FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit *	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(CS)101	Web Development using Open Source Scripting Language	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)102	Advanced Operating System	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)103	Data Structure through algorithms using 'C'	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)104 400	Programming in Java	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)105	Computer System Architecture	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)106	**Lab-I**: Programming in Web Development	-	-	2x2	2	-	50	100	150	-	30	50	80
MSc(CS)107	**Lab-II:** Programming in Data Structure through C	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)108	**Lab-III:** Programming in Java	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)109	Soft Skills	-	-	2x2	2	-	25	-	25	-	15	-	15
	TOTAL	15	5	16	28	500	300	200	**1000**	200	180	100	**480**

Pt. Ravishankar Shukla University
Raipur

CURRICULUM & SYLLABI

(Based on CBCS & LOCF)

M.Sc. Computer Science

Semester System

Session: 2024-26 & onwards

Approved by:	Board of Studies	Academic Council
Date:	10 MAY 2024	

M.Sc. Computer Science

Master of Science in Computer Science is a two-year professional post-graduate program designed to meet the shortage of qualified professionals in the IT (Information Technology) industry. This program helps students wanting to delve deeper into the world of Application development with the help of learning modern programming languages. The program is a combination of both theoretical and practical knowledge. **M.Sc.(CS)** endows students an opportunity to work with tools meant to develop better and faster applications. Technological issues require specialized solutions and **M.Sc. CS** provides hands-on training and skills to address to complex issues arising in the domains such as operating systems, computer languages and System Development. Students learn about the advanced applications of computer hardware and software and its application in various fields such as operating systems, web designing and computer languages such as .NET, Java, HTML, C++, RDBMS etc.

Program Outcomes:

Upon successful completion of the Master of Science in Computer Science program, students will be able to:

PO-1	**Knowledge:** Demonstrate a deep understanding of advanced computing concepts, theories, and techniques in various subfields of Computer Science.
PO-2	**Advanced Analytical and Computational Skills:** Possess advanced skills in system analysis and computation, including proficiency in using software, programming languages, and computational tools for simulations and data analysis.
PO-3	**Self-directed and Life-long Learning**: Recognize the importance of ongoing professional development and lifelong learning in the rapidly evolving field of computer applications& IT/ Computer Science, and will exhibit the ability to continue learning independently or in formal educational settings.
PO-4	**Critical Thinking and Reasoning:** Exhibit advanced critical thinking skills by analyzing and evaluating by theories, practical and projects, and by making reasoned judgments about complex computing problems.
PO-5	**Effective Communication**: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions
PO-6	**Further Education or Employment:** Engage for further academic pursuits, including Ph.D.. Get employment in academia, research institutions, industry, government, and other public sectors.
PO-7	**Problem Solving:** Formulate abstract programming problems and derive solutions using logical reasoning and programming.
PO-8	**Effective Citizenship**: **Leadership and Innovation:** Lead and innovate in various computer applications & IT/ Computer Science, contributing to advancements in the field and applying computer applications and IT insights to emerging challenges.
PO-9	**Ethics**: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
PO-10	**Social/ Interdisciplinary Interaction**: Integrate programming concepts and techniques into inter disciplinary contexts, collaborating effectively with professionals from other fields to address complex problems.
PO-11	**Global Perspective**: Recognize the global nature of Computer Science and its impact.

PROGRAMME SPECIFIC OUTCOMES (PSOs) : At the end of the program, the student will be able to:

PSO1	Understand the nature of Computer Science and explore the concepts in further details.
PSO2	Apply the knowledge of Computer Science concepts in interdisciplinary fields and draw the inferences by finding appropriate solutions.
PSO3	Pursue research in challenging areas of Computer Applications/Computer Science & IT
PSO4	Employ confidently the knowledge of Computer software and tools for treating the complex problems and scientific investigations.
PSO5	Qualify national level tests like NET/GATE etc.

M.Sc. Computer Science

Specification of Course	Semester	No. of Courses	Credits
Core	I-IV	25	84
Elective	II-III	04	16
Total		29	100

SCHEME OF TEACHING AND EXAMINATIONS 2024-26
MASTER OF COMPUTER SCIENCE (2 Years)

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit *	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(CS)101	Web Development using Open Source Scripting Language	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)102	Advanced Operating System	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)103	Data Structure through algorithms using 'C'	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)104 400	Programming in Java	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)105	Computer System Architecture	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)106	**Lab-I**: Programming in Web Development	-	-	2x2	2	-	50	100	150	-	30	50	80
MSc(CS)107	**Lab-II:** Programming in Data Structure through C	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)108	**Lab-III:** Programming in Java	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)109	Soft Skills	-	-	2x2	2	-	25	-	25	-	15	-	15
	TOTAL	15	5	16	28	500	300	200	**1000**	200	180	100	**480**

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit *	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(CS)201	Advanced RDBMS & PL/SQL	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)202	Advanced Computer Networks	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)203	.Net Technology	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)204	Elective – I	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)205	Elective – II	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS)206	**Lab-IV**: Programming in RDBMS & PL/SQL	-	-	2x2	2	-	50	100	150	-	30	50	80
MSc(CS)207	**Lab-V**: Programming based on paper-III	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)208	**Lab-VI:** Programming Lab in Network	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS)209	GD/PI based on Indian Knowledge System	-	-	2x2	2	-	25	-	25	-	15	-	15
	TOTAL	15	5	16	28	500	300	200	**1000**	200	180	100	**480**

* **L+T+(P/2)**

S.No	Elective -I	Elective -II
I.	Formal Automata Theory	AI & Expert System
II.	Big Data	Digital Signal Processing
III.	Open Source Software with Case Study of Linux	Soft Computing
IV.	MOOC	MOOC

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit *	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MSc(CS) 301	Data Science using Python	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS) 302	Software Engineering	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS) 303	Advanced Computer System Architecture	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS) 304	Elective – III	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS) 305	Elective – IV	3	1	-	4	100	25	-	125	40	15	-	55
MSc(CS) 306	**Lab-VII:** Practical Based on Python	-	-	2x2	2	-	50	100	150	-	30	50	80
MSc(CS) 307	**Lab-VIII:** Programming in Linux	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS) 308	**Lab-IX**: Mini-Project	-	-	2x2	2	-	50	50	100	-	30	25	55
MSc(CS) 309	Internship	-	-	2x2	2	-	25	-	25	-	15	-	15
	TOTAL	15	5	16	28	500	300	200	**1000**	200	180	100	**480**

* **Note – Student should join Summer Internship of 4 to 6 weeks, after Second Semester Examination.**

S.No	Elective –III	Elective -IV
I.	Data Mining and Data Warehousing	Mobile Communication
II.	Digital Image Processing	Analysis and Design of Algorithms
III.	Compiler Design	Computer Graphics
IV.	MOOC	MOOC

FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit *	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
M.Sc.(CS) 401	Cloud Computing	3	1	-	4	100	50	-	150	40	30	-	70
M.Sc.(CS) 402	Network Security and Cryptography	3	1	-	4	100	50	-	150	40	30	-	70
M.Sc.(CS) 403	Internet of Things	3	1	-	4	100	50	-	150	40	30	-	70
M.Sc.(CS) 404	Project Based Seminar	-	-	2x1	1	-	50	-	50	-	30	-	30
M.Sc.(CS) 405	Internship: Major Project/ Research Project (Dissertation)	-	-	3x2	3	-	100	200	300	-	60	100	160
M.Sc.(CS) 406	MOOC	**Non Credit but mandatory course**											
	TOTAL	09	3	8	16	300	300	200	800	120	180	100	400

* **L+T+(P/2)**

- **The work done by the students should be enough to justify the duration of project as 6 to 8 weeks.**
- **The certificate of Company/institute must specify the duration of at least 6 weeks.**
- **Students having undergoing Project will have to send the confirmation letter from the company/institute within 1 week of joining. This letter will have to consist of the information regarding Company/institute name, Guide Name, Project Title, Project Starting Date etc.**
- **The student will have to deliver Seminar and will have to submit two copies of Project Reports after completion of Project Work.**
- **Preferably, independent work should be carried out by each student.**
- **Participating in Workshops, Conferences and Seminars or publishing Research Papers will be given weightage in the Research Project.**
- **Students should register for any one MOOC course from SWAYAM/NPTEL/RSU LMS. under the guidance of a mentor and a certificate of completion must be submitted to the mentor.**

Note:

- In place of Elective Course of II and III semester, Student can choose paper(s) from **any one MOOC course from SWAYAM/NPTEL/RSU LMS** subject to the following conditions:
  a. The chosen paper from **any one MOOC course from SWAYAM/NPTEL/RSU LMS** will be other than the papers offered in the current course structure.
  b. The paper will be of PG level with a minimum of 10 weeks' duration of 4 credits and 100 marks.
  c. The list of courses on SWAYAM keeps changing; the departmental committee will finalize the list of MOOC courses for each semester.
  d. The paper(s) may be chosen from **any one MOOC course from SWAYAM/NPTEL/RSU LMS** on the recommendation of Head of the Department.
- The candidates who have joined the PG Program in School of Studies (University Teaching Department), shall undergo Generic Elective Courses (only qualifying in nature) offered by other departments/SoS in Semester II and Semester III.
- The candidates who have joined the PG Program in School of Studies in Computer Science & IT Studies (University Teaching Department), shall undergo Skill Enhancement Course/Value Added Course (only qualifying in nature) in Semester II and Semester III.

Generic Elective Courses: (Offered to PG students of other Departments/SoS only)

Semester	Course Code	Course Title	Course Type (T/P)	Hrs/ Week	Credits	Marks		
						CIA	ESE	Total
II	CS-CBCS-01	Essential of Information Technology	T	2	2	25	75	100
III	CS-CBCS-02	Computer Networking & HTML	T	2	2	25	75	100

Skill Enhancement/Value Added Courses: (Offered to the PG students of SoS in Computer Science & IT)

Semester	Course Code	Course Title	Course Type (T/P)	Hrs/ Week	Credits	Marks		
						CIA	ESE	Total
II	CS-VAC-01	Cyber Crimes and Law	T	2	2	25	75	100
III	CS-VAC-02	Green Computing	T	2	2	25	75	100

Program Articulation Matrix:

Following matrix depicts the correlation between all the courses of the program and Program Outcomes

Course Code	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
MSc(CS) 101	√	√	√	√	√	√	√	×	√	√	√	√	√	√	×	√
MSc(CS) 102	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 103	√	√	√	√	√	×	√	√	×	√	√	√	×	√	×	√
MSc(CS) 104	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 105	√	√	√	√	√	√	√	×	×	√	√	√	√	√	×	×
MSc(CS) 106	√	√	√	√	√	√	√	×	×	√	√	√	√	√	×	√
MSc(CS) 107	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 108	√	√	√	√	√	×	√	√	×	√	√	√	×	√	×	×
MSc(CS) 109	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 201	√	√	√	√	√	√	√	×	×	√	√	√	√	√	×	×
MSc(CS) 202	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 203	√	√	√	√	√	√	×	√	×	√	√	√	√	√	×	√
MSc(CS) 204-I	×	√	×	√	√	√	×	×	√	×	×	×	×	×	√	×
MSc(CS) 204-II	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	×
MSc(CS) 204-III	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	×
MSc(CS) 205-I	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 205-II	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 205-III	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 206	√	√	√	√	×	√	√	√	√	√	√	√	√	√	√	√
MSc(CS) 207	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MSc(CS) 208	√	√	√	×	√	×	√	√	√	√	√	√	√	√	×	×
MSc(CS) 209	√	√	√	√	√	√	√	√	√	√	√	√	√	×	√	×
MSc(CS) 301	√	×	√	×	√	×	√	√	×	√	√	√	√	√	×	×
MSc(CS) 302	√	√	√	×	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 303	√	√	√	√	√	√	√	√	√	√	√	√	√	√	×	√
MSc(CS) 304-I	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 304-II	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	√
MSc(CS) 304-III	√	×	√	√	√	√	×	√	×	√	√	√	√	√	×	√
MSc(CS) 305-I	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	×
MSc(CS) 305-II	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	×
MSc(CS) 305-III	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	×
MSc(CS) 306	√	√	√	√	√	√	√	√	×	√	√	√	√	√	×	×
MSc(CS) 307	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	×
MSc(CS) 308	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
MSc(CS) 309	√	√	√	×	√	×	√	√	×	√	√	√	√	√	×	×
MSc(CS) 401	×	√	×	√	×	√	×	√	√	√	√	√	√	√	√	√
MSc(CS) 402	×	×	×	√	√	√	√	×	√	×	×	×	×	×	√	√
MSc(CS) 403	×	√	×	√	√	√	√	×	√	×	×	×	×	×	√	√
MSc(CS) 404	×	√	×	√	√	√	√	×	√	×	√	×	√	√	√	√
MSc(CS) 405	√	√	√	√	√	×	√	×	√	×	√	×	√	×	√	√
MSc(CS) 406	√	√	√	×	√	×	√	√	×	√	√	√	√	×	√	×
No. of courses mapping the PO/PSO	31	38	31	36	39	34	37	27	23	31	33	31	31	30	17	20

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	Course Title		Course Type
MSc(CS)101	Web Development using Open Source Scripting Language		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
4	3	1	0

Maximum Marks	Sessional	Theory
125	25	100

Learning Objective (LO):

This course aims to make student learn Web Development concepts using scripting Language. It also helps to develop an understating of WWW and web hosting etc.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Learn about WEB pages and its execution.	U
2	Design web pages and hosting concepts.	U
3	Run DBMS query and link it with web Page.	AP
4	Learn DNS registration Process	U
5	Learn Website Publishing.	E

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	2	3	1	-	1	-	3	1	-	1	-	3	1	-	-	-
CO2	2	2	3	1	1	1	2	-	-	-	-	2	2	-	-	3
CO3	1	3	3	1	1	1	1	-	2	2	-	3	1	-	-	2
CO4	3	2	2	1	1	2	3	1	-	2	1	1	2	-	-	-
CO5	3	3	3	1	1	2	2	-	-	3	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:

MSc(CS)101- Web Development using Open Source Scripting Language

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I Webpage designing** HTML: Introduction to HTML, historical context and justification for HTML, Basic structure of an HTML document, Elements of HTML, HTML Tag and attributes, working with Text, Lists, tables and frames, Hyperlinks, Images and multimedia, working with forms and controls static V/S Dynamic websites, introduction to DHTML, CSS: concept of CSS , Creating style sheet, way of implementing CSS, CSS properties, Selector, CSS Id and class, CSS styling-Background, Text Format, Controlling fonts, Working with block elements and objects , working with lists and tables Box Model(Introduction, Border properties, padding properties, Margin properties).	10	1
II	**UNIT – II Event Handling and validation** Java Script:- what is java script, comparison between java, java script and VB script, The document Object model(DOM), Introduction to objects and methods, The hierarchy of JavaScript objects, window object, document object, outputting Text with JavaScript, JavaScript HTMl events and event listeners, JavaScript Validation: JavaScript from validation, Validate Numerical Input, Automatic HTML from Validation, Data Validation, HTML constant validation.	10	2
III	**UNIT – III Introduction to PHP** PHP evalution of PHP, Basic syntax, Defining variable and constant, datatype, Operator, Expression, Global Variables, Conditional Statement & looping statement: If-else, switch, while, for, for each loop Function: Function, call by value and call by reference, Recursion function, inbuilt functions, string: creatibg and accessing String, searching and replacing string, Formatting string, string library function arrays: Types of Array, Enumerated Arrays, Associative Array, Iteration, Multi dimensional Array, Array Function and SPL.	10	3
IV	**UNIT – IV Advanced PHP** Handling HTML from data, Hidden Field, Dealing with Multi-value field, File Uploaded form, Redirecting a form after submission, PHP file Include, PHP file require, Difference between include and require, Session Management, Cookies, PHP FTP, PHP HTTP, Exception Handling : PHP Exception and Errror, Difference between Fatal error and Warning, TRY, CATCH, THROW.	10	4
V	**UNIT – VDatabase Connectivity & Website Hosting** **Database Connectivity with My SQL:**Introduction to RDBMS, Connection PHP with MySQL Database, Performing basic database operation (DML), (insert, delete, update, select) with PHP, Setting query parameter, Executing query in PHP, **Website Hosting:** Website Hosting Basics, Domain Name Registration, Configuring DNS, Website Uploading and Publishing, Web-Page Performance, Search Engins, Monitoring and Securiuty.	10	5

Books Recommended:

- **Headfirst PHP and MySQL –** lynn Beighley and Michael Morrison
- **Learning PHP, MySQL and Java Script With J-Query, CSS –** Robin Nixon
- **HTML 5 Black Book, Covers CSS3, Java Script, XML, XHTML, AJAX, PHP and Jquerry-** D T Editotial Services
- **Introduction to Object Oriented Programming:** K V Witt, Galgotia Publications.
- **Object Oriented Programming**: *G Blaschek*, Springer Verlag
- **Object Data Management**: *R Cattel*, Addison Wasley.

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	Course Title		Course Type
MSc(CS)102	Advanced Operating System		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
4	3	1	0

Maximum Marks	Sessional	Theory
125	25	100

Learning Objective (LO):

The course learning objective is to develop an understanding of Operating System Concepts for relating the other subjects with the functions of OS.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Understand the basics of how does operating system work.	U
2	Inculcate knowledge of basic functions of operating system like memory management, disk scheduling etc.	U
3	Develop critical thinking to manage processes and learn managing hardware and software both.	U
4	Develop internal knowledge of system handling.	E
5	Process starts their execution and how it completes.(U)	E

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	3	3	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	3	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)102
Advanced Operating System

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I: Introduction** Defining operating system, History and Evolution of operating system, Dual mode operation in operating system, **Basic Concepts**: batch processing, spooling, multiprogramming, multiprocessor system, time sharing, real time systems, Functions and Goals of operating system, Operating system as resource manager, Operating system as an abstract machine.	10	1
II	**UNIT – II: Processor Management** Process concept, Process Control Block, **Process State**: State Transition Diagram, **Scheduling Queues**: Queuing Diagram, Types of schedulers-context switching and dispatcher, various types of CPU scheduling algorithms and their evaluation, multilevel queues and multilevel feedback queues, Thread life cycle, multithreading,	10	2
III	**UNIT – III: IPC and Dead Locks** **Inter Process Communication**: competing and co-operating processes, Introduction to concurrent processing, Precedence graphs, Critical section problem, Semaphore concept, Study of classical process synchronization problems: Producer–Consumer, Dining Philosophers. **Deadlocks**: The dead lock problem, dead lock definition, **Deadlock Characterization**: necessary condition, resource allocation graph, **Deadlocks handling**: Deadlock prevention, Deadlock avoidance, Banker's algorithm, Deadlock detection, Recovery from Deadlock.	10	3
IV	**UNIT – IV: Memory Management** Preliminaries of memory management, Contiguous memory allocation, partitioned allocation MFT, fragmentation, MVT, partition allocation policies, compaction, Non-Contiguous memory allocation, Paging, Structure of page table, Segmentation, **Virtual Memory**: Concepts, demand paging, Swapping, **Page replacement policies**: FIFO, Optimal, LRU, MRU, Thrashing. **Secondary Storage**: Hierarchy, physical characteristics, evaluation of disk access time and data transfer rate, **Scheduling algorithms**: FCFS, SCAN etc.	10	4
V	**UNIT – V: File and Device Management** **File concept**: file types, file directory maintenance, file sharing, basic file system structure, access methods-sequential and direct access, free space management contiguous, linked allocation and indexed allocation and their performances. **Protection and Security**: principle of protection, domain structure, access matrix, access control, the security problems. **Distributed systems:** Introduction & Features, Types of distributed OS.	10	5

Books Recommended:

- **Operating System Concepts**, *Abraham Silberschatz, Peter B. Galvin and Greg Gagne,* Wiley India
- **Modern Operating System**, *Andrew .S. Tanenbaum*, PHI
- **Operating System Concepts**, *James L. Peterson and Abraham Silberschatz,* Addison-Wesley
- **Operating System Concepts & Design**, *Milan Milenkovic,* MGH
- **An Introduction to Operating Systems**, *Harvey M. Dietel,* Addison Wesley

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	**Course Title**		**Course Type**
MSc(CS)103	Data Structure through Algorithms using 'C'		Core
Credit	**Hours Per Week (L-T-P)**		
	L	T	P
4	3	1	0

Maximum Marks	Sessional	Theory
125	25	100

Learning Objective (LO):

Objective of this course is to make student think about real time data storage and its structure. After completion of this course student will be able to understand and write coding in efficient manner.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Design the appropriate data structures and algorithms for solving real world problems and enables them to gain knowledge in practical applications of data structures.	Ap
2	Choose efficient data structures and apply them to solve problems and analyze the efficiency of programs based on time complexity.	An
3	Create better design of computer applications.	An
4	Understand technique such as Searching, Sorting, Tree and Graph so that student gain the reasoning ability to implement these concept in development of live commercial applications	Ap
5	Understand about memory representation of different data structures.(U)	U

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	3	3	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	3	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)103
Data Structure through Algorithms using 'C'

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I Array and Linked Lists** Algorithm: **Concept of Algorithm, definition, characteristics of algorithm,** algorithmic notation, analysis of algorithm, rate of growth, time, Basic time and space analysis of an algorithm, Asymtotic notation. **DataStructure: Definition, Types of Data Structure, Data Structure operation.** Array: Linear Array, Representations of Array in Memory, Traversing, Insertion and Deletion in Linear Array, Multidimensional Array. Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists, Circular Linked List.	10	1
II	**UNIT – II Stack and Queues** Stacks Definition, concepts, operation and application of Stacks, Recursion and Polish notations, Quick sort, tower of Hanoi, Queue, Priority Queue: definition concepts, operation and application of Queue, circular queue and Dequeue. Linked representation of stack and queue.	10	2
III	**UNIT – III Trees and Its Representation:** Terminologies related to trees, Binary Tree, complete binary tree, almost complete binary tree; Tree Traversals-preorder, in order and post order traversals, their recursive implementations, Expression tree-evaluation, Linked representations of binary tree, operations. header nodes; threads, **Binary Search Tree:** searching, Inserting and deleting in BST, Heap; Path Lengths; Huffman's Algorithms. Basic idea of AVL Tree.	10	3
IV	**UNIT – IV Graphs:** Related definitions; Graph representations- adjacency matrix, adjacency list, adjacency multi-list; Traversal schemes - depth first search, breadth first search; Minimum spanning tree; Shortest path algorithm; Kruskal and Dijkstra's algorithms.	10	4
V	**UNIT – V Searching, Hashing and Sorting:** Searching : Linear Search, Binary Search, Searching and data modification Hashing- Basics, methods, collision, resolution of collision, chaining; Internal Sorting, External sorting - Bubble Sort, Insertion Sort, Selection Sort, Merge sort, Radix sort, heap sort.	10	5

BOOKS RECOMMENDED:

- **Fundamental of Data Structures**, *Horowitz and Sahani*, Galgotia Publishers.
- **Data Structures and Program Design in C**, *Kruse R.L*, PHI.
- **Data Structures using C and C++,** *Tanenbaum*, PHI.
- **Data Structures**, Schaum Series.
- **Data Structures**, *Bhagat Singh*.
- **Data Structures** - *Trembley and Sorenson*.

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	2	I
Course Code	Course Title		Course Type
MSc(CS)104	Programming in JAVA		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
4	3	1	0
Maximum Marks	Sessional		Theory
125	25		100

Learning Objective (LO):

The objective of this course is to make learn students high level object oriented programming like java which develops programming skills in students.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Understand fundamentals structure and model of Java programming language.	U
2	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.	U
3	Understand the basic principles of creating Java applications with graphical user interface (GUI)	U
4	Write a computer program to solve specified problems as well as make Business and research applications.	Ap
5	Understanding all fundamentals of Java students can easily relate and solve the real problem.	An

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	1	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	1	-	-	-	-	2	1	-	-	3
CO3	3	3	2	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	3	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)104- Programming in JAVA

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I: Introduction to Java Programming** **An overview of Java:** Object Oriented Programming, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, Data Types, **Variables:** Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; **Operators**: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [ ] and instance of operator. **Control Statements:** Java's Selection statement, Iteration Statement, Jump Statement. **Arrays**: Declaring Array variables, constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.	10	1
II	**UNIT – II: Classes and Interface** **Introducing Classes:** Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining **Methods**: method overloading and overriding, Using objects as parameter, Constructors, Garbage collection, finalize () method. **Inheritance**: Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private, **Package:** Define package, CLASSPATH, importing package, Interface: Define an interface, implementing interface, extending interface, variable in interface, **Overview of Nested Class:** Top level nested class and interface, Non static inner class, Local class, Anonymous class.	10	2
III	**UNIT – III: Exception handling and Multithreading** **Exception Handling:** Exception types, Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, throws, and finally. **Multithreading:** Creating Thread, Thread Priority, Synchronization, Thread Scheduler, Running & Yielding, Sleeping & Waking Up, Waiting & Notifying, Suspending & Resuming; miscellaneous methods in thread class.	10	3
IV	**UNIT – IV: Fundamental Library Classes of Java and Input / Output** Object class, String class, String Buffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, Array List class, Liked List class, Tree Set, Comparator, Vector, Stack. **I/O Classes and Interfaces:** File, Buffer Stream, Character Stream, and Random Access for files, Object Sterilization.	10	4
V	**UNIT – V: Events, GUI and JDBC** **Event Handling:** Overview of Event Handling, Event Hierarchy, The Delegation Event Model, Event Classes, KeyEventClass, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Event Adapters. **GUI Programming:** Introduction to Swing, History, Features, Components and Containers, Swing Packages, Painting, Swing Component Classes; **JDBC:** Introduction to JDBC, JDBC Drivers Type, Connection, JDBC URLs, Driver Manager, Statement – Creating, Executing, Closing, Result Set – Data Types and Conversions. Prepared Statement.	10	5

Books Recommended:

- **Java: The Complete Reference,** *Herbert Schildt*, Oracle Press.
- **Core Java: Volume-I & Volume 2,** *Cay S. Horstmann & Gary Cornell*, PEARSON
- **Programming with Java,** *E. Balagurusamy*, McGraw Hill Education
- **Core Java**, *R. Nageshwara Rao*, Dreamtech Press

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	Course Title		Course Type
MSc(CS)105	Computer System Architecture		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
4	3	1	0

Maximum Marks	Sessional	Theory
125	25	100

Learning Objective (LO):

The course develops an understanding of Computer architecture and its detailed working. It inculcates the cognition of circuit design of internal parts of computers and its electronics basics.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Develops an intuitive knowledge of circuitry design of electronic components.	R
2	Understand the overall internal architecture of computer in detail and also the digital representation of data in a computer system.	U
3	Understand the general concepts in digital logic design, including logic elements and their use in combinational and sequential logic circuit design.	An
4	Understand computer arithmetic formulate and solve problems, understand the performance requirements of systems.	E
5	Familiar with system hardware component.	U

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	2	3	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	3	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)105
Computer System Architecture

Unit No.	Topics	No. of Hours	CO No.
I	**UNIT – I Representation of Information and H/w component** Number system (decimal, BCD, octal, hexadecimal) and conversions, r and r-1's complement, Fixed and Floating point representation, Binary codes: Excess-3, ASCII, EBCDIC, Error detection codes. Boolean Algebra, Map simplification K-Map, Logic Gates, **Combinational Circuit:** Half and Full Adder, Decoder and Multiplexer; **Sequential Circuit:** Flip-Flop (SR, D, JK, Master-Slave,T), 4 bit Register, Register with parallel load, Shift register, Binary ripple Counter, Binary synchronous counter.	10	1
II	**UNIT – II Register transfer language and micro operations** Register Transfer Language (RTL), Concepts of bus, Bus and Memory transfers, **Micro-operation:** Arithmetic, Logic and Shift micro operation, Instruction code, Computer registers, Computer instructions, Timing and control, Instruction Cycle and Interrupt Cycle, Memory reference instructions, Input-output and interrupt, Design of basic computer	10	2
III	**UNIT – III Programming Computers and CPU** Machine Language, Assembly Language, Assembler, Program Loops, Input /Output, Programming, General register organization, Stack organization, Instruction format, Addressing modes, Data transfer and manipulation language, Micro-programmed and Hardwired control, RISC Vs. CISC, **Pipelining in CPU design:** , Parallel Processing ,Arithmetic and RISC pipelining.	10	3
IV	**UNIT – IV Computer Arithmetic and I/O Techniques** Addition, Subtraction, Division and Multiplication Algorithm, Input-Output Interface, asynchronous data transfer; **Modes of transfer:** Programmed I/O, Interrupt Mechanism, Direct Memory Access (DMA), I/O Processor.	10	4
V	**UNIT – V Memory Organization** **Memory hierarchy:** Static and Dynamic RAM, ROM; Building large memory using chips, Associative Memory: associative mapping, Direct mapping, set associative mapping; Cache Memory Organization, Virtual Memory.	10	5

BOOKS RECOMMENDED:

- **Computer System Architecture**, *Morris Mano*, PHI, 3rd Edition)
- **Computer Organization and Architecture**, *William Stalling*, PHI
- **Computer organization and Architecture**, *J.P.Hayes*, TMH.
- **Digital Computer Logic Design**, *Morris Mano* ,PHI
- **Computer System Architecture and organization**, *Dr. M. Usha,and T. S. Shrikant*, Wiley publication.
- **Digital Computer Electronics**, *Malvino.*
- **Structured Computer Organization**, *Andrew S. Tanenbanm*, PHI
- **Modern Digital Electronics**, *R.P.Jain*, TMH
- **Fundamental of microprocessors,** *B. Ram*

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	**Course Title**		**Course Type**
MSc(CS)106	Lab-I:Programming in Web Development		Core
Credit	**Hours Per Week (L-T-P)**		
	L	T	P
2	-	-	4

Maximum Marks	Sessional	Practical
150	50	100

Learning Objective (LO):

The learning objective of the course to make students learn basics of networking and development of web pages, CSS, Layouts and its publishing.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Learn about WEB pages and its execution.	AP
2	Design web pages and hosting concepts.	AP
3	Run DBMS query and link it with web Page.	AP
4	Learn DNS registration Process	AP
5	Learn Website Publishing.	AP

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	2	3	1	-	1	-	3	1	-	1	-	3	1	-	-	-
CO2	2	2	3	1	1	1	2	-	-	-	-	2	2	-	-	3
CO3	1	3	3	1	1	1	1	-	2	2	-	3	1	-	-	2
CO4	3	2	2	1	1	2	3	1	-	2	1	1	2	-	-	-
CO5	3	3	3	1	1	2	2	-	-	3	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)106
Lab-I:Programming in Web Development

Unit No.	Topics	No. of Hours	CO No.
I	HTML Basic concepts, Web designing issue, Structure of HTML documents.	10	1
II	HTML Elements: Core attributes, Language attributes, Linking Basics, Linking in HTML. Images and Anchors, Anchor Attributes, Image Maps, Semantic Linking Meta Information.	10	1
III	Introduction to PHP and its basic Concepts with programs	10	1
IV	Advanced Concept of PHP like event handling etc..	10	1
V	Fundamental programs of Database connectivity	10	1

Books Recommended:

- **Fundamentals of Computers**, V. Rajaraman, Prentice Hall of India.
- **HTML Complete Reference**, *Thomas A. Powell*, TMH

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	**Course Title**		**Course Type**
MSc(CS)107	Lab-II: Programming in Data Structure Through 'C'		Core
Credit	**Hours Per Week (L-T-P)**		
	L	**T**	**P**
2	-	-	4

Maximum Marks	Sessional	Practical
100	50	50

Learning Objective (LO):

This course aims to student to learn how memory uses data structures for efficient management of memory for better programming.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Learn memory structures in programming.	Ap
2	Manage memory during programming.	Ap
3	Learn what data structure is used for better memory management.	Ap
4	Understand technique such as Searching, Sorting, Tree and Graph so that student gain the reasoning ability to implement these concept in development of live commercial applications	Ap
5	Understand about memory representation of different data structures.(U)	Ap

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	3	3	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO5	3	3	3	1	1	1	3	-	-	2	-	3	2	-	-	2

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)107
Lab-II: Programming in Data Structure Through 'C'

Unit No.	Topics	No. of Hours	CO No.
I	Programs Related to Array and Linked Lists	10	1
II	Programs Related to Stack and Queues	10	2
III	Programs Related to Trees	10	3
IV	Programs related to Searching algorithms	10	4
V	Programs related to Sorting algorithms	10	5

Books Recommended:

- **Fundamental of Data Structures**, *Horowitz and Sahani*, Galgotia Publishers.
- **Data Structures and Program Design in C**, *Kruse R.L*, PHI.
- **Data Structures using C and C++,** *Tanenbaum*, PHI.
- **Data Structures**, Schaum Series.
- **Data Structures**, *Bhagat Singh.*
- **Data Structures** - *Trembley and Sorenson.*

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	2	I
Course Code	Course Title		Course Type
MSc(CS)108	Lab-III: Programming in Java		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
2	-	-	4
Maximum Marks	Sessional		Practical
100	50		50

Learning Objective (LO):

The objective of this course is to make students implement knowledge of java programming language into practical and observe the output and to make analysis of efficacy of the program.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Understand fundamentals structure and model of Java programming language.	Ap
2	Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.	Ap
3	Understand all fundamentals of Java students can easily relate and solve the real problem.	Ap
4	Understand the basic principles of creating Java applications with graphical user interface (GUI).	Ap
5	Write a computer program to solve specified problems as well as make Business and research application.	Ap

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	3	3	1	1	1	3	-	-	2	-	3	2	-	-	2
CO4	3	3	3	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	3	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:
MSc(CS)108
Lab-III: Programming in Java

Unit No.	Topics	No. of Hours	CO No.
I	**Programs related to Variables:** Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting **Operators, Control Statements, Arrays.**	10	1
II	Programs related to Classes and Interface	10	2
III	Programs related to Exception handling and Multithreading	10	3
IV	Programs related to Fundamental Library Classes of Java and Input / Output	10	4
V	Programs related to Events, GUI and JDBC	10	5

Books Recommended:

- **Java: The Complete Reference,** *Herbert Schildt*, Oracle Press.
- **Core Java: Volume-I & Volume 2,** *Cay S. Horstmann & Gary Cornell*, PEARSON
- **Programming with Java,** *E. Balagurusamy*, McGraw Hill Education
- **Core Java**, *R. Nageshwara Rao*, Dreamtech Press

M.Sc. (CS) Semester-I

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	I
Course Code	Course Title		Course Type
MSc(CS)109	Soft Skills		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
2	0	0	4
Maximum Marks	Sessional		-
25	25		00

Learning Objective (LO):

The course aims is to develop presentation skills and communication skills in students.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Develop good personality.	Ap
2	Develop good managerial skill	Ap
3	Develop good communication skill	Ap
4	Face an interview with more confidence.	Ap
5	Have a better holistic perspective about their careers.	Ap

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO3	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-
CO4	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	3
CO5	3	3	3	-	1	-	3	1	-	-	-	3	1	-	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation

Detailed Syllabus:

MSc(CS)109

Soft Skills

Unit No.	Topics	No. of Hours	CO No.
I	Personality Development	10	1
II	Managerial Skill	10	2
III	Mock Interview	10	3
IV	Communication Skill	10	4
V	Interpersonal Skill	10	5

M.Sc. (CS) Semester-II

Program	Subject	Year	Semester
M.Sc.	Computer Science	1	II
Course Code	Course Title		Course Type
MSc(CS)201	Advanced RDBMS & PL/SQL		Core
Credit	Hours Per Week (L-T-P)		
	L	T	P
4	3	1	0

Maximum Marks	Sessional	Theory
125	25	100

Learning Objective (LO):

The course objective is to make students learn a understanding of DBMS concepts specifically SQL Concepts and PL- SQL programming.

Course Outcomes (CO):

CO No.	Expected Course Outcomes At the end of the course, the students will be able to :	CL
1	Design a database based on the given requirement.	Ap
2	Make Database oriented application with knowledge of subject provided to them.	Ap
3	Get the knowledge about Standard Query Language statements, PL/SQL, Query processing and optimization.	U
4	Apply normalization techniques on given database.	Ap
5	Get the basic building blocks of data warehousing, mining, Big Data Analytics, cloud computing etc.	U

CL: Cognitive Levels (**R**-Remember; **U**-Understanding; **Ap**-Apply; **An**-Analyze; **E**-Evaluate; **C**-Create).

CO-PO/PSO Mapping for the course:

PO / CO	POs											PSO				
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5
CO1	1	3	3	3	1	-	2	1	1	-	-	3	1	-	-	-
CO2	3	3	3	1	1	1	3	-	-	-	-	3	2	-	-	1
CO3	1	2	2	1	1	1	2	-	-	2	-	3	2	-	1	2
CO4	3	3	2	1	1	2	3	1	-	2	1	3	2	-	-	-
CO5	3	2	3	1	1	-	2	-	-	2	2	3	2	3	-	-

"3" – Strong; "2" – Moderate; "1"- Low; "-" No Correlation