SRM UNIVERSITY
(Under section 3 of UGC Act 1956)

DEPARTMENT OF COMPUTER APPLICATIONS

B.C.A. - SECOND YEAR
(2014-2015 REGULATION)

THIRD SEMESTER

LESSON PLAN

SRM UNIVERSITY

FACULTY OF SCIENCE AND HUMANITIES

SRM NAGAR, KATTANKULATHUR – 603 203

Semester	Course Code	Course Title	L	T	P	Total of LTP	C
III	UCA14301	PROGRAMMING IN JAVA	3	2	--	5	4

UNIT I - INTRODUCTION TO JAVA

The Genesis of Java- Buzzwords- Object oriented Concepts- Lexical Issues- Data types and variables- Arrays- Operators - Control Statements: Selection- Iteration and jump Statement.

UNIT II - CLASSES AND METHODS

Introducing classes - Class fundamentals - Declaring Objects - Assigning object reference variables. Introducing method – Constructors- The this Keyword- Garbage Collection- Finalize() method- Overloading methods- Using objects as parameters- Argument Passing - Returning Objects- Recursion – static and final keyword - Nested and Inner Classes - String Class - Command Line arguments.

UNIT III - INHERITANCE, PACKAGES, INTERFACES

Inheritance Basics - using Super- method Overriding – Dynamic method dispatch - abstract classes- Using final with Inheritance – Packages – Access Protection – Importing packages –Interfaces.

UNIT IV - EXCEPTION HANDLING, MULTITHREADING, APPLET

Exception handling fundamentals- Types- Using try, catch, throw, throws and finally - Java thread model – Creating a Thread – Creating multiple threads - Thread priorities – synchronization - Inter-thread communication - Applet Basics – Applet Skeleton – HTML applet tag – Passing parameters to applet

UNIT V - I/O STREAMS, UTILITY CLASSES, EVENT HANDLING

I/O Streams: Byte Streams – Character Streams – Reading and Writing Files — Legacy Classes and Interface: Vector, Stack, The Enumeration Interface - Utility classes: String Tokenizer, Date, Calendar, Gregorian Calendar, Random, Scanner – Introduction to Event Handling: Event Classes – Event Listener Interfaces.

TEXT BOOK

1. Herbert Schildt, (2007),"Java: The Complete Reference", Seventh Edition, McGraw Hill.

REFERENCES

1. Arnold and J.Gosling,(2000), "The Java Programming Language", Second edition, Addision Wesley.
2. Art Gittleman, (2002), "Ultimate Java Programming", Wiley Publications.

LESSON PLAN

Subject Name: **PROGRAMMING IN JAVA**

Subject Code: **UCA14301**

UNIT I		
Lecture Hour	**Description**	**Reference with chapter**
1	The Genesis of Java	TB1, Ch-1
2	Buzzwords	TB1, Ch-1
3	Object Oriented Concepts	TB1, Ch-2
4	Lexical Issues	TB1, Ch-2
5	Data Types	TB1, Ch-3
6	Variables	TB1, Ch-3
7	Arrays	TB1, Ch-3
8	(Contd.) Arrays	TB1, Ch-3
9	Operators	TB1, Ch-4
10	(Contd.) Operators	TB1, Ch-4
11	Control Statements: Selection	TB1, Ch-5
12	Iteration	TB1, Ch-5
13	Jump Statement	TB1, Ch-5

UNIT II		
Lecture Hour	**Description**	**Reference with chapter**
14	Introducing Classes	TB1, Ch-6
15	Class Fundamentals	TB1, Ch-6
16	Declaring Objects	TB1, Ch-6
17	Assigning Object Reference Variables	TB1, Ch-6
18	Introducing Method	TB1 - Ch-6
19	Constructors	TB1, Ch-6
20	The this keyword	TB1, Ch-6
21	Garbage Collection	TB1, Ch-6

22	Finalize() method	TB1, Ch-6
23	Overloading Methods	TB1, Ch-7
24	Using objects as parameters	TB1, Ch-7
25	Argument Passing	TB1, Ch-7
26	Returning Objects	TB1, Ch-7
27	Recursion	TB1, Ch-7
28	Static and final keyword	TB1, Ch-7
29	Nested and Inner Classes	TB1, Ch-7
30	String Class	TB1, Ch-7
31	(Contd.) String Class	TB1, Ch-7
32	Command Line Arguments	TB1, Ch-7

UNIT III		
Lecture Hour	**Description**	**Reference with chapter**
33	Inheritance Basics	TB1, Ch-8
34	(Contd.) Inheritance Basics	TB1, Ch-8
35	Using Super	TB1, Ch-8
36	Method Overriding	TB1, Ch-8
37	Dynamic Method Dispatch	TB1, Ch-8
38	Abstract Classes	TB1, Ch-8
39	Using final with Inheritance	TB1, Ch-8
40	Packages	TB1, Ch-9
41	Access Protection	TB1, Ch-9
42	Importing Packages	TB1, Ch-9
43	Interfaces	TB1, Ch-9
44	(Contd.) Interfaces	TB1, Ch-9

UNIT IV		
Lecture Hour	**Description**	**Reference with chapter**
45	Exception Handling Fundamentals	TB1, Ch-10
46	Types	TB1, Ch-10
47	Using try, catch,	TB1, Ch-10
48	Throw, throws	TB1, Ch-10
49	finally	TB1, Ch-10
50	Java thread Model	TB1, Ch-11
51	Creating a thread	TB1, Ch-11
52	Creating Multiple Threads	TB1, Ch-11
53	Thread Priorities	TB1, Ch-11
54	Synchronization	TB1, Ch-11
55	Inter-thread Communication	TB1, Ch-11
56	Applet Basics	TB1, Ch-12
57	Applet Skeleton	TB1, Ch-12
58	HTML Applet Tag	TB1, Ch-12
59	Passing Parameters to Applet	TB1, Ch-12

UNIT V		
Lecture Hour	**Description**	**Reference with chapter**
60	I/O Streams: Byte Streams	TB1, Ch-13
61	Character Streams	TB1, Ch-13
62	Reading Files	TB1, Ch-13
63	Writing Files	TB1, Ch-13
64	Legacy Classes and Interface: Vector	TB1, Ch-17
65	Stack	TB1, Ch-17
66	The Enumeration Interface	TB1, Ch-17
67	Utility Classes: String Tokenizer	TB1, Ch-18
68	Date	TB1, Ch-18
69	Calendar	TB1, Ch-18
70	Gregorian Calendar	TB1, Ch-18
71	Random	TB1, Ch-18
72	Scanner	TB1, Ch-18
73	Introduction to Event Handling: Event Classes	TB1, Ch-22
74	(Contd.) Event Classes	TB1, Ch-22
75	Event Listener Interfaces	TB1, Ch-22

Semester	Course Code	Course Title	L	T	P	Total of LTP	C
III	UCA14302	**MANAGING DATABASE**	3	2	--	**5**	4

Unit I: INTRODUCTION

Data-Database-DBMS-File Processing system vs. DBMS-Data Independence-Data catalog-Three schema architecture of a database-Functional components of DB- ER Model: Entity-Attributes and its type – Entity and Relationship-Design issues of ER Model-Constraints.

Unit II: STRUCTURED QUERY LANGUAGE(SQL)

Overviews of SQL- Data Definition commands, set operations, aggregate function, null values, Data Manipulation commands, Data control commands, Views in SQL, Nested complex queries.

Unit III: RELATIONAL – DATABASE DESIGN.

Relational- Database Design: Design guidelines for relational schema, Functional Dependencies – Normal Forms – 1NF – 2NF-3NF- BCNF – 4NF-.Integrity and security in database: Domain constraints, Referential integrity.

Unit IV: TRANSACTION MANAGEMENT

Transaction MANAGEMENT: Transaction concept, Transaction state, ACID Properties, Implementation of Atomicity and Durability, concurrent executions, Serializability, Recoverability, Implementation of isolation.

Unit V : CONCURRENCY CONTROL AND PHYSICAL STORAGE MEDIA

Concurrency control: lock-based, Time stamp-based, validation-based protocols, Deadlock handling, Recovery system, Failure classification, storage structure, Overview of physical storage Media: Magnetic Disks- RAID- Tertiary storage_ File Organization-Organization of Records in Files- Indexing and Hashing- Ordered indices- Static Hashing-Dynamic Hashing.

BOOK FOR STUDY:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan- “Database System Concepts”, Fourth Edition, McGraw-Hill, 2002.(Unit I,IV and V)
2. Date C.J.,Kannan A.,Swamynathan S.,(2006),” An Introduction to Database Systems”, Eighth Edition, Pearson Education.(Unit II and III)

REFERENCES:

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.

LESSON PLAN

Subject Name: **MANAGING DATABASE**
Subject Code: **UCA14302**

UNIT I		
Lecture Hour	**Description**	**Reference with chapter**
1	Data-Database-DBMS	TB1,ch-1.1
2	File Systems versus Database systems	TB1, Ch-1.2
3	Data Independence : Logical and Physical	TB2, Ch-2.2.2
4	Data catalog	TB2,Ch -3.3
5	Data Models : Entity Relationship model	TB1, Ch-1.3.3
6	Relational Model, Hierarchical and Network Model	TB1, Ch-1.3.3
7	DBMS Architecture : The three schema architecture	TB2, Ch-2.2
8	Data Modeling using Entity Relationship model	TB2, Ch-3
9	Entity types, Entity Sets, Attributes, and Keys	TB2, Ch-3.3
10	Relationships, Relationship types and constraints	TB2, Ch-3.4
11	Weak Entity types, Refining the ER Design for the company database	TB2, Ch-3.5 TB2, Ch-3.6
12	ER Diagrams, Naming Conventions	TB2, Ch-3.7
13	Design Issues of ER Model	TB2, Ch-3.7
14	Constraints	TB2, Ch-4.3

UNIT II		
Lecture Hour	**Description**	**Reference with chapter**
15	Overview of SQL	TB1, Ch – 3.1
16	Data Definition Commands- Create, Alter	TB1, Ch-3.2
17	Data Definition Commands- Drop, Desc	TB1, Ch-3.2
18	Set Operations- Union , Union all, Intersect, Minus	TB1, Ch-3.4
19	Set Operations- Cartesian product, division	TB1,Ch-3.4
20	Aggregate Functions- maxi, min, sum, avg	TB1, Ch-3.5
21	Aggregate Functions- count and null values	TB1, Ch-3.5,3.6
22	Data Manipulation Commands- insert, delete	TB1, Ch-3.10
23	Data Manipulation Commands- update and select	TB1, Ch-3.10
24	Views in SQL	TB1 - Ch-3.9
25	Nested queries	TB1, Ch-3.7
26	Complex queries	TB1, Ch-3.8
27	Data control commands	TB1, Ch-3.10.5

UNIT III		
Lecture Hour	**Description**	**Reference with chapter**
28	Database Design- Introduction	TB2, Ch-11.1
29	Relational Model Concepts: Domains, Attributes, and Relations	TB2, Ch-7.1, 7.1.1
30	Characteristics of Relations, Relational Model Notation	TB2, Ch-7.1.2, 7.1.3
31	Relational Algebra: Select, Project, Rename Operation	TB2, Ch-7.4
32	Functional Dependencies	TB2, Ch-12.2
33	Non-loss Decomposition	TB2,Ch-12.2
34	Normal Forms:1NF, 2NF, 3NF	TB2, Ch-12.3
35	Boyce/codd Normal Form	TB2, Ch-12.5
36	Multi-valued dependencies and 4NF	TB2, Ch-13.2
37	Join Dependencies and 5NF	TB2, Ch-13.3
38	Integrity and security in database- Domain constraint	TB2, Ch-9.5
39	Integrity and security in database-Referential integrity	TB2, Ch-9.4

UNIT IV		
Lecture Hour	**Description**	**Reference with chapter**
40	Transaction Management- Transaction concept	TB1, Ch-15.1
41	Properties of Transactions- ACID	TB1, Ch-15.1
42	Transaction States	TB1, Ch-15.2
43	Implementation of Atomicity and Durability	TB1, Ch-15.3
44	Concurrent Executions	TB1, Ch-15.4
45	Serializability-Introduction	TB1, Ch-15.5
46	Confilict Serializability	TB1, Ch-15.5.1
47	Non-Conflict Serializability	TB1, Ch-15.5.1
48	View Serializability	TB1, Ch-15.5.2
49	Recoverability- Recoverable Schedule	TB1, Ch-15.6.1
50	Recoverability- Cascadeless Schedule	TB1, Ch-15.6.2
51	Implementation of isolation	TB1, Ch-14.7

UNIT V		
Lecture Hour	**Description**	**Reference with chapter**
52	Concurrency control	TB1, Ch-16
53	Locking Techniques: Types of Locks	TB1., Ch-16.1

54	Dealing with Deadlock and Starvation	TB1, Ch-16.6
55	Time Stamp Ordering	TB1, Ch-16.2
56	Validation Techniques	TB1, Ch-16.3
57	Granularity of Data Items	TB1, Ch-16.4
58	Recovery Concepts	TB1, Ch-17
59	Shadow Paging	TB1, Ch-11.3.1
60	Log Based Recovery	TB1, Ch-17.4
61	Secondary storage Devices: Hardware Description of Disk Devices	TB1, Ch - 11
62	Magnetic Tape Storage Devices	TB1, Ch - 11.1,11.2
63	RAID Technology	TB1, Ch-11.3
64	RAID Organizations and Levels	TB1, Ch-11.3.3
65	File Operations	TB1, Ch-11.6
66	Hashing Techniques	TB1 - Ch-12
67	External Hashing for Disk Files	TB1, Ch-12.6
68	Hashing Techniques that allow Dynamic File Expansion	TB1, Ch-12.7
69	Indexing: Types of Single level Ordered Indexes	TB1, Ch-12
70	Multilevel Indexes	TB1, Ch-12.2.2

UCA14303 - OPERATING SYSTEM

UNIT - INTRODUCTION (15 Hours)

Definition – Mainframe system – Desktop Systems – Multiprocessor systems – Distributed systems – clustered systems – Real time and Hand held systems – System components – Os Services – System Calls – Programs – Structures

UNIT II - PROCESSES & SCHEDULING (15 Hours)

Process concepts – Process Scheduling – operation on Process – Cooperating process – IPC – CPU Scheduling: Basic Concepts – Scheduling criteria – Scheduling algorithms – Multiprocessor Scheduling – Real time Scheduling

UNIT III - PROCESS SYNCHRONIZATION (15 Hours)

Background – The critical Section problem – synchronization hardware – semaphores

– Classic Problems of Synchronization - critical Regions – Monitors – OS Synchronization

UNIT IV - DEADLOCKS (15 Hours)

System model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock prevention – Deadlock Avoidance – Deadlock Detection and Recovery from

Deadlock

UNIT V - MEMORY MANAGEMENT (15 Hours)

Swapping – Contiguous memory Allocation – Paging – segmentation – segmentation with paging – Demand Paging – Process creation – Page Replacement – Thrashing

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin & Greg Gagne, (2006), “Operating System Concepts”, Sixth Edition, John Wiley & Sons, Inc.

REFERENCE BOOKS:

1. Milankovic M , (1992),”Operating System concepts and Design, 2nd edition, Tata Mcgraw hill.

2. H.M.Deitel, (2002), ”An Introduction to Operating Sysems”,2nd edition, Pearson Education.

LESSON PLAN

Subject Name: **OPERATING SYSTEM**
Subject Code: **UCA14303**

Unit I: Introduction

Definition - Mainframe system - Desktop Systems - Multiprocessor systems - Distributed Systems - clustered systems - Real time and Hand held systems - System components - OS Services - System calls - Programs - Structures

Day	Description	Reference with chapter
Day 1	Definition - What is an Operating System?	TB : Ch 1.1
Day 2	Mainframe Systems	TB : Ch 1.2
Day 3	Desktop Systems	TB : Ch 1.3
Day 4	Multiprocessor Systems	TB : Ch 1.4
Day 5	Distributed Systems	TB : Ch 1.5
Day 6	Clustered Systems	TB : Ch 1.6
Day 7	Real time Systems	TB : Ch 1.7
Day 8	Handheld Systems	TB : Ch 1.8
Day 9	System Components	TB : Ch 3.1
Day 10	OS Services	TB : Ch 3.2
Day 11	System Calls	TB : Ch 3.3
Day 12	Process, File, Device and Information Management	TB : Ch 3.3.1, 3.3.2, 3.3.3, 3.3.4
Day 13	System Programs	TB : Ch 3.4
Day 14	System Structure	TB : Ch 3.5
Day 15	Layered approach, Microkernals	TB : Ch 3.5.2, TB : Ch 3.5.3

UNIT II : **Processes and Scheduling**

Process concepts - Process scheduling - operation on process - cooperating process - IPC - CPU Scheduling : Basic concepts - Scheduling criteria - Scheduling algoritms - Multiprocessor scheduling - Real time scheduling

Day	Description	Reference with chapter
Day 16	Process Concept	TB : Ch 4.1

Day 17	Process Scheduling	TB : Ch 4.2
Day 18	Operation on processes	TB : Ch 4.3
Day 19	Cooperating processes	TB : Ch 4.4
Day 20	Interprocess Communication - Message Passing System	TB : Ch 4.5.1
Day 21	Naming	TB : Ch 4.5.2
Day 22	Synchronization, Buffering	TB : Ch 4.5.3, Ch 4.5.4
Day 23	An Example : Mach and Windows 2000	TB : Ch 4.5.5, Ch 4.5.6
Day 24	CPU Scheduling : Basic Concepts	TB : Ch 6.1
Day 25	Scheduling Criteria	TB : Ch 6.2
Day 26	Scheduling Algoritms - FCFS, Shortest Job first scheduling	TB : Ch 6.3.1, Ch 6.3.2
Day 27	Priority scheduling, Round-robin Scheduling	TB : Ch 6.3.3, Ch 6.3.4
Day 28	Multilevel Queue, Multilevel feedback queue scheduling	TB : Ch 6.3.5, Ch 6.3.6
Day 29	Multiprocessor Scheduling	TB : Ch 6.4
Day 30	Real time Scheduling	TB : Ch 6.5

Unit III: **Process Synchronization**

Background - The critical section problem - synchronization hardware - semaphores - Classic problems of Synchronization - critical Regions - Monitors - OS Synchronization

Day	Description	Reference with chapter
Day 31	Process Synchronization - Background	TB : Ch 7.1
Day 32	The Critical section problem	TB : Ch 7.2
Day 33	Two process Solutions	TB : Ch 7.2.1
Day 34	Multiple process Solutions	TB : Ch 7.2.2
Day 35	Synchronization hardware	TB : Ch 7.3
Day 36	Semaphores - Usage, Implementation	TB : Ch 7.4.1, Ch 7.4.2
Day 37	Deadlocks and starvation, Binary semaphores	TB : Ch 7.4.3, Ch 7.4.4
Day 38	Classic Problems of Synchronization - The Bounded Buffer problem	TB : Ch 7.5.1
Day 39	The Readers - Writers Problem	TB : Ch 7.5.2
Day 40	The Dinning philosophers problem	TB : Ch 7.5.3
Day 41	Critical Regions	TB : Ch 7.6
Day 42	Implementation of Conditional region	TB : Ch 7.6
Day 43	Monitors	TB : Ch 7.7
Day 44	OS Synchronization - Synchronization in Solaris 2	TB : Ch 7.8.1
Day 45	Synchronization in Windows 2000	TB : Ch 7.8.2

Unit IV: **Deadlocks**

System model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock prevention - Deadlock Avoidance - Deadlock Detection and Recovery from Deadlock

Day	Description	Reference with chapter
Day 46	Deadlocks - System model	TB : Ch 8.1
Day 47	Deadlock characterization - Necessary conditions	TB : Ch 8.2.1
Day 48	Resource Allocataion Graph	TB : Ch 8.2.2
Day 49	Methods for handling deadlocks	TB : Ch 8.3
Day 50	Deadlock Prevention - Mutual exclusion, Hold and Wait	TB : Ch 8.4.1, Ch 8.4.2
Day 51	No Preemption, Circular Wait	TB : Ch 8.4.3, Ch 8.4.4
Day 52	Deadlock Avoidance - Safe state	TB : Ch 8.5.1
Day 53	Resource Allocataion Graph Algorithm	TB : Ch 8.5.2
Day 54	Banker's Algorithm - Safety Algorithm	TB : Ch 8.5.3, Ch 8.5.3.1
Day 55	Resource request algorithm	TB : Ch 8.5.3.2
Day 56	Example	TB : Ch 8.5.3.3
Day 57	Deadlock Detection - Single instance of each resource type	TB : Ch 8.6, Ch 8.6.1
Day 58	Several instances of a Resource type	TB : Ch 8.6.2
Day 59	Recovery from deadlock - Process termination	TB : Ch 8.7, Ch 8.7.1
Day 60	Resource preemption	TB : Ch 8.7.2

Unit V: **Memory management**

Swapping - Contiguous memory allocation - Paging - segmentation - segmentation with paging - Demand paging - Process creation - Page Replacement – Thrashing

Day	Description	Reference with chapter
Day 61	Memory management - Swapping	TB : Ch 9.2
Day 62	Contiguous memory allocation	TB : Ch 9.3
Day 63	Fragmentation	TB : Ch 9.3.3
Day 64	Paging - Basic method	TB : Ch 9.4, Ch 9.4.1
Day 65	Hardware support, Protection	TB : Ch 9.4.2, Ch 9.4.3

Day 66	Structure of the page table	TB : Ch 9.4.4
Day 67	Shared pages	TB : Ch 9.4.5
Day 68	Segmentation - Basic method, Hardware	TB : Ch 9.5.1, Ch 9.5.2
Day 69	Protection and sharing, Fragmentation	TB : Ch 9.5.3, Ch 9.5.4
Day 70	Segmentation with paging	TB : Ch 9.6
Day 71	Demand paging	TB : Ch 10.2
Day 72	Process creation	TB : Ch 10.3
Day 73	Page Replacement - FIFO Page replacement	TB : Ch 10.4, Ch 10.4.2
Day 74	Optimal, LRU, LRU Approximation page replacement	TB : Ch 10.4.3, Ch 10.4.4, Ch 10.4.5
Day 75	Thrashing	TB : Ch 10.6