage of internal assessment for theory/practical course will be 50%.
However, the remaining 50% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Papers are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
15	15	20	30	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn basics of PostgreSQL and SQL Syntax with required terms, Exploring data types Understanding with hands-on, to explore – Data Definition and Data Manipulation based on case studies and practical examples	**25**
CO-2	Understanding with hands-on, to explore – Operators & Built-in Functions	**25**
CO-3	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	**25**
CO-4	Understanding of MongoDB Architecture and Shell. Concept of MongoDB Administration.	**25**

Curriculum Revision:	
Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410232**

Course Title: **.NET Core Framework**

Course Group: **CORE COURSES**

Course Objectives:

ASP.NET Core is a redesign of ASP.NET, with architectural changes that result in a leaner and modular framework. ASP.NET Core provides features that help you build web APIs. To Understand the concepts of ASP.NET Core Web API and Angular to build a web site from scratch like:

1. To learn what is ASP.NET Core
2. Design Responsive UI using Html, CSS and Bootstrap.
3. Develop secure web application based on user roles.
4. To learn what is Entity Framework Core and how to use it in conjunction with ASP.NET Core Web API

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**ASP.NET Core:** Introduction to ASP.NET Core; What is ASP.NET Core? ; ASP.NET Core Features ; Advantages of ASP.NET Core ; MVC Pattern ; Understanding ASP.NET Core MVC ; ASP.NET Core vs. ASP.NET MVC vs. ASP.NET Web Forms; ASP.NET Core Environment Setup; ASP .NET Core First Application; Project Layout; Understanding Life Cycle of ASP.Net Core Request	**20**
2	**Controllers & Action Methods:** Controllers Overview; Action Methods and IActionResult object; Passing data from Controller to View; Understanding Action Selectors; Action Filters; Building Custom Action Filters; Middleware; Asynchronous Action Methods	**10**

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3	**Views & Helpers:** Introducing Razor View; Advantages of Razor View; Razor Syntax; Types of Views; Partial Views; Layout Pages; Special Views; View Categorization based on Model ; Html Helpers; Built-In Html Helpers; URL helpers; Tag Helpers; Custom Tag Helpers	**10**
4	**Model Binding:** Html Form behaviour; Model Binder Overview; DefaultModelBinder; Binding to Complex Classes ; IFormCollection Model Binding; IFormFile Model Binder; Bind Attribute ; TryUpdateModelAsync; **State Management Techniques:** Cookies; Session Security: Authentication and Authorization **MVC and Entity Framework Core:** Basic CRUD Operations using Entity Framework	**20**

Reference Books:

1	Programming ASP.NET Core, by Dino Esposito
2	Learn ASP. NET Core 3: Develop Modern Web Applications with ASP. NET Core 3, Visual Studio 2019, and Azure, 2nd Edition, by Kenneth Yamikani Fukizi, Jason De Oliveira, Michel Bruchet
3	ASP.NET Core Application Development: Building an application in four sprints By James Chambers, David Paquette, Simon Timms
4	Learning ASP.NET Core MVC Programming by Mugilan T. S. Ragupathi

Supplementary learning Material:	
1	https://www.tutorialsteacher.com/core
2	https://www.tutorialspoint.com/asp.net_core/index.htm
3	https://www.coursera.org/learn/intro-to-dotnet-core#modules

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 50%.
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In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
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3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Papers are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

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Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
20	40	15	15	5	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Ability to use ASP.NET Core framework. Understand the benefits of MVC design over traditional ASP.NET Web Forms.	**25**
CO-2	Ability to design Responsive UI using Html, CSS and Bootstrap ASP.NET Core applications. Acquiring sufficient knowledge on role of Model, View and Controller in integrating them to develop complete web application	**25**
CO-3	Ability to understand how Routing API maps requests to action methods in controller. Learn how to reuse code rendering HTML using custom HTML Helper methods and Tag Helpers.	**25**
CO-4	Ability to understanding and applying validation framework for both client and server validations. Implement security in ASP.Net Core applications. Access databases and performing CRUD operations using LINQ and Entity Framework	**25**

Curriculum Revision:	
Version:	1
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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: **Master of Science(Information Technology)**

Semester: **II**

Course Code: **101410233**

Course Title: **Data Mining Techniques & Artificial Intelligence**

Course Group: **CORE COURSES**

Course Objectives:

a) To describe the concept of Data Mining & its attributes.
b) To apply the concept of data mining components and techniques in designing data mining systems.
c) To solve basic Statistical calculations on Data.
d) To describe the aspect of data pre-processing.
e) To explain the concept of Data Cleaning & Integration.
f) To explain decision Trees and clustering.
g) To install and Configure WEKA Tool.
h) To compare various Data Mining techniques available in WEKA.
i) To learn the fundamental concepts of traditional Artificial Intelligence (AI) systems.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to data mining (DM):** Motivation for Data Mining - Data Mining-Definition and Functionalities – Classification of DM Systems - DM task primitives - Integration of a Data Mining system with a Database or a Data Warehouse - Issues in DM – KDD Process **Data Pre-processing:** Data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation, feature extraction , feature transformation, feature selection, introduction to Dimensionality Reduction, CUR decomposition	15

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2	**Concept Description, Mining Frequent Patterns, Associations and Correlations:** What is concept description? - Data Generalization and summarization-based characterization - Attribute relevance - class comparisons, Basic concept, efficient and scalable frequent item-set mining methods, mining various kind of association rules, from association mining to correlation analysis, Advanced Association Rule Techniques, Measuring the Quality of Rules	**15**
3	**Classification and Prediction:** Classification vs. prediction, Issues regarding classification and prediction, Statistical-Based Algorithms, Distance-Based Algorithms, Decision Tree-Based Algorithms, Neural Network-Based Algorithms, Rule-Based Algorithms, Combining Techniques, accuracy and error measures, evaluation of the accuracy of a classifier or predictor. Neural Network Prediction methods: Linear and nonlinear regression, Logistic Regression Introduction of tools such as DB Miner / WEKA / DTREG DM Tools	**15**
4	**Artificial Intelligence (AI) and Knowledge Based Systems (KBS)**: Natural and Artificial Intelligence ,Testing intelligence with Turing test, and Chinese room experiment, Application areas of Artificial Intelligence, Data pyramid, Production systems and AI based searches like Hill climbing and Heuristic search, KBS structure, Components of KBS, Categories of KBS, Knowledge Based Shell, Advantages, Limitations and Applications of KBS, Knowledge acquisition, Knowledge update, Factual and procedural knowledge representations ,Knowledge management cycle	**15**

Reference Books:

1	**Jiawei Han & Micheline Kamber, "Data Mining: Concepts & Techniques", Morgan Kaufmann Publishers (2002)**
2	**J. Han, M. Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann**
3	**M. Kantardzic, "Data mining: Concepts, models, methods and algorithms, John Wiley &Sons Inc.**
4	**M. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education.**
5	**Rushell and Norvig, Modern Approach to Artificial Intelligence, Prentice Hall of India Ltd., 2009.**

Supplementary learning Material:	
1	**https://www.javatpoint.com/data-mining**
2	**https://www.geeksforgeeks.org/data-mining-techniques/**
3	**https://www.guru99.com/data-mining-tutorial.html**
4	**https://www.javatpoint.com/artificial-intelligence-ai**

Pedagogy:

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The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

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practical.

In-Semester Continuous internal evaluation:

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Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
10	**40**	**20**	**10**	**10**	**10**	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	**Perform the preprocessing of data and apply mining techniques on it.**	**25**
CO-2	**Identify the association rules, classification, and clusters in large data sets.**	**25**
CO-3	**Solve real world problems in business and scientific information using data mining.**	**25**
CO-4	**Understanding of fundamental concepts related to artificial intelligence and Understanding of the applications of artificial intelligence in various domains.**	**25**

Curriculum Revision:	
Version:	1
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Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410234**

Course Title: **Practical Based on Databases – Beginner to Professional**

CourseGroup: **CORE COURSES**

Course Objectives:

- Exploring knowledge of Relational Databases and NoSQL Databases.
- Application of RDBMS and NoSQL
- Implement different features of Databases based on software application
- It helps to developer to build applications, administrators to protect data integrity and build fault-tolerance environments

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* **J**: Jury; **V**: Viva; **P**:Practical

List of Practical:

To practice basic problem definitions, refer "w3schools" learning portal. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:	
1	PostgreSQL 15.3 Documentation, The PostgreSQL Global Development Group, https://www.postgresql.org/docs
2	PostgreSQL – A comprehensive guide to building, programming, and administering PostgreSQL databases, Korry Douglas, Susan Douglas, SAMS
3	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
4	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island
Supplementary learning Material:	

1	https://spoken-tutorial.org/
2	https://swayam.gov.in/explorer
3	MongoDB Documentation
4	MongoDB Tutorial (w3schools.com)
5	MongoDB Tutorial: What It is and Features - javatpoint

Pedagogy:

- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn basics of PostgreSQL and SQL Syntax with required terms, Exploring data types Understanding with hands-on, to explore – Data Definition and Data Manipulation based on case studies and practical examples	**25**
CO-2	Understanding with hands-on, to explore – Operators & Built-in Functions	**25**
CO-3	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	**25**
CO-4	Understanding of MongoDB Architecture and Shell. Concept of MongoDB Administration.	**25**

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CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410235**

Course Title: **Practical Based on .NET Core Framework**

CourseGroup: **CORE COURSES**

Course Objectives:

- To design and develop ASP.NET Core applications.
- To design Responsive UI using Html, CSS and Bootstrap.
- To develop secure web application based on user roles.
- To develop web application using Entity Framework Core and how to use it in conjunction with ASP.NET Core Web API

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* **J**: Jury; **V**: Viva; **P**:Practical

List of Practical:

To practice https://www.tutorialspoint.com/asp.net_core/index.htm More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

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1	Programming ASP.NET Core, by Dino Esposito
2	Learn ASP. NET Core 3: Develop Modern Web Applications with ASP. NET Core 3, Visual Studio 2019, and Azure, 2nd Edition, by Kenneth Yamikani Fukizi, Jason De Oliveira, Michel Bruchet
3	ASP.NET Core Application Development: Building an application in four sprints By James Chambers, David Paquette, Simon Timms
4	Learning ASP.NET Core MVC Programming by Mugilan T. S. Ragupathi
Supplementary learning Material:	
1	https://www.tutorialsteacher.com/core
2	https://www.coursera.org/learn/intro-to-dotnet-core#modules

Pedagogy:
• Explain / justify all the Program Definitions and correlate to real world problems and solution • Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment • Internal / External Examination as per the norms of CVM University

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R	**U**	**A**	**N**	**E**	**C**	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Ability to use ASP.NET Core framework. Understand the benefits of MVC design over traditional ASP.NET Web Forms.	**25**
CO-2	Ability to design Responsive UI using Html, CSS and Bootstrap ASP.NET Core applications. Acquiring sufficient knowledge on role of Model, View and Controller in integrating them to develop complete web application	**25**
CO-3	Ability to understand how Routing API maps requests to action methods in controller. Learn how to reuse code rendering HTML using custom HTML Helper methods and Tag Helpers.	**25**
CO-4	Ability to understanding and applying validation framework for both client and server validations. Implement security in ASP.Net Core applications. Access databases and performing CRUD operations using LINQ and Entity Framework	**25**

Curriculum Revision:	
Version:	1
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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410236**

Course Title: **Python Framework**

Course Group: **ELECTIVE**

Course Objectives:

a) Understand technical concepts of Django and Flask Framework
b) Learners can take web applications from concept to launch in a matter of hours.
c) Django takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.
d) Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction – Django Framework:** Design principles, Introduction - URLs, Templates, Apps, Understand setup of Django admin site App **Django – URLs and Views:** URL – Regular expressions, Parameters and Query strings, Consolidation and Modularization, Naming and Namespace Views – Method requests and response, Method middleware, Flash messages, Classbased views **Django – Templates:** Syntax, Configuration, Reusable template, Built-in context processors, Custom context processors, Built-in Filters and Tags, Custom filters	15

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2	**Django – Application Management:** Manage Django setting.py, Static web-page resources, Logging, Email service, Debug Django applications, Django management commands **Django – Forms:** Structure and Workflow, Form processing – Initialization, Field access, Validation, Error handling, Form field type – Widgets, Options and Validations, Layout Django forms in Templates, Advanced form processing, Formsets	**15**
3	**Django – Models:** Workflow, Data types, Default and custom behaviors, Relationships in Django models, Transactions, Model Migrations, Database task, Initial data setup, Signals, Learn model.py, Models and multiple databases **Django – Model Queries and Managers:** CRUD single records in Django models, CRUD multiple records in Django models	**13**
4	**Flask:** Introduction, Basic application structure – Initialization, Routes and view functions, Debug mode, Command-line options, Request-Response cycle, Flask extension, Case study – The blog project	**17**

Reference Books:

1	Beginning Django – Web Application Development and Deployment with Python, Apress, Daniel Rubio
2	Practical Django 2 and Channels 2, Apress, Federico Marani
3	Beginning Django E-Commerce, Apress, Jim McGaw
4	Learning Flask Framework, PACKT, Matt Copperwait, Charles Leifer
5	Flask Web Development, O'REILLY, Miguel Grinberg

Supplementary learning Material:	
1	https://www.djangoproject.com/
2	https://www.w3schools.com/django/
3	https://www.tutorialspoint.com/python_web_development_libraries/python_web_development_libraries_django_framework.htm
4	https://www.javatpoint.com/django-tutorial

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 50%.
However, the remaining 50% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal

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evaluation.
4. Presentation/Online Course Work/Research Papers are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
20	40	15	15	5	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Django and Flask frameworks help in development by easing common tasks in the majority of web projects. These frameworks are helpful to make web project more reliable because it offers variety in terms of tools and resources.	**25**
CO-2		**25**
CO-3		**25**
CO-4		**25**

Curriculum Revision:	
Version:	1
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CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410237**

Course Title: **PRACTICAL BASED ON PYTHON FRAMEWORK**

CourseGroup: **ELECTIVE**

Course Objectives:

- To be able to understand technical concepts of Django and Flask Framework
- To perform development of web applications from concept to launch in a matter of hours.
- Django takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* **J**: Jury; **V**: Viva; **P**:Practical

List of Practical:

To practice https://www.python.org/doc/. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:	
1	Beginning Django – Web Application Development and Deployment with Python, Apress, Daniel Rubio
2	Practical Django 2 and Channels 2, Apress, Federico Marani
3	Programming in Python 3- A Complete Introduction to Python Language, Mark Addition-Wesley
4	Beginning Django E-Commerce, Apress, Jim McGaw
5	Learning Flask Framework, PACKT, Matt Copperwait, Charles Leifer
6	Flask Web Development, O'REILLY, Miguel Grinberg
Supplementary learning Material:	
1	https://www.python.org/doc/
2	https://www.djangoproject.com/
3	https://www.w3schools.com/django/

4	https://www.tutorialspoint.com/python_web_development_libraries/python_web_development_libraries_django_framework.htm
5	https://www.javatpoint.com/django-tutorial

Pedagogy:

- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
5	15	20	10	20	30	

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Django and Flask frameworks help in development by easing common tasks in the majority of web projects. These frameworks are helpful to make web project more reliable because it offers variety in terms of tools and resources.	**25**
CO-2		**25**
CO-3		**25**
CO-4		**25**

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410238**

Course Title: **Internet of Things (IoT)**

Course Group: **ELECTIVE**

Course Objectives:

a) This subject covers the fundamentals of IoT with its architecture, protocols and Applications.
b) It also covers the overview and programming of two widely used IoT platforms Arduino and Raspberry Pi.
c) Understanding the communication protocols and Information Theory in IoT.
d) Gaining knowledge of domain specific IoT

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction of IOT:** Introduction Of IOT; Introduction-Definition & Characteristics Of IoT , Physical Design Of IoT- Things In IoT; Introduction Of IOT Reference Architecture and IOT Reference Model; IOT Application Fields ; Threads And Security Issues With IOT System	15
2	**IOT hardware platforms of IOT end devices:** Sensing devices and smart IOT end points: Sensors, sensor devices and Input devices, Actuators; Introduction of Embedded system and its role in IOT; Embedded system microcontroller architecture; Introduction IOT system educational Hardware development platforms: Arduino and Raspberry Pi; Introduction of Raspberry Pi hardware Peripherals	15

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3	**IOT communication Protocols and information theory :** RF energy and theoretical range; Short range communication used in IOT: Non-IP based and IP based WPAN (Wireless personal area network) and its protocols; Long rang communication(LPWAN) used in IOT and its protocols; IOT edge to cloud protocols, Cloud service models; Introduction of Data management system for IOT	**13**
4	**Domain Specific IoTs :**Home Automation: Smart Lighting, Smart Appliances, Intrusion Detection, Smoke/Gas Detectors, Cities-Smart Parking, Smart Lighting, Smart Roads, Structural Health Monitoring, Surveillance, Emergency Response, Environment-Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring, Forest Fire Detection , River Floods Detection , Retail-Inventory Management , Smart Payments , Smart Vending Machines , Logistics-Route Generation & Scheduling , Shipment Monitoring , Remote Vehicle Diagnostics, Agriculture-Smart Irrigation ,Green House Control ,Industry - Machine Diagnosis & Prognosis Indoor Air Quality Monitoring ,Health & Lifestyle -Health & Fitness Monitoring, Wearable Electronics IoT	**17**

Reference Books:

1	Vijay Madisetti & Arshdeep Bahga, Internet of Things (A Hands-on-Approach), 1st Ed., VPT, 2014
2	Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1-4493- 9357-1
3	Internet of Things architecture and Design Principles, Raj Kamal, McGrawhill Education private limited, 2017
4	Learning Internet of Things, Peter Waher, / Packt Publishing Limited, 2015
5	Internet of Things: Technologies and Applications for a New Age of Intelligence,Vlasios Tsiatsis, Stamatis Karnouskos and Jan Holler, Academic Press, 2018
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7	The Internet of Things, Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley, 2018
8	Designing the Internet of Things, Adrian McEwen & Hakim Cassimally, Wiley, 2018
9	The Internet of Things, Hakima Chaouchi, Wiley, 2017

Supplementary learning Material:	
1	https://www.tutorialspoint.com/internet_of_things/index.htm
2	https://www.iotworldtoday.com
3	https://aws.amazon.com/iot
4	https://github.com/connectIOT/iottoolkit
5	https://www.arduino.cc

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
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The weightage of internal assessment for theory/practical course will be 50%.
However, the remaining 50% weightage for theory/practical courses will be for End-Semester

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand the vision of IoT from a global context.	**25**
CO-2	Building state of the art architecture in IoT. Understand the IOT hardware platforms of IOT end devices. Demonstrate the architecture and functioning of IoT systems including the sensors and microcontrollers with their interfacing and software need considering application areas.	**25**
CO-3	Use of Devices, Gateways and Data Management in IoT. Diagnose the various IoT protocols with detailing of their elements and overall functioning within IoT systems for efficient communication. Design an IoT system to take the benefit of the Clouds for computing and storage considering security issues	**25**
CO-4	Understand the application of IoT. Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints. Leverage the benefits of IoT technologies for automating the various real-life challenges in various application areas. Develop the software components of IoT system using Arduino/Raspberry Pi Programming.	**25**

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FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: **Master of Science (Information Technology)**

Semester: **II**

Course Code: **101410239**

Course Title: **Practical Based on Internet of Things (IoT)**

CourseGroup: **ELECTIVE**

Course Objectives:

- This subject covers the fundamentals of IoT with its architecture, protocols and Applications.
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- Understanding the communication protocols and Information Theory in IoT.
- Gaining knowledge of domain specific IoT

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