PREFACE

The purpose of education is to culture the minds of a pupil so that they can accomplish all their aims in life. Education, which is known as the mirror of society, unfolds what is already enfolded in a person. Education enables pupils to use the full potential of their mind, spirit and body. It develops the ability in them to make the best use of their personality, circumstances, and surroundings so they may achieve their goals in life for themselves and for others, preparing the members of society to adapt to the constantly changing conditions of society. As such, honouring diversity and ensuring inclusion by treating all with respect and dignity and showing sensitivity to gender, cultural, and religious differences has become an important element of the education discipline.

The Board of studies of Computer Science has framed the present syllabus to revise the curriculum in tune with the parent university. In this process care has been taken to give emphasis to various aspects such as the creativity of students, knowledge of current development in the discipline, the impacts due to the development of science and technology, employability and entrepreneur development.

The Board of Studies resolved to restructure the curriculum and syllabi of complementary Computer Science papers of B.Sc.Statistics Degree course, under the newly proposed choice- based credit system, as part of the reformation in the undergraduate curriculum for the 2023-24 academic year, offering three Discipline Specific Components(DSC) and two Foundation Components(MDC) as to switch into 4-year undergraduate programs to bring Kerala's undergraduate education at par with well acclaimed universities across the globe. Programme models proposed by the M.G. University and the Kerala State Higher Education Council are selected as the base for the

task. The restructuring is attempted in such a way as to lay emphasis on student choice and self-learning. The new structure would ultimately pave the way for a qualitative transformation of the existing system. While attempting the reforms, the existing conditions relating to infrastructure, work load and staff pattern have been properly taken care of and provision for full utilization of the existing faculty is proposed.

SHINY JOHN
Chairperson and Members
Board of Studies of Computer Science (UG)
Mar Athanasius College (Autonomous)
Kothamangalam

SL NO	NAME	OFFICIAL ADRESS
1.	CHAIRMAN	MS. SHINY JOHN ASST. PROFESSOR IN COMPUTER SCIENCE DEPT. OF STATISTICS, M.A COLLEGE, KOTHAMANAGALAM 9495356384
2.	EXPERT	DR.G.RAJU PROFESSOR CHRIST UNIVERSITY BANGALORE 9446106628
3	EXPERT	DR.SHIJO M. JOSEPH HEAD, ASSOCIATE PROFESSOR, DEPT. OF COMPUTER SCIENCE, MAHATMA GANDHI COLLEGE, KEEZHOOR, IRITTY, KANNUR 9447447985
4.	EXPERT NOMINATED BY VICE-CHANCELLOR	DR.SABU M.K ASSOCIATE PROFESSOR DEPT. OF COMPUTER APPLICATIONS,COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOG, KOCHI
5.	FROM INDUSTRY	DEVI GOPALAKRISHNAN PRICIPAL OPTIMIZATION SPECIALIST PPD, PART OF THERMO FISHER SCIENTIFIC
6.	MERITORIOUS ALUMNUS	RENJITH RAJ ASSOCIATE VICE PRESIDENT JP MORGAN CHASE BANK BANGALORE
7.	SPECIAL INVITIE	
8.	SPECIAL INVITIE	DR. JOMY JOHN HEAD, ASST. PROFESSOR DEPT. OF COMPUTER SCIENCE, K.K.T.M. GOVERNMENT COLLEGE PULLUT,KODUNGALLUR, THRISSUR
9.	SPECIAL INVITIE	BIJU SKARIA HEAD, ASSOCIATE PROFESSOR DEPT.OF COMPUTER APPLICATIONS M.A COLLEGE OF ENGINEERING KOTHAMANGALAM

Programme Outcomes (PO)

PO 1: Critical thinking and Analytical reasoning

Capability to analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories to develop knowledge and understanding; critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.

PO 2: Scientific reasoning and Problem solving

Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective; capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.

PO 3: Multidisciplinary/interdisciplinary/transdisciplinary Approach

Acquire interdisciplinary /multidisciplinary/transdisciplinary knowledge base as a consequence of the learning they engage with their programme of study; develop a collaborative-multidisciplinary/interdisciplinary/transdisciplinary- approach for formulate constructive arguments and rational analysis for achieving common goals and objectives.

PO 4: Communication Skills

Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.

PO 5: Leadership and Entrepreneurship Skills

Ability to work effectively and lead respectfully with diverse teams; setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way. After inculcating all the necessary graduate qualities, a graduate can become an entrepreneur.

PO 6: Social Consciousness and Responsibility

Ability to contemplate the impact of research findings on conventional practices, and a clear understanding of responsibility towards societal needs and reaching the targets for attaining inclusive and sustainable development.

PO 7: Equity, Inclusiveness and Sustainability

Appreciate equity, inclusiveness and sustainability and diversity; acquire ethical and moral reasoning and values of unity, secularism and national integration to enable to act as dignified citizens; able to understand and appreciate diversity (caste, ethnicity, gender and marginalization), managing diversity and use of an inclusive approach to the extent possible.

PO 8: Moral and Ethical Reasoning

Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour.

PO 9: Networking and Collaboration

Acquire skills to be able to collaborate and network with educational institutions, research organisations and industrial units in India and abroad.

PO 10: Lifelong Learning

Ability to acquire knowledge and skills, including "learning how to learn", that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

Scheme of Instructional Credits and Hours

No	Semester	Course Title	Course Type	Credit	Hrs/ Week	Total Hours
1	1	PROGRAMMING IN PYTHON	DSC B	4	5	90
2	1	CYBER SECURITY	MDC	3	4	72
3	2	FUNDAMENTALS OF AI, ML AND DL	DSC B	4	5	90
4	2	DATA SCIENCE WITH SQL	MDC	3	4	72
5	3	PROGRAMMING WITH GO	DSC B	4	5	90

Semester wise Syllabus Index
Computer Science (Minor)

Semester-1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ Week	Hour Distribution /week			
					L	T	P	O
M24CS1DSC100	PROGRAMMING IN PYTHON	Discipline Specific Component - DSC B	4	5	3	0	2	0
M24CS1MDC100	CYBER SECURITY	Foundation Component - MDC	3	4	2	0	2	0

L- Lecture, **T**- Tutorial, **P**- Practical/Practicum, **T**- Others

Semester-2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ Week	Hour Distribution /week			
					L	T	P	O
M24CS2DSC100	FUNDAMENTALS OF AI, ML AND DL	Discipline Specific Component - DSC B	4	5	3	0	2	0
M24CS2MDC100	DATA SCIENCE WITH SQL	Foundation Component - MDC	3	4	2	0	2	0

L- Lecture, **T**- Tutorial, **P**- Practical/Practicum, **T**- Others

Semester-3

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ Week	Hour Distribution /week			
					L	T	P	O
M24CS3DSC200	PROGRAMMING WITH GO	Discipline Specific Component - DSC B	4	5	3	0	2	0

L- Lecture, **T**- Tutorial, **P**- Practical/Practicum, **T**- Others

Courses with Records and Practical

SI No	Semester	Course type	Course Title
1	1	DSC	PROGRAMMING IN PYTHON
2	1	MDC	CYBER SECURITY
3	2	DSC	FUNDAMENTALS OF AI, ML AND DL
4	2	MDC	DATA SCIENCE WITH SQL
5	3	DSC	PROGRAMMING WITH GO

SEMESTER 1

Syllabus with Course Outcomes, Mode of Evaluation and Assessment

First Semester

Discipline Specific Component (DSC B)

PROGRAMMING IN PYTHON

	Mar Athanasius College (Autonomous), Kothamangalam **FYUGP SYLLABUS**
Program	COMPUTER SCIENCE
Course Name	PROGRAMMING IN PYTHON
Type of Course	DSC B
Course Code	To be prepared by the University
Course Level	100
Course Summary	Demonstrate the concepts of control structures in Python. Implement Python programs using functions and strings. Implement methods to create and manipulate lists, tuples and dictionaries

Semester	1					Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		2		5
Pre-requisites, if any	Nil					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Describe the fundamentals of computers	K	PO1
2	Illustrate the basics of programming concepts of Python	K,U	PO2
3	Apply Python programming structure for developing logics for problem solving	K,U,A	PO2, PO6
4	Design and develop Python programs for problem solving	U,A	PO2, PO3, PO9, PO10

COURSE CONTENT
Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Fundamentals of Computers: Define computer, introduction to bit, byte, program, hardware and software, Organization of a	6	1

		Digital Computer.		
	1.2	Problem Solving Life Cycle: Understanding the Problem Statement, Analysing the problem, Planning Program design using Hierarchy charts,	3	1
	1.3	Problem solving approaches: Top-down approach, Bottom-up approach. Algorithms: Definition of algorithm, Flowchart: Definition, symbols.	6	1
2	2.1	Introduction to Programming: Classification of computer languages- machine, assembly and high-level languages,	4	2,3
	2.2	Language translators: Assembler, Compiler, Interpreter, Types of errors- Syntax errors, Logical errors and Runtime errors.	3	2,3
	2.3	Introduction to Python Programming: Python features, Demo of Interactive and script mode, Tokens in Python: Variables, Keywords, Comments, Literals,	3	2,3
	2.4	Data types, Indentation, Operators and its precedence, Expressions, Use of comments or documentation in a computer program, Input and Print functions.	5	2,3
3	3.1	Control Structures: Selective statements – if, if-else, nested if, if –elif ladder statements, Iterative statements - while, for, Nested loops, else in loops, break, continue and pass statements.	5	2,3
	3.2	Data Structures: List: Create, Access, Slicing, List Methods- len, max, min, sum, count, index, reverse, clear, append, extend, del, remove, and insert. Tuple: Create, Indexing and Slicing, Tuple methods- len,	5	2,3

		max, min, sum, count, index, reverse, clear, del, remove.		
	3.3	Dictionary: Create, Accessing, and modifying, dict() function, Dictionary operations- len, max, min, get, clear, items, keys, pop, update, values. Sets: Create, Set operations- add, discard, clear, set.	5	2,3
4		Implementation of a Sequential programs with python tokens, operators and expressions. Selection and Looping constructs. Develop programs to handle List, Tuples, Dictionary and Sets	30	3,4
5	Teacher Specific Contents (This can be either classroom teaching, practical session, field visit etc. as specified by the teacher concerned) This content will be evaluated internally			

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)**					
	Lecture, Tutorial and Activity oriented					
Assessment Types	**MODE OF ASSESSMENT**					
	A	**Continuous Comprehensive Assessment (CCA)**				
		Components			**Mark Distribution**	
		Theory: Quiz, Test Papers, seminar			25 Marks	
		Practical: Lab performance, record			15 Marks	
	B	**End Semester Examination (Written)**				
	Theory	**Question Pattern** **[Maximum Time 1 Hour 30 minutes, Maximum Marks 50]**				
		Module	Part A Short Answer	Part B Short essay	Part C Long essay	Total
			1 Marks	**5 Marks**	**10 Marks**	

		I	4	2	1	**7**
		II	4	2	1	**7**
		III	4	2	2	8
		Total no of questions	**12**	**6**	**4**	**22**
		Number of questions to be answered	**10**	**4**	**2**	**16**
		Total Marks	**10**	**20**	**20**	**50**
	Practical	**[Maximum Time 2 Hours, Maximum Marks 35]**				
		Record		**Examination**		**Total**
		10 Marks		25 Marks		**35 Marks**

TEXT BOOK:

1. Kanetkar, Yashavant, and Aditya Kanetkar. Let Us Python: Python Is Future, Embrace It Fast. BPB Publications, 2019.
2. INTRODUCTION TO COMPUTING AND PROBLEM SOLVING USING PYTHON ABOUT THE AUTHOR E Balagurusamy.
3. Sinha, Pradeep K., and Priti Sinha. *Computer fundamentals*. BPB publications, 2004.
4.

SUGGESTED READINGS:

1. David I. Schneider, "An Introduction to Programming Using Python", Global Edition, Pearson Education Limited, 2015 (Modules 2,3 and 4)
2. Eric Matthes, "Python Crash Course: A Hands-On, Project-Based Introduction to Programming", 2nd Edition, No starch Press, 2019.

SOME SUGGESTIONS FOR TEACHER SPECIFIC CONTENTS:

- Python programming activities as a Gateway to Programming
- Industry related assignment works train them for Industry-Relevant Skills
- Practical experience equips the students for Community and Collaboration Opportunities
- Creative programming encourages their exploration and creativity.
- Working on Real-World Application of Concepts

Syllabus with Course Outcomes, Mode of Evaluation and Assessment First Semester

Foundation Component – MDC

CYBER SECURITY

	Mar Athanasius College (Autonomous), Kothamangalam **FYUGP SYLLABUS**

Programme	COMPUTER SCIENCE					
Course Name	CYBER SECURITY					
Type of Course	MDC					
Course Code	To be prepared by the University					
Course Level	100					
Course Summary	This course provide a foundational level knowledge on networking, Cyber space and threat landscape.					
Semester	1					Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2		2		4
Pre-requisites, if any	Nil					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Learn the foundations of networks and Cyber space and threat landscape.	K,U	PO1
2	To develop knowledge in students that can help them plan, implement, and monitor cyber security mechanisms to ensure the protection of information technology assets.	K,U	PO2
3	To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security.	K,U,A	PO6
4	To equip students with the basic technical knowledge and skills needed to protect and defend against cyber threats.	U,A	PO5

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Introduction: Basics of Computer and Hardware Device, Software, Operating	3	1

		Systems		
	1.2	Networking: LAN, MAN, WAN, Network Communication medias, Network Topologies, OSI model,	3	1
	1.3	Workgroups and Domains, Basic network components: Hubs, Switches, Bridges, Routers, Firewalls, Media, Exploring Protocols and Services, MAC Address	2	1,2
	1.4	The Internet Address Architecture: significance of IP addressing, Expressing IP Addresses, Binary and decimal representation of IP addresses, Binary to Decimal and Hexadecimal Conversion	4	1,2
	1.5	IPv4 Addressing Basics: IPv4 address classes: A, B, C, D, E. Subnet Addressing, Subnet Masks, Configuring IPv4 (DHCP, Manually).	6	1,2
2	2.1	Defining Cyberspace, Internet, Concept of cyber security, Hacking, Types of Hackers, Cyber Security: Vulnerability, Threat	3	1,2
	2.2	CIA Triad, Cyber Threats - Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, Surface Web, Deep Web, Dark Web, The Onion Router (TOR)	3	1,2
	2.3	Significance of host firewall and Internet Security Software, Basics of Cryptography: public Key, Private Key	3	1,2
	2.4	Reporting of Cyber crimes, IT Act 2000 and its amendments, Organizations dealing with Cyber crime and Cyber security in India	3	1,2,3
3	3.1	Lab: Computer Hardwre: Installation and trouble	10	1,2,3,4

		shooting, Networking: Installation and trouble shooting of LAN		
	3.2	Simulation of LAN using CISCO Packet Tracer, Explore basic Networking commands: Checking the TCP/IP Configuration with ipconfig, Troubleshooting,	12	1,2,3,4
	3.3	Search engine: DuckDuckGo, google, Tor, Best search practices	8	1,2,3,4
4	Teacher Specific Contents (This can be either classroom teaching, practical session, field visit etc. as specified by the teacher concerned) This content will be evaluated internally			

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)**					
	Lecture, Tutorial and Activity oriented					
Assessment Types	**MODE OF ASSESSMENT**					
	A	**Continuous Comprehensive Assessment (CCA)**				
		Components			**Mark Distribution**	
		Theory: Quiz, Test Papers, seminar			15 Marks	
		Practical: Lab performance, record			15 Marks	
	B	**End Semester Examination (Written)**				
	Theory	**Question Pattern** **[Maximum Time 1 Hour, Maximum Marks 35]**				
		Module	Part A Short Answer	Part B Short essay	Part C Long essay	Total
			1 Marks	**5 Marks**	**10 Marks**	
		I	6	3	1	**10**
		II	6	3	1	**10**
		Total no of questions	**12**	**6**	**2**	**20**

		Number of questions to be answered	**10**	**3**	**1**	**14**
		Total Marks	**10**	**15**	**10**	**35**
	Practical	**[Maximum Time 2 Hours, Maximum Marks 35]**				
		Record		**Examination**		**Total**
		10 Marks		25 Marks		**35 Marks**

TEXT BOOK:

1. Introduction To Computers, By Peter Norton, Publisher : McGraw-Hill Education
2. Introduction to Cyber Security: Guide to the World of Cyber Security, By Anand Shinde, Publisher: Notion Press; 1st edition
3. The Internet Address Architecture, TCP/IP Illustrated, Volume 1, Second EditionKevin R.
4. Fall, W. Richard Stevens
5. Understanding Cisco Networking Technologies Exam 200-301, Todd Lammle
6. Tor and the Deep Web: The Complete Guide to Stay Anonymous in the Dark Net Paperback,by Leonard Eddison, Publisher : Createspace Independent Pub (2 March 2018).
7. Cyber Laws: Intellectual Property & E-Commerce Security, By Kumar K, Dominant Publishers.
8. Computer Networking, 8e, By Kurose, Publisher : Pearson Education; 8th edtion

SOME SUGGESTIONS FOR TEACHER SPECIFIC CONTENTS:

- Training students in LAN infrastructure settings.
- Making capable of how to set Cyber Security in LAN environment.
- Proficient in identifying and troubleshooting LAN connectivity and security issues .
- Training to become skilful to Protect and defend computer systems and networks from cybersecurity attacks.
- Train the students to effectively communicate in a professional setting to address information security issues.
- Fostering the students for responsible behaviour in cyber ethics.

MAR ATHANASIUS COLLEGE
KOTHAMANGALAM
KNOWLEDGE IS POWER

Semester 2

Syllabus with Course Outcomes, Mode of Evaluation and Assessment Second Semester

Discipline Specific Component (DSC B)

FUNDAMENTALS OF AI, ML AND DL

	Mar Athanasius College (Autonomous), Kothamangalam **FYUGP SYLLABUS**
Programme	COMPUTER SCIENCE
Course Name	FUNDAMENTALS OF AI, ML AND DL
Type of	DSC B

Course						
Course Code	To be prepared by the University					
Course Level	100					
Course Summary	To understand the AI, ML and DL foundations and applications					
Semester	2					Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3		2		5
Pre-requisites, if any	Nil					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Demonstrate the basic concepts of AI, the role of data.	K,U	PO1
2	Describe the fundamental concepts of application of AI, the need for AI in society and the role of ML, DL in AI.	U	PO2, PO6
3	Explain the basics technologies of Machine Learning, Deep learning.	U	PO1, PO9
4	Identify various approaches of AI to solve problems.	U,A	PO2, PO9, PO10
Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)			

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Introduction to Artificial Intelligence: Defining Intelligence, Components of Intelligence, Differences Between Human and Machine Intelligence Working of AI, Advantages and Disadvantages of Artificial Intelligence	3	1
	1.2	History of Artificial Intelligence, Types of Artificial Intelligence, Weak	4	1,2

		AI, Strong AI, Reactive Machines, Limited Memory, Theory of Mind, Self-Awareness		
	1.3	Types of AI Systems Based on Functionalities, Artificial Intelligence Vs Augmented Intelligence Vs Cognitive Computing, Features of AI, Applications of AI, Robotics—an Application of AI	4	1,2
	1.4	Machine Learning: Making the machines learn, How is AI related to Machine Learning, Difference between AI and ML, Traditional Programming vs Machine Learning, Machine Learning and Deep Learning	4	1,2
2	2.1	Artificial Intelligence Technologies: Techniques in AI: Neural Networks, Machine learning, Deep learning, Natural language processing, Deep neural network, Computer vision, Cognitive Computing.	5	2,3
	2.2	Machine Learning Model, Types of Machine Learning Algorithms: Supervised Machine Learning: Classification Algorithm, Regression, Unsupervised Learning: Clustering, Association analysis, Dimensionality reduction, Outlier detection or anomaly detection	5	2,3
	2.3	Semi-Supervised Learning, Reinforcement Learning (RL), Regression Analysis in Machine Learning, Types of Regression, Classification Techniques: K-Nearest Algorithm, Pros and Cons of KNN Algorithm. Decision Trees, Advantages and Disadvantages of decision tree	5	2,3

	2.4	Clustering Techniques: K-Means Algorithm, Pros and Cons of K-Means Algorithm, Naïve Bayes Classification, Pros and Cons of Naive Bayes Algorithm, Applications	5	2,3
3	3.1	MODULE 3: (10 Hours) Neural Network: Working of Neural Networks, Pros and Cons, Applications of Neural Networks	3	2,3
	3.2	Deep Learning, Working of Deep Learning, Applications of Deep Learning, Machine Learning Vs Deep Learning	3	2,3
	3.3	Support Vector Machine (SVM), working of SVM, Advantages and Disadvantages of SVM	4	2,3
4		Design and model AI based solutions to critical problem domains in the real world	30	3,4
5	Teacher Specific Contents (This can be either classroom teaching, practical session, field visit etc. as specified by the teacher concerned) This content will be evaluated internally			

TEXT BOOK:

1. ARTIFICIAL INTELLIGENCE Beyond Classical AI, Reema Thareja, Third Edition, Pearson

2. Jiawei Han and Micheline Kamber. Data Mining Concepts and Techniques, Elsevier, Second Edition

3. Thomas A. Runkler. Data Analytics: Models and algorithms for Intelligent Data Analysis, Springer

4. V. Bhuvaneswari T. Devi, Big Data Analytics – A Practitioners Approach, First Edition, 2016

SUGGESTED READINGS:

1. Machine Learning for Decision Makers Cognitive Computing Fundamentals for Better Decision Making, Second Edition, Dr. Patanjali Kashyap

2. An Introduction to Data, Everything You Need to Know About AI, Big Data and Data Science, Francesco Corea

SOME SUGGESTIONS FOR TEACHER SPECIFIC CONTENTS:

- Industry related assignment works
- Practical experience
- Creative programming encourages their exploration and creativity.
- Working on Real-World Application of Concepts

Syllabus with Course Outcomes, Mode of Evaluation and Assessment

Second Semester

Foundation Component – MDC
Data Science with SQL

	Mar Athanasius College (Autonomous), Kothamangalam **FYUGP SYLLABUS**
Programme	COMPUTER SCIENCE
Course Name	Data Science with SQL
Type of Course	Foundation Component - MDC
Course Code	To be prepared by the University

Course Level	100					
Course Summary	This course provide a foundational level knowledge on Data Science and SQL					
Semester	2					Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2		2		4
Pre-requisites, if any	Nil					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Demonstrate the basic concepts of data science and database management systems.	K,U	PO1
2	Describe the fundamental concepts and application of Data Mining, Big Data and Big Data Analytics and the concepts of DBMS.	K,U	PO1, PO2, PO3, PO7
3	Identify and define the information that is needed to design a database management system. Design SQL queries for data definition and data manipulation.	K,U	PO4, PO5, PO9, PO10
4	Understood the relational database design principles and the basic issues of transaction. Apply MySQL to implement DDL and DML commands.	K,U,C,A	PO5, PO9, PO10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Data Science: Data Mining- Introduction to Data mining, DM Tasks, Predictive, Descriptive	3	1,2
	1.2	Knowledge Data Discovery, KDD Steps, Clustering, Classification, Outlier Analysis, Dimensionality Reduction, Application of Data Mining	3	1,2
	1.3	Data Science, Introduction to Data Science, Data Classification	3	1,2

	1.4	Big Data: The Major Sources of Big Data, The Three Vs of Big Data Analytics	3	1,2
	1.5	Need of SQL in Data Science, Elements of SQL for Data Science, Introduction to SQL, Types of SQL Queries: DDL, DML and DCL	3	3
2	2.1	DBMS: Introduction to database management system (DBMS), Components of DBMS, Traditional File System Versus Database Systems, Disadvantages of traditional file system, Advantages of database systems, Disadvantages of database system	7	1,2,3
	2.2	DBMS Users, End users or naive users, Online users, Application programmers, Database administrator	3	1,2
	2.3	MySQL: Introduction, Features, advantages, Data Types: numeric, string, date /time, Boolean, Variables, MySQL database, table, view	3	3
	2.4	MySQL Commands- DDL: Create, Alter, Drop, DML: Insert, Select, Update, Delete, DCL: Grant, Revoke, Command clauses: where, order by, group by, having, like, between, MySQL functions: aggregate functions	5	3
3	3.1	Implementation of Database commands- Creating, Accessing, Deleting databases, Viewing Database contents using DDL and DML commands: Add and Modify database contents	10	4
	3.2	Retrieving data, selecting all data, selecting particular rows/columns, selecting data based on condition, Sorting the table content, modifying the data in the table, deleting data from table	10	4
	3.3	Implementing aggregate and group functions, dropping table, altering table such as adding/modifying/deleting columns of tables	10	4
5	Teacher Specific Contents (This can be either classroom teaching, practical session, field visit etc. as specified by the teacher concerned) This content will be evaluated internally			

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)**
	Lecture, Tutorial and Activity oriented

<table>
<tr><td rowspan="11"></td><td>A</td><td colspan="5">Continuous Comprehensive Assessment (CCA)</td></tr>
<tr><td rowspan="3"></td><td colspan="3">Components</td><td colspan="2">Mark Distribution</td></tr>
<tr><td colspan="3">Theory: Quiz, Test Papers, seminar</td><td colspan="2">15 Marks</td></tr>
<tr><td colspan="3">Practical: Lab performance, record</td><td colspan="2">15 Marks</td></tr>
<tr><td>B</td><td colspan="5">End Semester Examination (Written)</td></tr>
<tr><td rowspan="8">Theory</td><td colspan="5">Question Pattern
[Maximum Time 1 Hour, Maximum Marks 35]</td></tr>
<tr><td rowspan="2">Module</td><td>Part A
Short Answer</td><td>Part B
Short essay</td><td>Part C
Long essay</td><td rowspan="2">Total</td></tr>
<tr><td>1 Marks</td><td>5 Marks</td><td>10 Marks</td></tr>
<tr><td>I</td><td>6</td><td>3</td><td>1</td><td>10</td></tr>
<tr><td>II</td><td>6</td><td>3</td><td>1</td><td>10</td></tr>
<tr><td>Total no of questions</td><td>12</td><td>6</td><td>2</td><td>20</td></tr>
<tr><td>Number of questions to be answered</td><td>10</td><td>3</td><td>1</td><td>14</td></tr>
<tr><td>Total Marks</td><td>10</td><td>15</td><td>10</td><td>35</td></tr>
<tr><td rowspan="3">Practical</td><td colspan="5">[Maximum Time 2 Hours, Maximum Marks 35]</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">Examination</td><td>Total</td></tr>
<tr><td colspan="2">10 Marks</td><td colspan="2">25 Marks</td><td>35 Marks</td></tr>
</table>

TEXT BOOK:

1.Introduction to Database Management System By Dr. Satinder Bal Gupta Aditya Mittal, UNIVERSITY SCIENCE PRESS

2. Fundamentals of Database Systems 7th Edition, Elmasri & Navathe, Pearson Education

3.Paul DuBois, “MySQL”, Fourth Edition, Pearson Education, 29 Aug 2008

4.Vikram Vaswani, “MySQL: The Complete Reference”, 1st Edition, McGraw Hill Education, 2004 (Module 3 & 4).

SUGGESTED READINGS:

1.An introduction to database systems, C. J Date, 8th edition, Pearson education

2.Abraham Silberschatz, Henry F Korth & S Sudharssan, Database System Concepts, 4th

edition, Tata McGraw Hil

SOME SUGGESTIONS FOR TEACHER SPECIFIC CONTENTS:

- Train and equip the students to utilize the knowledge of data science to handle, identify and predict the problems in various domains like Healthcare, Transportation, Sports, Government, E-commerce, Gaming, Social media etc
- preparing the students with the capability of applying their knowledge in SQL for supporting and using its powerful aggregation and analysis operations that are essential for deriving insights from data.
- Equip the students in performing tasks like calculating averages, sums, or counts, grouping data by specific criteria, and creating summary reports.
- Helps to apply the knowledge acquired in Data Science DBMS and SQL in identifying the capabilities that are invaluable for decision-makers seeking to understand trends and make informed choices.

Semester 3

Syllabus with Course Outcomes, Mode of Evaluation and Assessment Third Semester

Discipline Specific Component (DSC B)

Programming with Go

	Mar Athanasius College (Autonomous), Kothamangalam **FYUGP SYLLABUS**					
Programme	COMPUTER SCIENCE					
Course Name	Programming with Go					
Type of Course	DSC					
Course Code	To be prepared by the University					
Course Level	200					
Course Summary	Demonstrate the concepts of control structures in Go Lang. Implement programs using functions and strings.					
Semester	3					Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	

		3		2		5
Pre-requisites, if any	Nil					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the fundamental programming concepts and terminology	K,U	PO1
2	Illustrate problem-solving basics of Go programming language	U	PO1, PO2
3	Apply programming concepts to solve real-world problems using Go Lang	U	PO6
4	Design and develop programs in Go for problem solving	U,A	PO9, PO10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

Content for Classroom transaction (Units)

Module	Units	Course description	Hrs	CO No.
1	1.1	Classification of programming languages - Machine, assembly & High level, language processors- Assembler, Interpreter and Compiler	4	1
	1.2	Planning a Computer program, purpose of program planning, Algorithms and Flowcharts with examples	3	1,2
	1.3	Go Programming Language: Go Programming Language, Common Rule, Variables: Declaring Variable, Assigning Variables, Comment	4	1,2
	1.4	Arithmetic Operations: Bit operators, Logical operators, Increment and Decrement, Operators and precedence. Mathematical Functions, Getting Input from Keyboard, Comparison Operators, Logical	4	1,2

		Operators		
2	2.1	Decision: if..then, switch..case, Iteration – for, Iteration – while, break and continue.	6	2,3
	2.2	Arrays, Slices and Maps: Array, Slice, Map, Functions: Creating A Simple Function, Function with Parameters	6	2,3
	2.3	Function with Returning Value, Function with Multiple Returning Values, Function with Multiple Parameters and Returning Value, Closure Function, Recursion Function.	6	2,3
3	3.1	Pointers, Structs and Methods: Structs, Methods	4	2,3
	3.2	String Operations: Concatenating Strings, String To Numeric, Numeric to String, String Parser, Check String	4	2,3
	3.3	Data Length, Copy Data, Upper and Lower Case Characters	4	2,3
4		Identify real-world problems in the relevant area of study, analyse and generate logics for the identified problems and generate problem statements initially provide its solution in terms of algorithm and flowchart. Develop the problem statements using Go language by identifying exceptional inputs if any. Implementation of a Sequential programs with Go tokens, operators and expressions with Branching and Looping constructs.	30	3,4
5	Teacher Specific Contents (This can be either classroom teaching, practical session, field visit etc. as specified by the teacher concerned)			

	This content will be evaluated internally

<table>
<tr><td rowspan="2">Teaching and Learning Approach</td><td colspan="6">Classroom Procedure (Mode of transaction)</td></tr>
<tr><td colspan="6">Lecture, Tutorial and Activity oriented</td></tr>
<tr><td rowspan="15">Assessment Types</td><td colspan="6">MODE OF ASSESSMENT</td></tr>
<tr><td>A</td><td colspan="5">Continuous Comprehensive Assessment (CCA)</td></tr>
<tr><td rowspan="3"></td><td colspan="3">Components</td><td colspan="2">Mark Distribution</td></tr>
<tr><td colspan="3">Theory: Quiz, Test Papers, seminar</td><td colspan="2">25 Marks</td></tr>
<tr><td colspan="3">Practical: Lab performance, record</td><td colspan="2">15 Marks</td></tr>
<tr><td>B</td><td colspan="5">End Semester Examination (Written)</td></tr>
<tr><td rowspan="8">Theory</td><td colspan="5">Question Pattern
[Maximum Time 1 Hour 30 minutes, Maximum Marks 50]</td></tr>
<tr><td rowspan="2">Module</td><td>Part A
Short Answer</td><td>Part B
Short essay</td><td>Part C
Long essay</td><td rowspan="2">Total</td></tr>
<tr><td>1 Marks</td><td>5 Marks</td><td>10 Marks</td></tr>
<tr><td>I</td><td>4</td><td>2</td><td>1</td><td>7</td></tr>
<tr><td>II</td><td>4</td><td>2</td><td>1</td><td>7</td></tr>
<tr><td>III</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>Total no of questions</td><td>12</td><td>6</td><td>4</td><td>22</td></tr>
<tr><td>Number of questions to be answered</td><td>10</td><td>4</td><td>2</td><td>16</td></tr>
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<tr><td rowspan="3">Practical</td><td colspan="4">[Maximum Time 2 Hours, Maximum Marks 35]</td></tr>
<tr><td colspan="2">Record</td><td colspan="2">Examination</td><td>Total</td></tr>
<tr><td colspan="2">10 Marks</td><td colspan="2">25 Marks</td><td>35 Marks</td></tr>
</table>

TEXT BOOK:

1. Get Programming with Go, Nathan Youngman Roger Peppé

2. Go Programming by Example, Agus Kurniawan, 1st Edition, 2015
3. The Go Programming Language P H R A S E B O O K, David Chisnall
4. The Way to Go A Thorough Introduction to the Go Programming Language, Ivo BalbaertiUniverse, Inc. Bloomington
5. Hands-on Go Programming By Sachchidanand Singh, Prithvipal Singh BPB Publications (3 May 2021)

SOME SUGGESTIONS FOR TEACHER SPECIFIC CONTENTS:

- Industry related assignment works
- Practical experience
- Creative programming encourages their exploration and creativity.
- Working on Real-World Application of Concepts