Master of Science (Information Technology)
Master of Science (Information Technology) Semester-I

Course Code	PS01CINT51	Title of the Course	Object Oriented Programming Using Java
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	To learn the programming concepts and necessary constructs of the Java programming language and the Java Platform, Standard Edition (Java SE). To study the fundamentals of object-oriented programming. To acquire basic knowledge to write object-oriented programs in Java. To learn important features of the Java SE platform. To understand fundamentals of graphical programming in Java and the basic concepts of JDBC.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Java and its Basic Concepts** – The Java programming language: history, evolution, features – Introduction to the Java programming environment, JDK, JRE – An anatomy of a Java program – Data types, wrapper classes, automatic boxing and unboxing – Encapsulation, Inheritance, polymorphism, Interfaces – Packages – Decision making and Loop Control	25
2.	**Programming Concepts** – Input-output in Java – File handling – Exception handling – String handling – Multithreading – Introduction to java.util package and important members from it	25
3.	**Graphical Programming** – Introduction to the Abstract Window Toolkit (AWT) – Writing graphical programs using Swing library – Using various Swing components – Managing layout using Swing – Event handling using Swing	25

4.	**JDBC Concepts** – Introduction to JDBC – Different types of JDBC drivers – Programming database applications using JDBC – GUI Swing Programming database applications using JDBC	25

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices

Evaluation Pattern:

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop

1.	Ability to develop computer programs using the Java programming language and the Java SE platform.
2.	Understanding of the fundamental concepts of object-oriented programming.
3.	Ability to develop object-oriented software in Java.
4.	Knowledge of multithreading and file handling in Java.
5.	Ability to develop GUI programs in Java.
6.	Knowledge of database access in Java using JDBC.

Suggested References:

Sr. No.	References
1.	Schildt H. : The Complete Reference Java 2, 5th Edition, McGraw-Hill / Osborne,

	2002.
2.	Daniel Joshi and Pavel Vorbiev: The Java 1.1 Programmer's reference – Comdex Times, 1997.
3.	C. Thomas: Introduction to Object Oriented Programming with Java - TMH, 2009.
4.	Naughton: The Java Hand Book – TMH, 1996.

On-line resources to be used if available as reference material
1. https://www.computerscience.org/resources/java/
2. http://programmingbydoing.com/
3. https://www.hackerrank.com/products/school
4. https://www.javacodegeeks.com/

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Master of Science (Information Technology)
Semester-I

Course Code	PS01CINT52	Title of the Course	PYTHON PROGRAMMING
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	To learn the fundamentals of the Python programming language. To understand development of procedural as well as object-oriented Python programs. To learn GUI program development using Python. To study how to access files and databases from Python.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Python** – Brief history, key characteristics, advantages, major application areas – Syntax overview, comments, naming conventions – Primitive data types, data type constructors – Console input and output – Control structures – Programming exercises	25
2.	**Aggregate and Composite Data Types and Functions** – Sequence types: Lists, tuple, range – Text sequence type: str – Mapping type : dict – Set type: set – Programming exercises	25
3.	**Some More Features of Python** – Exception handling – Functions – Object-oriented programming in Python – classes, the constructor, members, methods, inheritance – Installing, updating and using modules – Programming exercises	25

4.	**Developing Applications using Python** – File handling – Developing GUI applications – Database access from Python – Programming exercises	25

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices

Evaluation Pattern:		
Sr. No.	**Details of the Evaluation**	**Weightage**
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Ability to develop computer programs using the Java programming language and the Java SE platform.
2.	Understanding of the fundamental concepts of object-oriented programming.
3.	Ability to develop object-oriented software in Java.
4.	Knowledge of multithreading and file handling in Java.
5.	Ability to develop GUI programs in Java.
6.	Knowledge of database access in Java using JDBC.

Suggested References:	
Sr. No.	References
1.	Mark Lutz, "Learning Python", 4 th Edition, O'Reilly, 2009.

On-line resources to be used if available as reference material
1. https://www.tutorialspoint.com/python/index.htm
2. https://www.tutorialspoint.com/python

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Master of Science (Information Technology)
Semester-I

Course Code	PS01CINT53	Title of the Course	COMPUTER NETWORKS & CYBER SECURITY
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	To learn data communication fundamentals. To understand the basic concepts of high speed LANs, satellite communication, routing and congestion control. To acquire the basic knowledge about the concepts of Internetworking, VPN and mobile phone system. To study the fundamentals of cyber security.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction and Data Communication Fundamentals** – Introduction and classification of computer networks – Properties of Transmission media Guided Media: Twisted Pair, Co-axial Cable, Fiber Optics Unguided Media: Radio waves, Microwaves, Infrared – Function of network devices**:** Amplifier, Repeater, Hub, Switch, Bridge, Router, Gateway – The OSI reference model & TCP/IP reference model – IEEE 802.3 Ethernet Cabling Scheme	25
2.	**High Speed LANs, Satellite Communication & Routing and Congestion Control** – Gigabit Ethernet – Communication Satellites: Geosynchronous Satellites, Medium-Earth Orbit Satellites, Low-Earth Orbit Satellites, Satellites versus Fiber – Routing Techniques Static Vs Dynamic Routing Algorithm Shortest Path Routing Flooding Distance Vector Routing – Congestion Control The concept of congestion	25

	Congestion Prevention Policies	
3.	**Internetworking, VPN and Mobile Phone System** – Introduction and Issues that arise in Internetworking – Different ways in which networks differ – Fragmentation – Tunneling & Virtual Private Networks – The mobile telephone system : Advanced Mobile Phone System D-AMPS: The Digital Advanced Mobile Phone System	25
4.	**Cyber Security** – Introduction, Traditional Cryptography, Fundamental Cryptographic – Principles, Secret-Key Algorithms, Public-Key Algorithms – Firewalls : Introduction and Packet Filter Firewall – Cybercrime: Definition and Origins of the World – Classification of Cybercrimes – Cybercrime and Indian ITA 2000. – Introduction to phishing, password cracking, key loggers, spywares, Trojan Horses, DoS/DDoS	25

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices

Evaluation Pattern:		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Understanding of the data communication fundamentals.
2.	Ability to describe the basic concepts related to high speed LANs, satellite

	communication, routing and congestion control.
3.	Basic knowledge about the concepts of Internetworking, VPN and mobile phone system.
4.	Ability to understand the fundamentals of cyber security.

Suggested References:	
Sr. No.	References
1.	Andrew S. Tanenbaum & David J. Wetherall, Computer Networks, Pearson, 5th Edition
2.	Nina Godbole , Sunit Belapure, Cyber Security, WILEY
3.	Stallings W. Data and Computer Communications, 10th Edition, Pearson, 2014.
4.	Behrouz Forouzan, Data Communications and Networking, 5th Edition, McGraw-Hill Higher Education, 2012.
5.	William Stallings, Network Security Essentials: Applications and Standards, 6th Edition, Pearson, 2018.
6.	Behrouz A. Forouzan, Cryptography & Network Security, 3rd Edition, McGraw-Hill Higher Education, 2007.

On-line resources to be used if available as reference material
1. https://www.cybrary.it/resources/glossary/
2. https://tutorials.cyberaces.org/tutorials.html

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Master of Science (Information Technology)
Semester-I

Course Code	PS01CINT54	Title of the Course	RELATIONAL DATABASE MANAGEMENT SYSTEMS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	To study the fundamentals of database systems and data models. To acquire basic knowledge about the Structured Query Language (SQL). To understand the concept of normalization and entity-relationship diagrams. To learn database programming concepts.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Database Systems and Data Models** – Database systems: needs, definitions, advantages – Users associated with database systems and their roles – Categories of data models (internal level models, Conceptual level models and external level models) – System catalog, Data independence, Data sharing,Data integrity, Data protection (security, backup and recovery)	25
2.	**Normalization & E-R Diagram** – Codd rules – Normalization (1NF to 3NF) – Entity-Relationship Diagram: Entities, Attributes (simple v/s composite, single-valued v/s multi-valued, complex, stored v/s derived), entity keys, relationships, their degree, cardinality ratios for binary relationships (1:1, 1:N, N:1, M:N), attributes of relationships, strong v/s weak entities, recursive relationships and role names, notations	25
3.	**SQL (Structured Query Language)** – Introduction to SQL – Data Types – DDL, DML and DCL Commands with syntax – Database objects like views, indexes, sequence, & synonyms – Built-in functions – mathematical functions, string functions, date & time functions, formatting functions, data type conversion	25

	functions – Types of Joins – Subquery	
4.	**PL/SQL(Procedural Language for SQL)** – Introduction to PL/SQL – Control structures – Cursor – Exception Handling – Stored Procedures and Functions – Database triggers – Packages	25

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices

Evaluation Pattern:		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Understanding of the fundamentals of database systems and data models.
2.	Basic knowledge of the Structured Query Language (SQL).
3.	Understanding of the concept of normalization and entity-relationship diagrams.
4.	Basic knowledge of the database programming concepts.

Suggested References:	
Sr. No.	References

1.	Elmasri R and Navathe S.B: Fundamentals of Database Systems - The Benjamin/Cummings Pub
2.	Abbey, Corey&Abramson,Oracle 9i**:**A Beginner's Guide,Oracle Press, TMH Edition
3.	Ivan Bayross, SQL, PL/SQL, BPB Publications

On-line resources to be used if available as reference material
1. https://www.tutorialspoint.com/dbms/index.htm
2. https://www.studytonight.com/dbms/

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Master of Science (Information Technology)
Semester-I

Course Code	PS01CINT55	Title of the Course	OPERATING SYSTEM CONCEPTS
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To provide basic understanding of the role and functioning of an operating system. 2. To study the fundamental concepts related to operating systems.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction** – Understanding the role of operating systems – Operating system services – Interrupt handling – Operating system interfaces:GUI, Command Line Interface, system calls – Types of Operating Systems – Structure of operating system	25
2.	**Process Management** – Process Concept – Queuing Diagram Representation of Process Scheduling – Schedulers: long term, middle term, short term – CPU Scheduling Algorithms – Introduction to process synchronization – Critical Section Problem – Semaphores, Monitors – Introduction to the Concept of a Deadlock, – Necessary Conditions for Deadlock	25
3.	**Memory Management** – Basic concepts of memory management – Swapping – Contiguous Memory Allocation – Paging – Segmentation – Virtual Memory: demand paging, Page Replacement Algorithms	25

4.	**Disk & File System Management** – File Systems – File attributes, operations, types, access methods – Directory structure – Disk structure, Disk attachment – Disk Scheduling Algorithms – FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK – RAID structures	25

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices

Evaluation Pattern:		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Ability to describe the role and functioning of an operating system.
2.	Understanding of fundamental concepts related to operating systems.
3.	Knowledge of process, memory, disk and file system management.

Suggested References:	
Sr. No.	References
1.	Silbetschatz, Galvin, Gagne: Operating System Concepts, 8th edition, John Wiley and Sons, Inc., 2008.
2.	Tanenbaum A. S. : Modern Operating Systems, 3rd edition, Prentice-Hall, 2008.

On-line resources to be used if available as reference material
1. https://www.tutorialspoint.com/operating_system/index.htm
2. https://www.britannica.com/technology/operating-system

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Master of Science (Information Technology)
Semester-I

Course Code	**PS01CINT56**	Title of the Course	**Practicals**
Total Credits of the Course	**5**	Hours per Week	**10**

Course Objectives:	1. To provide practical experience of Python programming 2. To provide practical experience off working with database management systems. 3. To familiarize students with Java programming.

Course Content		
	Description	Weightage* (%)
	Part-1 : Practical based on PS01CINT51	30
	Part-2 : Practical based on PS01CINT52	35
	Part-3 : Practical based on PS01CINT54	35

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching as well as online / ICT-based teaching practices

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	describe and work with database management systems.
2.	design databases for application software.

3.	create and manipulate databases using client software of the DBMS.
4.	develop database-hosted code for the DBMS.
5.	gain familiarity with Java programming.
6.	gain knowledge of developing Python programs.

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