



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Computer Network

Course Group: Core Courses

Course Objectives:

Understanding of Computer Network concepts like:

- To develop an understanding of computer networking basics. Understand the concepts of data communication and networks, TCP/IP and OSI reference models.
- Understand, describe, analyse and evaluate the services of network layer, Link layer, Transport layer and application layer.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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 computer networks and Internet: Understanding of network and Internet, The network edge, The network core, Understanding of Delay, Loss and Throughput in the packet switching network, protocols layers and their service model, History of the computer network Application Layer: Principles of computer applications, Web and HTTP, E-mail, DNS, Socket programming with TCP and UDP	20
2	Transport Layer: Introduction and transport layer services, Multiplexing and Demultiplexing, Connectionless transport (UDP), Principles of reliable data transfer, Connection-oriented transport (TCP), Congestion control, TCP congestion control	20
3	Network Layer: Introduction to forwarding and routing, Network Service models, Virtual and Datagram networks, study of router, IP protocol and addressing in the Internet, Routing algorithms, Broadcast and Multicast routing	10



4	The Link layer and Local area networks: Introduction to link layer services, error-detection and correction techniques, Multiple access protocols, addressing, Ethernet, switches, VLAN	10
----------	--	-----------

Reference Books/Audio-visual Course:

1	Computer Networking- A Top-Down approach (6th edition), Kurose and Ross, Pearson
2	Computer Networks- A Top-Down approach, Behrouz Forouzan, McGraw Hill
3	Computer Networks (5th edition), Andrew Tanenbaum, Prentice Hall
4	Computer Networking: A Top - Down Approach, by Ames Kurose, Keith Ross
5	Computer Networks - Andrew S Tanenbaum
6	Computer Networks: A Systems Approach Book by Bruce S. Davie and Larry L. Peterson
7	Data Communications and Networking (5th edition), Behrouz Forouzan, McGraw Hill
8	TCP/IP Protocol Suite (4th edition), Behrouz Forouzan, McGraw Hill

Supplementary learning Material:

1	https://www.coursera.org/learn/fundamentals-network-communications
2	https://nptel.ac.in/courses/106105080
3	https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand the basics of computer networks and Internet. Also understand Application Layer in detail.	25
CO-2	Understand the Transport Layer	25
CO-3	Understand the Network Layer	25
CO-4	Understand the Link layer and Local area networks	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: NoSQL Databases

Course Group: Core Courses

Course Objectives:

Understanding of Computer Network concepts like:

- c) NoSQL systems are purpose-built solutions, designed to address specific technical requirements. NoSQL systems originated to provide high throughput, fault-tolerant horizontally scalable simple data storage and retrieval with a bare minimum of additional functionality.
- d) The structure of many different forms of data is more easily handled and evolved with a NoSQL database. NoSQL databases are often better suited to storing and modeling structured, semi-structured, and unstructured data in one database.
- e) Non-relational databases allow for great adaptability and flexibility, making it a more suitable choice when handling large sets of unstructured and unrelated data.

Teaching & Examination Scheme:

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

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

Detailed Syllabus:

Sr.	Contents	Hours
1	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	15



2	Mongo DB Shell: Basic Querying, Conditional operators, Regular expression, MapReduce, Relational data modeling approach and normalization, Document data model approach Mongo DB Architecture: Core processes: mongod, mongo, mongos, Mongo DB tools, Standard deployment, Replication, Sharding, Production cluster architecture	12
3	Mongo DB: Data storage engine, Data file, Reads and writes, Data written using Journaling, GridFS - Mongo DB File System, Indexing Administering Mongo DB: Tools, Backup and Recovery, Importing and Exporting, Managing the server, Monitoring	15
4	Mongo DB Use Cases: Use Case-1: Performance monitoring, Use Case-2: Social networking Mongo DB Limitations and Best Practices	18

Reference Books/Audio-visual Course:

1	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
2	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island

Supplementary learning Material:

1	https://www.mongodb.com/docs/
2	https://www.w3schools.com/mongodb/index.php
3	https://www.javatpoint.com/mongodb-tutorial

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	25
CO-2	Understanding of MongoDB Architecture and Shell.	25
CO-3	Concept of MongoDB Administration.	25
CO-4	Different Use cases for practical application.	25



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Software Engineering and Agile

Course Group: Core Courses

Course Objectives:

- To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. To give the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.
- Understanding of software requirements and the SRS documents. Understanding of the role of project management including planning, scheduling, risk management, etc.
- Explain the different software architectural styles. Understanding of implementation issues such as modularity and coding standards.
- Understanding of software testing approaches such as unit testing and integration testing.
- Describe software measurement and software risks. Understanding of software evolution and related issues such as version management. Analyzing on quality control and how to ensure good quality software.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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: Introduction to Software Engineering, Defining Software, Changing Nature of Software, Attributes of a Good Software, Software Development Life Cycle, Software Process, Software Myths, Current Trends in Software Engineering, Web Engineering, Reengineering Software Process Models: Waterfall Model, Prototyping Model, Iterative Model, Time Boxing Model and Spiral Model, Introduction to Basic Concepts of Agile Software Development	12



2	Software Project Management: Responsibilities of a Software Project Manager, Project Planning, Metrics or Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO Model, An Analytical Technique, Staffing Level Estimation, Scheduling, Organization and Team Structures, Staffing, Risk Management, Software Configuration Management Requirements Analysis and Specification: Requirements Gathering and Analysis, Software Requirements Specification, Formal System Specification, Axiomatic Specification, Algebraic Specification	15
3	Software Design: Design Concepts and Design Principal, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design, FunctionOriented Software Design (Overview), User Interface Design (Characteristics of A Good User Interface, Basic Concepts, Types of User Interfaces) Object Oriented Analysis & Design Tool – UML: UML Overview, Class Diagram, Activity Diagram, Sequence and Collaboration Diagram, State Chart Diagram, Use Case Diagram	18
4	Software Coding & Testing: Coding, Code Review, Software Documentation, Testing, Unit Testing, Debugging, Program Analysis Tools, Integration Testing. Software Maintenance: Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models, Estimation of Maintenance Cost	15

Reference Books/Audio-visual Course:

1	Jalote Pankaj : Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, 2005 (ISBN 978-81-7319-702-4).
2	Roger Pressman , Software Engineering, A Practitioners Approach, McGraw Hill Publication
3	Ivar Jacobson, Object Oriented Software Engineering A use case Approach , Pearson
4	Rajib Mall : Fundamentals of Software Engineering, 2 nd Edition, Prentice-Hall of India, 2006 (ISBN-81-203-2445-5)
5	James A Senn : Analysis and Design of Information Systems McGraw Hill Intl. Std. Edn, 1985
6	C Lliu: Elements of Descrete Mathematics – TMH
7	Swapan Kumar chakraborty and Bikash Kanti Sarkar: Discrete Mathematics – OXFORD Higher Education
8	Ian Sommerville : Software Engineering, 6th edition, Pearson Education, 2001, (ISBN 81 7808-497-X)

Supplementary learning Material:

1	https://nptel.ac.in/courses/106101061
2	https://www.edx.org/course/software-engineering-essentials
3	https://www.mooc-list.com/course/object-oriented-design-coursera
4	https://onlinecourses.nptel.ac.in/noc20_cs68/preview

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University



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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand about the Software Development Life Cycle. Distinguish different process model for a software development. Analyze the model according the requirement.	25
CO-2	Design software requirements specification solution for a given problem definitions of a software system. Identify user needs and formulate software specifications, analyze requirements by applying various modeling techniques, Translate the requirements model into the design model.	25
CO-3	Understand the importance of User-interface design principles in software development, the concepts of clean room software development.	25
CO-4	Examine testing concepts and identify them to develop error free software. Evaluate the risk and quality issues in project management, validate the solutions and construct alternate solutions if there is a need. Students can apply the knowledge, techniques, and skills in the development of a software product.	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Practical Based on NoSQL Databases

Course Group: Core Courses

Course Objectives:

- NoSQL systems are purpose-built solutions, designed to address specific technical requirements. NoSQL systems originated to provide high throughput, fault-tolerant horizontally scalable simple data storage and retrieval with a bare minimum of additional functionality.
- The structure of many different forms of data is more easily handled and evolved with a NoSQL database. NoSQL databases are often better suited to storing and modeling structured, semi-structured, and unstructured data in one database.
- Non-relational databases allow for great adaptability and flexibility, making it a more suitable choice when handling large sets of unstructured and unrelated data.

Teaching & Examination Scheme:

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

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

List of Practical:

Below mentioned problem definitions are for basic practice. 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.

```
Structure of 'restaurants' collection: [Ref.: https://www.w3resource.com/mongodb-exercises/]  
{  
  "address": {  
    "building": "1007",  
    "coord": [ -73.856077, 40.848447 ],  
    "street": "Morris Park Ave",  
    "zipcode": "10462"  
  },  
}
```



```
"borough": "Bronx",
"cuisine": "Bakery",
"grades": [
  {"date": {"$date": 1393804800000 }, "grade": "A", "score": 2 },
  {"date": {"$date": 1378857600000 }, "grade": "A", "score": 6 },
  {"date": {"$date": 1358985600000 }, "grade": "A", "score": 10 },
  {"date": {"$date": 1322006400000 }, "grade": "A", "score": 9 },
  {"date": {"$date": 1299715200000 }, "grade": "B", "score": 14 }
],
"name": "Morris Park Bake Shop",
"restaurant_id": "30075445"
}
```

1. Write a MongoDB query to display all the documents in the collection restaurants.
2. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine for all the documents in the collection restaurant.
3. Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine, but exclude the field _id for all the documents in the collection restaurant.
4. Write a MongoDB query to display the fields restaurant_id, name, borough and zip code, but exclude the field _id for all the documents in the collection restaurant.
5. Write a MongoDB query to display all the restaurant which is in the borough Bronx.
6. Write a MongoDB query to display the first 5 restaurant which is in the borough Bronx.
7. Write a MongoDB query to display the next 5 restaurants after skipping first 5 which are in the borough Bronx.
8. Write a MongoDB query to find the restaurants who achieved a score more than 90.
9. Write a MongoDB query to find the restaurants that achieved a score, more than 80 but less than 100.
10. Write a MongoDB query to find the restaurants which locate in latitude value less than -95.754168.
11. Write a MongoDB query to find the restaurants that do not prepare any cuisine of 'American' and their grade score more than 70 and latitude less than -65.754168.
12. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American' and achieved a score more than 70 and located in the longitude less than -65.754168.
Note : Do this query without using \$and operator.
13. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American' and achieved a grade point 'A' not belongs to the borough Brooklyn. The document must be displayed according to the cuisine in descending order.
14. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those



restaurants which contain 'Wil' as first three letters for its name.

15. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'ces' as last three letters for its name.
16. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Reg' as three letters somewhere in its name.
17. Write a MongoDB query to find the restaurants which belong to the borough Bronx and prepared either American or Chinese dish.
18. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which belong to the borough Staten Island or Queens or Bronx or Brooklyn.
19. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which are not belonging to the borough Staten Island or Queens or Bronx or Brooklyn.
20. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which achieved a score which is not more than 10.
21. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'.
22. Write a MongoDB query to find the restaurant Id, name, and grades for those restaurants which achieved a grade of "A" and scored 11 on an ISODate "2014-08-11T00:00:00Z" among many of survey dates.
23. Write a MongoDB query to find the restaurant Id, name and grades for those restaurants where the 2nd element of grades array contains a grade of "A" and score 9 on an ISODate "2014-08-11T00:00:00Z".
24. Write a MongoDB query to find the restaurant Id, name, address and geographical location for those restaurants where 2nd element of coord array contains a value which is more than 42 and upto 52.
25. Write a MongoDB query to arrange the name of the restaurants in ascending order along with all the columns.
26. Write a MongoDB query to arrange the name of the restaurants in descending along with all the columns.
27. Write a MongoDB query to arranged the name of the cuisine in ascending order and for that same cuisine borough should be in descending order.
28. Write a MongoDB query to know whether all the addresses contains the street or not.
29. Write a MongoDB query which will select all documents in the restaurants collection where the



coord field value is Double.

30. Write a MongoDB query which will select the restaurant Id, name and grades for those restaurants which returns 0 as a remainder after dividing the score by 7.
31. Write a MongoDB query to find the restaurant name, borough, longitude and attitude and cuisine for those restaurants which contains 'mon' as three letters somewhere in its name.
32. Write a MongoDB query to find the restaurant name, borough, longitude and latitude and cuisine for those restaurants which contain 'Mad' as first three letters of its name.
33. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5.
34. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan.
35. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn.
36. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn, and their cuisine is not American.
37. Write a MongoDB query to find the restaurants that have at least one grade with a score of less than 5 and that are located in the borough of Manhattan or Brooklyn, and their cuisine is not American or Chinese.
38. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6.
39. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan.
40. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn.
41. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American.
42. Write a MongoDB query to find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American or Chinese.
43. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade with a score of 6.
44. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade



with a score of 6 and are located in the borough of Manhattan.

45. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn.
46. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American.
47. Write a MongoDB query to find the restaurants that have a grade with a score of 2 or a grade with a score of 6 and are located in the borough of Manhattan or Brooklyn, and their cuisine is not American or Chinese.
48. Write a MongoDB query to find the restaurants that have all grades with a score greater than 5.
49. Write a MongoDB query to find the restaurants that have all grades with a score greater than 5 and are located in the borough of Manhattan.
50. Write a MongoDB query to find the restaurants that have all grades with a score greater than 5 and are located in the borough of Manhattan or Brooklyn.
51. Write a MongoDB query to find the average score for each restaurant.
52. Write a MongoDB query to find the highest score for each restaurant.
53. Write a MongoDB query to find the lowest score for each restaurant.
54. Write a MongoDB query to find the count of restaurants in each borough.
55. Write a MongoDB query to find the count of restaurants for each cuisine.
56. Write a MongoDB query to find the count of restaurants for each cuisine and borough.
57. Write a MongoDB query to find the count of restaurants that received a grade of 'A' for each cuisine.
58. Write a MongoDB query to find the count of restaurants that received a grade of 'A' for each borough.
59. Write a MongoDB query to find the count of restaurants that received a grade of 'A' for each cuisine and borough.
60. Write a MongoDB query to find the number of restaurants that have been graded in each month of the year.
61. Write a MongoDB query to find the average score for each cuisine.
62. Write a MongoDB query to find the highest score for each cuisine.
63. Write a MongoDB query to find the lowest score for each cuisine.
64. Write a MongoDB query to find the average score for each borough.
65. Write a MongoDB query to find the highest score for each borough.
66. Write a MongoDB query to find the lowest score for each borough.



67. Write a MongoDB query to find the name and address of the restaurants that received a grade of 'A' on a specific date.
68. Write a MongoDB query to find the name and address of the restaurants that received a grade of 'B' or 'C' on a specific date.
69. Write a MongoDB query to find the name and address of the restaurants that have at least one 'A' grade and one 'B' grade.
70. Write a MongoDB query to find the name and address of the restaurants that have at least one 'A' grade and no 'B' grades.
71. Write a MongoDB query to find the name, address and grades of the restaurants that have at least one 'A' grade and no 'C' grades.
72. Write a MongoDB query to find the name, address, and grades of the restaurants that have at least one 'A' grade, no 'B' grades, and no 'C' grades.
73. Write a MongoDB query to find the name and address of the restaurants that have the word 'coffee' in their name.
74. Write a MongoDB query to find the name and address of the restaurants that have a zipcode that starts with '10'.
75. Write a MongoDB query to find the name and address of the restaurants that have a cuisine that starts with the letter 'B'.
76. Write a MongoDB query to find the name, address, and cuisine of the restaurants that have a cuisine that ends with the letter 'y'.
77. Write a MongoDB query to find the name, address, and cuisine of the restaurants that have a cuisine that contains the word 'Pizza'.
78. Write a MongoDB query to find the restaurants achieved highest average score.
79. Write a MongoDB query to find all the restaurants with the highest number of "A" grades.
80. Write a MongoDB query to find the cuisine type that is most likely to receive a "C" grade.
81. Write a MongoDB query to find the restaurant that has the highest average score for the cuisine "Turkish".
82. Write a MongoDB query to find the restaurants that achieved the highest total score.
83. Write a MongoDB query to find all the Chinese restaurants in Brooklyn.
84. Write a MongoDB query to find the restaurant with the most recent grade date.
85. Write a MongoDB query to find the top 5 restaurants with the highest average score for each cuisine type, along with their average scores.
86. Write a MongoDB query to find the top 5 restaurants in each borough with the highest number of "A" grades.



87. Write a MongoDB query to find the borough with the highest number of restaurants that have a grade of "A" and a score greater than or equal to 90.

Reference Books/Audio-visual Course:

1	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
2	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island

Supplementary learning Material:

1	https://www.mongodb.com/docs/
2	https://www.w3schools.com/mongodb/index.php
3	https://www.javatpoint.com/mongodb-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 (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	
5	15	20	10	20	30	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	25
CO-2	Understanding of MongoDB Architecture and Shell.	25
CO-3	Concept of MongoDB Administration.	25
CO-4	Different Use cases for practical application.	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Advanced Web Application Development

Course Group: Elective Courses - I

Course Objectives:

- a) Understand technical concepts of Laravel Framework
- b) To learn built-in authentication and authorization
- c) Artisan console
- d) Task scheduling and MVC
- e) 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)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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: Use of Laravel, How it Works!, Configure Laravel Environment, Directory Structure Route and Controllers: Route: Definitions, Group, Signed route, Model binding, Caching Controller: User input, Inject dependencies Form method spoofing, Redirects, Aborting the request, Custom Response	15
2	Control Structure: Echoing data, Conditions and Loops, Template inheritance, View composer and Service Injection Databases and Eloquent: Configuration, Seeding, Query builder, Eloquent: Introduction, Create & define model, Retrieve data, Insert, update and delete data, Scopes, Collections, Serialization, Relationship, Events	15



3	Frontend Components: Laravel mix, Frontend Presets and Auth Scaffolding, Pagination, Named error bags, String Helpers, Pluralization and Localization Collecting and Handling User Data: Injecting a request object, Route data, Upload files, Validation, Form requests, Eloquent model mass assignment	15
4	Artisan and Tinker: Introduction, Basic commands, Custom commands, Calling commands in Normal Code, Tinker and Laravel dump server Request, Response and Middleware: Request life cycle, Request object, Response object, Laravel and Middleware	15

Reference Books/Audio-visual Course:

1	Beginning Laravel, Apress, Sanjib Sinha
2	Design Patterns in PHP and Laravel, Apress, Kelt Dockins
3	A Laravel Up & Running (A framework for Building Modern PHP Apps), O'REILLY, Matt Stauffer

Supplementary learning Material:

1	https://laravel.com/docs/9.x/readme
2	https://www.tutorialspoint.com/laravel/laravel_overview.htm
3	https://github.com/laravel/laravel
4	https://www.javatpoint.com/laravel

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Laravel framework helps in development by easing common tasks in the majority of web projects. This framework is 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



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Practical Based on Advanced Web Application Development

Course Group: Elective Courses - I

Course Objectives:

- Strong foundation in the Laravel (PHP Framework) Programming
- Provide platform to build professional and excellent career in the IT industry

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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 “javapoints and tutorialpoints” 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/Audio-visual Course:

1	Beginning Laravel, Apress, Sanjib Sinha
2	Design Patterns in PHP and Laravel, Apress, Kelt Dockins
3	A Laravel Up & Running (A framework for Building Modern PHP Apps), O'REILLY, Matt Stauffer

Supplementary learning Material:

1	https://laravel.com/docs/9.x/readme
2	https://www.tutorialspoint.com/laravel/laravel_overview.htm
3	https://github.com/laravel/laravel
4	https://www.javatpoint.com/laravel



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 (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	
5	15	20	10	20	30	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Laravel framework helps in development by easing common tasks in the majority of web projects. This framework is 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:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Web Development using Python

Course Group: Elective Courses - I

Course Objectives:

- Understand technical concepts of Django and Flask Framework
- Learners can take 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.
- 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)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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, Class-based views Django – Templates: Syntax, Configuration, Reusable template, Built-in context processors, Custom context processors, Built-in Filters and Tags, Custom filters	15



2	<p>Django – Application Management: Manage Django setting.py, Static web-page resources, Logging, Email service, Debug Django applications, Django management commands</p> <p>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</p>	20
3	<p>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</p> <p>Django – Model Queries and Managers: CRUD single records in Django models, CRUD multiple records in Django models</p>	15
4	<p>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</p>	10

Reference Books/Audio-visual Course:

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:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	



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:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Practical Based on Web Development using Python

Course Group: Elective Courses - I

Course Objectives:

- a) Strong foundation in the Django and Flaks Framework Programming
- b) Provide platform to build professional and excellent career in the IT industry

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				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 “javapoints and tutorialpoints” 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/Audio-visual Course:

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:

- 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 (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	
5	15	20	10	20	30	

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:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Cyber Security

Course Group: Elective Courses - II

Course Objectives:

- a) Cybersecurity is critical because it helps to protect organizations and individuals from cyber attacks. Cybersecurity can help to prevent data breaches, identity theft, and other types of cybercrime. Organizations must have strong cybersecurity measures to protect their data and customers.
- b) Cybersecurity is the protection of internet-connected systems such as hardware, software and data from cyberthreats. The practice is used by individuals and enterprises to protect against unauthorized access to data centers and other computerized systems.

Teaching & Examination Scheme:

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

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

Detailed Syllabus:

Sr.	Contents	Hours
1	Cyber Security: Introduction and concept, Issues and challenges of cyber security, Definition: Cyberspace, Architecture of Cyberspace, Regulation of Cyberspace, Cyber security terminology, Cyberspace attack, Protection of end user machine	10
2	Cyber Crime: Classification of cyber crimes, Common cyber crimes, Cyber crime targeting computers and mobiles, financial frauds, Social engineering attacks, malware and ransomware attacks, zero day and zero click attacks.	10
3	Data Privacy and Data Security: Definition: Data, meta-data, big data, and non-personal data, Data protection, Data privacy and data security, Personal Data Protection Bill and its compliance, Data protection principles, Big data security issues and challenges, Data protection regulations of other countries- General Data Protection Regulations(GDPR),2016 Personal Information Protection and Electronic Documents	15



	Act (PIPEDA), Social media- data privacy and security issues.	
4	Social Media Security: Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media	10

Reference Books/Audio-visual Course:

1	Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2	Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3	Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4	Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5	Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6	Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
7	Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Supplementary learning Material:

1	https://nptel.ac.in/courses/106105031
2	https://nptel.ac.in/courses/106106129

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Introduction and concept of cyber security, Cyber space and basic terminology.	25
CO-2	Understanding classification of cyber crimes and different attacks.	25
CO-3	Understanding the concept of data privacy and its policy.	25
CO-4	Use case based on social media security.	25

Curriculum Revision:



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: III

Course Code:

Course Title: Test Automation

Course Group: Elective Courses - II

Course Objectives:

- Automated Testing Saves Time and Money. Manually repeating these tests is costly and time consuming. Once created, automated tests can be run over and over again at no additional cost and they are much faster than manual tests. Automated software testing can reduce the time to run repetitive tests from days to hours.
- It helps to improve the overall software testing activities by enabling a high-quality product in a shorter time with faster releases.

Teaching & Examination Scheme:

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

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

Detailed Syllabus:

Sr.	Contents	Hours
1	Test Automation: Introduction, need of Test Automation, Benefits, Manual vs Automated testing, Choose right tool, Relation between Test Automation and Business Processes for developing software	10
2	Selenium Part – I: Introduction, Advantages and disadvantages, IDE, Environment Setup Locators: Finding elements by: name, ID, link text, DOM via Java Script, XPath, and CSS WebDriver: History, Architecture, Working with: ChromeDriver, FireFoxDriver	15
3	Selenium Part – II: Selenium Grid: Launching the hub, Adding instance to the hub, Adding server with defaults Advanced user interactions, Working with HTML5	10
4	Selenium Part – III: Synchronization test, Data-Driven testing, Page object model, Behaviour-driven development, Corss-browser testing	10



Reference Books/Audio-visual Course:

1	Complete Guide to Test Automation, Arnon Axelrod, Apress
2	Selenium 2 Testing Tools – Beginner’s Guide, David Burns, PACKT
3	Selenium Testing Tools Cookbook, Unmesh Gundecha, PACKT

Supplementary learning Material:

1	https://www.javatpoint.com/selenium-tutorial
2	https://www.tutorialspoint.com/selenium/index.htm

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

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	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Concepts and applications of test automation.	25
CO-2	Introduction of different web drivers.	25
CO-3	Selenium: Setup, Configuration and Application in various environments	25
CO-4	based on different testing models.	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Computer Application (MCA)

Semester: IV

Course Code:

Course Title: Project Work

Course Group: Core Courses

Course Objectives:

- To provide the hands on experience in analyzing, designing and implementing various projects, students are assigned major projects based on the languages they have learned so far.
- To solve industrial (or society or research) problems.
- To plan, schedule, and monitor the software project.
- To develop, code, and test a large project cohesively.
- To learn documentation of a project.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	--	25	--	--	300/120	300/120	100/40

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

Guidelines:

Sr.	Contents
1	The project definition should be finalized after 3rd semester Examinations.
2	It is recommended that the team should be maximum about 2-3 students
3	Project plan [along with the division of work amongst teammates] would have been prepared and got approved within a maximum of 01 week of the start of the project.
4	It is advisable that object-oriented methodology is used with the reusability of classes and code, etc..
5	The output reports in the form of documentation should include a chapter on "Learning during Project Work", i.e. "Experience of Journey during Project Duration"
6	Data structure (database design) is mandatory
7	If a student is compelled to follow certain instructions (by the external, i.e. organization's Guide) which he/she does not agree to, such a student must prepare a supplementary report to document his/her version and present it to the examiners if such a need arises.



8	Internal guides (i.e. The faculty members) must devote the time allocated as per the timetable to guide the students for the project.
9	Every 15 days students should be shows their project work progress to internal guide.
10	Every end of months students should be submits monthly progress reports to internal guide duly signed by external guide.
11	Internal guides (i.e. The faculty members) should preferably visit external guide to to track the project.
12	Project document/presentation should be prepared according to general instructions provided by college/university and documentation reports printed on single sides of paper for 02 copies of hard binding reports.
13	The semester end assessment of project work presentation shall be on the basis of presentation, documentation and viva voce.

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 Project work course will be 50%. However, the remaining 50% weightage for Project work course will be for End-Semester final examination.

Evaluation of the projects would be done considering the framework available at the Institute. The main parameter of assessment would be the ability of the students to code.

Though the project and domain specific knowledge would be assessed for, the evaluation would predominantly depend on the students' ability to explain, modify or revise of code.

Coding standards should have been implemented.

[Though the project would be evaluated for the entire team, the examiner should emphasize on the contribution of each team member in the project development]

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal project work evaluation.
2. Attendance/Monthly Progress work/reports will be considered in the internal evaluation.
3. Documentation/Presentation/Viva Voce are part of the internal evaluation.
4. Explanation of Analysis & Design/ Explanation of Code will be considered in 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	
5	5	40	5	5	40	



Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	<p>Doing the project will enable the student to go through rich experience in developing large projects. Such an experience will include encountering various technical issues, finding sources to resolve the issues and finally finding the solution of all these issues satisfactorily.</p> <ul style="list-style-type: none">• Thinking analytically, analyzing, and synthesizing requirements and complicated information for getting a good comprehension of the solution methodology to be adopted.• Ability to document and write well.• Organizing the time effectively.• Working with teammates and generating substantial output of the efforts. <p>It will prepare the students for analyzing and programming for industrial problem and large projects work in future.</p>	100

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023