Semester – II										
SL.No	**Course Code**	**Course Title**	**Category**	**Periods**			**Credits**	**Max Marks**		
				L	**T**	**P**		**CAM**	**ESM**	**Total**
Theory										
1	A23PCPT204	PYTHON AND R PROGRAMMING	DSC	3	0	0	4	25	75	100
2	A23PCPT205	No SQL with MONGO DB	DSC	3	0	0	4	25	75	100
3	A23PCPT206	OPERATIONAL RESEARCH	DSC	3	0	0	4	25	75	100
4	A23PCPE204,205,206	GREEN COMPUTING / MOBILE COMPUTING/ CLIENT SERVER COMPUTING	DSE	3	0	0	4	25	75	100
Practical										
5	A23PCPL203	PYTHON AND R PROGRAMMING LAB	DSC	0	0	4	2	50	50	100
6	A23PCPL204	No SQL with MONGO DB LAB	DSC	0	0	10	2	50	50	100
Skill Enhancement Course										
7	A23PCPS202	Web Programming	SEC	0	0	4	2	100	0	100
							22	300	400	700

Department	**Computational Studies**	Programme: **M.Sc. Computer Science**						
Semester	**Second**	Course Category Code: **DSC**			*End Semester Exam Type: **TE**			
Course Code	**A23PCPT204**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**PYTHON AND R PROGRAMMING**	**4**	**0**	**0**	**4**	**25**	**75**	**100**
Prerequisite	Basic knowledge in python and R Programming							

Course Outcome		*After the completion of this course, the students will be able to:*	BT Mapping (Highest Level)
	CO1	To understand the Fundamentals of Computers and introduction to python and R language.	**K2**
	CO2	Organize, visualize, and analyze large, complex datasets by means of Python and R programming language	**K3**
	CO3	To understand the function.	**K3**
	CO4	To understand the data interface	**K4**
	CO5	To study about Inheritance and Files.	**K4**

UNIT-I	**R Basics**	**Periods: 12**	
Basic operations in R, Math operations in R, Vector , working with null values, Import & Export files in R, Data-frame, Joins, One-way and Two way tables, Vectors, Matrices			**CO1**
UNIT-II	**Python Basics**	**Periods: 12**	
Objects and Functions, Identifiers, Variables and Datatypes, Operators, Python Flow, Function Arguments, Recursive functions ,Lambda, Exception Handling , Iterators, Generators and Decoders.			**CO2**
UNIT-III	**Mathematics for Data science**	**Periods: 12**	
Probability, Statistics, Linear Algebra, Gradient Descent, Calculus for data science, ANOVA, Hypothesis testing.			**CO3**
UNIT-IV	**Numpy and Pandas**	**Periods: 12**	
Numpy: Arrays, Vectorization, Boolean Indexing, Matrix multiplication, Tuple, Join/Merge data, Unicode strings etc. Pandas: Data Structure, Data frame, Reading data, Handling missing data.			**CO4**
UNIT-V	**Exploratory Data Analysis**	**Periods: 12**	
Data Visualization using GGPLOT2 and Matplotlib, Data Pre-processing, Data Transformation, Data Reduction, Feature Extraction. Univariate and Multi-variate analysis.			**CO5**

Lecture Periods: 60	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 60**

Text Books

1. Martin C Brown, “Python The Complete Reference”, McGraw-Hill Education, 4th Edition,2018
2. ReemaThareja, “Python Programming Using Problem Solving Approach”, ISBN:9780199480173, Oxford University Press, First edition, 2017.
3. “R for Data Science: Import, Tidy, Transform, Visualize, and Model Data” by Garrett Grolemund and Hadley Wickham. Release Date: December 2016.

Reference Books

1. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,2015.
2. Business Analytics (The science of data driven decision making)- U Dinesh Kumar
3. “Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython”, 2nd Edition by Wes McKinney.Publisher: O'Reilly Media, Inc. Release Date: October 2017.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **M.Sc Computer Science**						
Semester	**Second**	Course Category Code: **DSE**			*End Semester Exam Type: **TE**			
Course Code	A23PCPT205	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	No SQL with MONGO DB	**4**	**-**	**-**	**4**	**25**	**75**	**100**

Prerequisite	Basic knowledge in Database	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Explain and compare different types of NoSQL Databases	**K3**
	CO2 Compare and contrast RDBMS with different NoSQL databases	**K3**
	CO3 Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases	**K3**
	CO4 Explain performance tune of Key-Value Pair NoSQL databases.	**K3**
	CO5 Apply Nosql development tools on different types of NoSQL Databases	**K3**

UNIT-I	**Periods: 12**	
Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Database.		**CO1**

UNIT-II	**Periods: 12**	
Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases. Replication and sharding, MapReduce on databases. Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.		**CO2**

UNIT-III	**Periods: 12**	
NoSQL Key/Value databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure		**CO3**

UNIT-IV	**Periods: 12**	
Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.		**CO4**

UNIT-V	**Periods: 12**	
Graph NoSQL databases using Neo4,NoSQL database development tools and programming languages, Graph Databases, Graph Database. Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases. **Case Study**: Facebook, E-Commerce Application, Restaurant.		**CO5**

Lecture Periods: 60	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 60**

Text Books ((Minimum 2 and maximum 3 – Latest editions to be given)

1. Sadalage, P. & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Wiley Publications,1st Edition ,2019.

Reference Books (Minimum 5– Latest editions to be given)

1.Shashank Tiwari, Professional NoSQL, Wrox Press, Wiley,2011.

2.Pramod Sadalage and Martin Fowler, NoSQL Distilled,Addison-Wesly Professinal 2012.

3.Dan McCreary and Ann Kelly, Making Sense of NoSQL, Maning Publications 2013.

4.Gaurav Vaish, Getting Started with NoSQL, Packet Publishing ,2018

5.NoSQL Theory and examples, Early Access Version, Edition 1.0 October 2021

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

*

Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**			Programme: **M.Sc Computer Science**				
Semester	**Second**			Course Category Code: **DSE**		*End Semester Exam Type: **TE**		
Course Code	**A23PCPE204**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Green Computing**	**3**	**0**	**0**	**3**	**25**	**75**	**100**
Prerequisite	**Basic knowledge in Supervised and Unsupervised**							

Course Outcome	*After completion of the course, the students will be able to*	BT Mapping (Highest Level)
	CO1 Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.	**K2**
	CO2 Enhance the skill in energy saving practices in their use of hardware.	**K2**
	CO3 Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.	**K3**
	CO4 Understand the ways to minimize equipment disposal requirements	**K4**

UNIT-I	**FUNDAMENTALS**	**Periods: 09**
Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.		**CO1**

UNIT-II	**GREEN ASSETS AND MODELING**	**Periods: 09**
Green Assets: Buildings, Data Centres, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.		**CO2**

UNIT-III	**GRID FRAMEWORK**	**Periods: 09**
Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data centre – Green Grid framework.		**CO3**

UNIT-IV	**GREEN COMPLIANCE**	**Periods: 09**
Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.		**CO4**

UNIT-V	**CASE STUDIES**	**Periods: 09**
The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.		**CO5**

Lecture Periods: 45	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 45**

Text Books

1. Bhuvan Unhelkar, —Green IT Strategies and Applications-Using Environmental Intelligence‖, CRC Press, June 2014.

2. Woody Leonhard, Katherine Murray, —Green Home computing for dummies‖, August 2012.

Reference Books

1. Alin Gales, Michael Schaefer, Mike Ebbers, —Green Data Center: steps for the Journey‖, Shroff/IBM rebook, 2011.
2. John Lamb, —The Greening of IT‖, Pearson Education, 2009.
3. Jason Harris, —Green Computing and Green IT- Best Practices on regulations & industry‖, Lulu.com, 2008
4. Carl speshocky, —Empowering Green Initiatives with IT‖, John Wiley & Sons, 2010.
5. Wu Chun Feng (editor), —Green computing: Large Scale energy efficiency‖, CRC Press

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **M.Sc Computer Science**						
Semester	**second**	Course Category Code: **SEC**			*End Semester Exam Type: **TE**			
Course Code	**A23PCPE205**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**MOBILE COMPUTING**	**3**	**0**	**0**	**3**	**100**	**-**	**100**
Prerequisite	**Basic knowledge in mobile computing**							

Course Outcome	*After completion of the course, the students will be able to*	BT Mapping (Highest Level)
	CO1 To understand the basics of object oriented analysis and design	**K2**
	CO2 To learn UML models and tools	**K2**
	CO3 To apply design patterns to various applications.	**K3**
	CO4 Recognize Design patterns using UML	**K3**
	CO5 To Apply design patterns to various applications	**K4**

UNIT-I	**WIRELESS COMMUNICATION**	**Periods: 6**	
Introduction: Challenges of Wireless Transmission - Multi-carrier modulation - Spread Spectrum – Satellite-Communication - Broadcast systems - Multiplexing - FDMA, TDMA andCDMA - Cellular organization of mobile telephone networks – Operation of cellular networks - Frequency Reuse - Tessellation - Handoff – Capacity Improvement			**CO1**
UNIT-II	**WIRELESS NETWORKS**	**Periods: 6**	
IEEE 802.11 Wireless LAN - Architecture - Modes of Operation - CSMA/CA and its variants - Wireless LAN security - Bluetooth networks - Generation of cellular networks - Overview of GSM - GPRS Network Architecture and Operations - UMTS and IMT 2000 - Packet Switching Domain - Core Network - Radio Access Network - LTE - Control Plane - User Plane.			**CO2**
UNIT-III	**L3 AND L4 WIRELESS PROTOCOLS**	**Periods: 6**	
Mobile IP - Mobility features in IPv6 - Proactive and reactive ad hoc routing protocols - DSDV, DSR and AODV - Limitations of Traditional TCP in wireless networks - TCP improvements for Wireless Networks – Indirect TCP, Snoop TCP, Mobile TCP - Security issues in network layer and transport layer.			**CO3**
UNIT-IV	**MOBILE COMPUTING PLATFORM**	**Periods: 6**	
PDA - Device characteristics and Software components - Smart Phone - Convergence of Mobile devices - J2ME - Modes, Data store, GUI support - HTTP Connection Interface Push Registry - Application development using Android APIs - Palm OS Architecture and Program Development - Overview of other mobile Operating Systems.			**CO4**
UNIT-V	**MOBILE INTERNET**	**Periods: 6**	
WAP - WAP Gateways - WML - VoiceXML - Mobile Messaging - Multimedia Messaging Service - Synchronized Multimedia Integration Language - Application Servers - Internet portals - Device management - Synchronization Models - Communication to Servlets and Web Services - Location aware Mobile computing - IP Multimedia Subsystem.			**CO5**

Lecture Periods: 45	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 45**

Text Books

1. Asoke Talukder, Hasan Ahmed, Rupa Yavagal, "Mobile Computing: Technology, Applications and Services Creation", Second Edition, TMH, 2010.
2. William Stallings, "Wireless Communication and Networks", Pearson, 2009.

Reference Books

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson, 2009.
2. Uwe Hansmann et al, "Principles of Mobile Computing", Springer, 2003.
3. Ivan Stojmenovic, "Handbook of Wireless Networks and Mobile Computing",Wiley, 2002

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

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Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **M.Sc Computer Science**						
Semester	**Second**	Course Category Code: **SEC**			*End Semester Exam Type: **TE**			
Course Code	**A23PCPE206**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Client Server Computing**	**4**	**0**	**0**		**100**	**-**	**100**
Prerequisite	**Basic knowledge in cloud**							

Course Outcome	*After completion of the course, the students will be able to*	BT Mapping (Highest Level)
	CO1 Compare the strengths and limitations of Client Server computing	**K2**
	CO2 Identify the architecture, infrastructure and delivery models of Client server	**K2**
	CO3 Ability to discern and appropriate Client Providers.	**K3**
	CO4 Recognize the Energy Efficient and Market Oriented Client models.	**K3**
	CO5 Comprehend the need of Client Server Computing in integrating IoT with Client	**K4**

UNIT-I	**Introduction**	**Periods: 6**	
The business opportunity – driving forces – major issues in information technology – right sizing - review of host & non-distributed computing. Basis of distributed computing – decomposition approaches layers vs tiers. Basis of client / server computing – componants.Client / server computing – approaches –applications development – cost – Implementation.			**CO1**
UNIT-II	**OPEN SYSTEM STANDARDS FOR CLIENT/SERVER COMPUTING:**	**Periods: 6**	
Understanding Client / Server computing – Dispelling the Myths – Obstacles – Upfrontand Hidden – Standards setting organizations- Factors for success. **TWO – TIER COMPUTING:** Introduction client Tier – Hardware and Software requirements operating system services – Types of Client – Server Tier – Types of Server-Eight layers of Software.			**CO2**
UNIT-III	**THREE-TIER COMPUTING:**	**Periods: 6**	
Introduction and comparison of two and three tier- Client side, server side andmiddleware side – Hardware and Software requirements – Transaction servers – TP lite Vs TPHeavy. **MIDDLEWARE:** Hardware and Software requirements – Netware connectivity – Types of Middleware – Data Base middleware – Standards			**CO3**
UNIT-IV	**M ULTI – TIER COMPUTING:**	**Periods: 6**	
Overview – Benefits – Disadvantages – Components – Tier separations and interaction **THIN CLIENT COMPUTING:** Introduction to computing models - Comparison – Components – environments.			**CO4**
UNIT-V	**FRONT END TOOLS:**	**Periods: 6**	
Overview – The Client components – Essential features of a front end tools. Case Studies – Account and Financial system, Sales automation and courseware system			**CO5**

Lecture Periods: 45	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 45**

Text Books

1. Dawana Travis Dewire, "Client/Server Computing", Tata McGraw -Hill PublishingCompany Limited, New Delhi, 2003.

2. Patrick Smith and Steve Guengesich, “Client/Server Computing”, Prentice Hall of India, New Delhi, 2002.

Reference Books

1. Robert Orfali, Dan Harkey and Jeri Edwards, “Essential Client/Server Survival Guide”, Galgotia Publications, New Delhi, 2001.
2. Joel P Kaster, “Understanding Thin Client/Server Computing”, Prentice Hall of India, New Delhi,2001.
3. Jein Edwards, “3 tier Client/server at Work”, Wiley Computer Publishing, USA, 1999.4. Ashhofaiol TomyMartin, “Building N-tier Applications with COM and VB 6.0”, Wiley Computer Publishing, Singapore, 1999.
5. Travis Derive D, “Second-Generation Client/Server Computing” McGraw Hill, New Delhi, 1997.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Internal Marks			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance	50	100
Marks	30	10	10		

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**			Programme:**M.Sc Computer Science**				
Semester	**Second**			Course Category Code: **DSC**			*End Semester Exam Type: **LE**	
Course Code	A23PCPL204			Periods/Week			Credit	Maximum Marks
				L	T	P	C	I M	ESE	TM
Course Name	No SQL with MONGO DB LAB			**0**	**0**	**4**	**2**	**50**	**50**	**100**
Prerequisite	Basic Knowledge in database									
Course Outcome	*After completion of the course,the students will be able to*								BT Mapping (Highest Level)	
	CO1	Learn basic MongoDB functions and it implementation.							**K3**	
	CO2	Implement various types of operations in MongoDB.							**K3**	
	CO3	Implement the concepts of limit records and sort records.							**K3**	
	CO4	Implement Indexing, Advanced Indexing and Hashing using MongoDB.							**K4**	
	CO5	Analyze and apply aggregation and Map Reduction in MongoDB.							**K4**	

List of Experiment

1. Installation of MongoDB on Windows .
2. Implementation of mongo Shell, Create database and display the database.
3. Execute the Commands of MongoDB and operations in MongoDB : Insert,

Query, Update, Delete and Projection.

4. Implementation of Where Clause, AND,OR operations in MongoDB.
5. Implementation of MongoDB count() cursor method.
6. Execute Aggregation Pipeline and its operations.
7. Execute Limit Records and Sort Records operation in MongoDB.
8. Implementation of Aggregation and Map Reduce functions in MongoDB.
9. Implementations of Indexing, Advanced Indexing using MongoDB.
10. Implementations of Hashing using MongoDB.

LecturePeriods:-	**TutorialPeriods:-**	**PracticalPeriods:30**	**TotalPeriods:30**

ReferenceBooks

1. Mongo DB: The Definitive Guide: Powerful and Scalable Data Storage 4th Edition 2019
2. Dan McCreary and Ann Kelly, Making Sense of NoSQL, Maning Publications 2013.
3. Gaurav Vaish, Getting Started with NoSQL, Packet Publishing ,2018.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)					Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
1	2	3	3	3	3	2	2	2
2	3	3	2	3	2	3	3	2
3	2	2	3	3	2	3	3	2
4	3	3	2	2	2	3	3	3
5	2	2	2	3	3	3	2	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Internal Marks			End Semester Examination (ESE) Marks	Total Marks
	Model Exam	Record	Attendance	50	100
Marks	30	10	10		

***** Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	**Computational Studies**	Programme: **M.Sc COMPUTER SCIENCE**						
Semester	**Second**	Course Category Code: **DSC**			*End Semester Exam Type: **LE**			
Course Code	**A23PCPS202**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**Web Programming**	**4**	**0**	**0**	**4**	**25**	**75**	**100**

Prerequisite	Basic knowledge about Web
Course Objectives	• To study the fundamentals of web application development • To understand the design components and tools using CSS • To learn the concepts JavaScript and programming fundamentals. • To understand the working procedure of XML • To understand the concept and principle of PHP

Course Outcome	*After the completion of this course, the students will be able to:*		BT Mapping (Highest Level)
	CO1	The fundamentals of web application development.	**K2**
	CO2	The design components and tools using CSS.	**K3**
	CO3	Concept of JavaScript and Programming fundamentals	**K3**
	CO4	The Working Procedure of XML Components	**K4**
	CO5	The concept and Principle of PHP	**K4**

UNIT-I	**INTRODUCTION TO INTERNET BASICS & HTML**	**Periods: 12**
Protocols - Secure connections – Applications and Development tools – Web Browsers – Server Definition – IP Address – TCP/IP Protocol – User Datagram Protocol – HTML - HTML Tags – Graphics to HTML Doc – HTML Development process – Simple HTML Forms – Web Site structure – Lists – Tables – Linking Documents.		**CO1**
UNIT-II	**CASSTYLE SHEET**	**Periods: 12**
Introduction to CSS: Need for CSS– Basic syntax and structure using CSS–Background images– Colors and properties – Creating Style sheet rules - Style sheet properties - Manipulating texts using fonts, borders and boxes - Margins, padding lists, positioning using CSS - Box - Display properties –Servlet – JSP.		**CO2**
UNIT-III	**JAVASCRIPTS**	**Periods: 12**
JavaScript- JavaScript in Web Pages – The Advantages of JavaScript –Writing JavaScript into HTML – Syntax – Operators and Expressions –Constructs and conditional checking - LOOPS – Functions – Placing text in a browser– Dialog Boxes – Form object's methods – Built in objects – user defined objects – Page Validation – Reporting.		**CO3**
UNIT-IV	**XML**	**Periods: 12**
Introduction to XML – Features of XML – Uses of XML – Advantages of XML – Simple XML – XML key components – XML Validation – DTD and Schemas – Well-formed XML document – Applications of XML – XSL, XSD and XSLT – XQuery – XQuery Features – XPath – XPath Expression – XPath Nodes – XQuery vs XPath.		**CO4**
UNIT-V	**PHP**	**Periods: 12**
Introduction – Features – basic syntax of PHP – Decision and looping – PHP and HTML – Arrays – Functions – Browser control – String - Form processing – Handling HTML Form with PHP – Working with files and Directories – Session and Cookie – Database Connectivity with MySQL – Exception Handling.		**CO5**

Lecture Periods: 60	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 60**

Text Books

1. Keith Wald, Jason Lengstorf," Pro PHP and jQuery", Paperback, 2016.
2. SemmyPurewal, "Learning Web App Development", O'Reilly Media, 2014.
3. Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India Private Limited, 2011.

4. Robert W.Sebesta, Programming the World Wide Web, 7th edition, Pearson Education, 2013.
5. P.J. Deitel AND H.M. Deitel," Internet and World Wide Web - How to Program", Pearson Education, 2009.

Reference Books

1. Yakov Fain, Victor Rasputnis, Anatole Tartakovsky and Viktor Gamov, "Enterprise Web Development ", O'Reilly Media, 2014.
2. Steven Suehring, Janet Valade, "PHP, MySQL, JavaScript& HTML5 All-in-One", John Wiley & Sons, Inc, 2013.
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* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)						Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
1	3	2	3	3	2	2	2	2	3
2	3	2	2	3	3	3	2	2	2
3	2	2	2	2	3	3	3	2	2
4	3	3	2	2	2	2	2	2	3
5	2	3	2	2	3	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus