AHMEDABAD UNIVERSITY

AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

Second Year MCA : Trimester IV

Subject Code: MCA 241 **Subject Name:** Core Java

Lectures per week (hours) : 3 Lectures + 1 Tutorial
Practicals per week (hours) : 4
Internal Assessment : 50 Marks
External Assessment : 50 Marks (Theory), 50 Marks (Practical)
Total Credits : 8

Prerequisite: Object-oriented Programming with C++

Aim

The course will provide strong foundation for object oriented software development using Java platform

Objectives

- To have clear understanding of the basic concepts and features of the Java programming language and its core libraries.
- To make the students familiar with professional programming skills and practices like sound program design, variable naming standards, coding conventions, and documentation the source code.
- To provide a sound knowledge base of Java platform and prepare the students for Advanced Java course.

Course Contents:

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	**Introduction to Java platform, Overview of java, Data types, variables, arrays, Classes and objects** Comparison C++ and Java, features of Java, Data types, Java Environment, JVM, Structure of a Java program, expressions and statements, arrays, Java string handling library (String and StringBuffer classes), creating classes and objects, methods and variables, constructors, finalize method and garbage collection, Method overloading.	9	20
Unit II	**Inheritance, Packages and interfaces, Exception handling mechanism** Inheritance, method overriding, final class and methods, static variables and methods, abstract class, defining packages, import statement, Java access protection, defining interfaces, multiple inheritance, runtime polymorphism using interface, basic syntax of exception handling only (try, catch and finally block)	9	25

Unit III	**Multi-threaded programming and Java input/output system** Creating threads, two approaches to create thread: extending Thread or implementing Runnable, thread life-cycle, thread priority, Thread methods: yield, stop, join and isAlive, (no inter-thread communication), Java I/O streams, byte stream and character stream classes (FileInputStream, FileOutputStream, FileReader, FileWriter) Filtered byte stream classes (DataInputStream, DataInputStream), Object serialization.	9	25
Unit IV	**Java Applet, AWT and Swing** Applet basics, applet methods, applet life-cycle, HTML applet tag, passing parameters to applets, Java event delegation model, Basic event sources and event listeners (ActionEvent, KeyEvent and MouseEvent), AWT Controls (creating simple GUI programs using frames, buttons, labels and textboxes), Introduction to basic Swing classes (JFrame, JLabel, JButton, JTextField)	9	30
	Total	**36**	**50**

Reference Books:

- The Complete Reference Java, J2SE, Herbert Schildt, 7th Edition Tata McGraw-Hill Publishing Company Limited.
- Teach Yourself Java, J O'Neil, 1st Edition, Tata McGraw Hill Publishing Company Limited.

Additional Reference Books:

- Using Java 2 Platform, Special Edition, Joseph Weber, 1st Edition Prentice Hall of India.
- Core Java 2 Volume I – Fundamentals, Cay S. Horstmann and Gary Cornell, 5th Edition, Prentice Hall, 2002.
- Programming with Java, E. Balagurusamy, 3rd Edition Tata McGraw Hill Publishing Company Limited.
- Sun's Java tutorial: http://java.sun.com/docs/books/tutorial/java/index.html

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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

Subject Code: MCA 241 **Subject Name:** Core Java
Practical per week (hours) : 4
Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be Covered	No. of Practical (Hours)
1.0	**Basic Java programs, Classes and Objects** Data types, Structure of a Java program, expressions and statements, arrays, Java string handling library (String and StringBuffer classes), creating classes and objects, methods and variables, constructors, finalize method and garbage collection, Method overloading.	09
2.0	**Inheritance, Packages and interfaces, Exception handling mechanism** Inheritance, method overriding, final class and methods, static variables and methods, abstract class, defining packages, import statement, Java access protection, defining interfaces, multiple inheritance, runtime polymorphism using interface, basic syntax of exception handling only (try, catch and finally block)	09
3.0	**Multi-threaded programming and Java input/output system** Creating threads, two approaches to create thread: extending Thread or implementing Runnable, thread life-cycle, thread priority, Thread methods: yield (), stop (), join () and isAlive(), (no inter-thread communication), Java I/O streams, byte stream and character stream classes (FileInputStream, FileOutputStream,FileReader,FileWriter) Filtered byte stream classes (DataInputStream, DataInputStream), Object serialization.	09
4.0	**Java Applet, AWT and Swing** Applet basics, applet methods, applet life-cycle, HTML applet tag, passing parameters to applets, Java event delegation model, Basic event sources and event listeners (ActionEvent, KeyEvent and MouseEvent), AWT Controls (creating simple GUI programs using frames, buttons, labels and textboxes), Introduction to basic Swing classes (JFrame, JLabel, JButton, JTextField)	09
	Total	**36**

AHMEDABAD UNIVERSITY

AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

Second Year MCA : Trimester IV

Subject Code: MCA 242 **Subject:** Software Engineering

Lectures per week (hours) **:** 3 Lectures + 1 Tutorial
Practicals per week (hours) : 0
Internal Assessment **:** 50 Marks
External Assessment **:** 50 Marks
Total Credits **:** 4

Prerequisite: None

Aim:

The course is aimed to help the student understand and appreciate the basic concepts of Software Engineering useful in software development and maintenance.

Objectives:

(1) To understand the basic concept and importance of Software Engineering
(2) To understand the process of Software Engineering
(3) To understand all the activities required to develop software.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	**Introduction to Software Engineering and Processes** What is software? – Evolving role of software – Types of software – Software Myths – Process Framework – CMM – Process Assessment – Various Process Models	9	13
Unit II	**Software Engineering Practice and System Engineering** SE practice – Core Principles – Detailed Practices Communication, Planning, Modeling, Construction and Deployment – System Engineering – System Engineering Hierarchy – Business Process Engineering – Product Engineering.	9	12
Unit III	**Requirements Engineering, Analysis and Design Modeling, Creating Architectural Design** Requirements Engineering Tasks Inception / Elicitation / Elaboration / Negotiation / Specification / Validation / Management - Requirements Analysis - Analysis Modeling Approaches Conventional / Object Oriented – Data Modeling Concepts – Flow Oriented Modeling - Design Process and Design Quality – Design Concepts Abstraction / Architecture / Modularity – Information Hiding – Functional Independence – Design Model – Software Architecture – Taxonomy of Architectural Styles - Architectural Design.	9	13

Unit IV	**Component and User Interface design, Testing strategies and tactics, Metrics for Product and Process** Conventional view of component – Designing Conventional Components – Golden Rules for User Interface Design – User Interface Analysis and Design – User Interface Design Issues – UI Design Evaluation – Software Testing Fundamentals – Black Box / White Box Testing – Basis Path Testing – Strategic Approach to Software Testing – Test Strategies for Conventional Software Unit / integration/ System / Acceptance – The Art of Debugging - Software Quality and Metrics – A Framework For Product Metrics – Metrics for Analysis model / design model / Source Code / Testing / Maintenance.	9	12
	Total	**36**	**50**

Outcomes:

Upon the completion of this course, the student will be able to:

(1) Understand and appreciate the importance of Software Engineering in today's world.
(2) Understand and perform the various activities required to develop good quality software within time and cost budget.

Reference Books:

(1) Software Engineering – A Practitioner's Approach, Roger Pressman, 7th Edition, TMH.

Additional Reference Books:

(1) Software Engineering, Sommerville, 8th Edition, Pearson Education

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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

Second Year MCA : Trimester IV

Subject Code: MCA 243 **Subject:** Operations Research

Lectures per week (hours) **:** 3 Lectures + 1 Tutorial
Practicals per week (hours) : 0
Internal Assessment **:** 50 Marks
External Assessment **:** 50 Marks
Total Credits **:** 4

Prerequisite: Knowledge of Matrix Algebra and Coordinate Geometry

Aim:

The course is aimed to help the student understand and appreciate the basic concepts of Quantitative Techniques useful in management decision making.

Objectives:

(1) To understand and appreciate the basic concept of Quantitative techniques useful in decision making.
(2) To gain knowledge of some of the important quantitative techniques useful in decision making.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	**Introduction to Operations Research and Linear Programming** Introduction to OR – Definition – History of OR – Applications of OR – Model Formulation for Linear Programming – Introduction to Graphical method - Theory of Simplex Method – Simplex Method – Sensitivity Analysis – Introduction to tools like LINDO, CPLEX	11	14
Unit II	**Transportation Problem and Queuing Theory** Introduction to Transportation problem – Initial feasible solution by Northwest Corner Method, Least Cost Method, Vogel's Approximation method – Optimization by MODI method – Introduction to assignment problem - Introduction to Queuing theory – Essential features of queuing system – performance measures of queuing system – Probability distributions in Queuing Systems – Classification of Queuing models – Single Server Queuing models.	9	12
Unit III	**Inventory Models** Introduction – Factors involved in Inventory problem analysis – Inventory model building – Inventory control models with and without shortages.	8	12

Unit IV	**Simulation and Project Management – PERT CPM** Introduction – Steps of Simulation process – Advantages and disadvantages of Simulation – Simulation of different types of problems – Role of computers in Simulation – Applications of simulation - Introduction to Project Management – Basic differences between PERT and CPM – Phases of Project Management - PERT/ CPM Network Components and precedence relationship – Finding Critical Path	8	12
	Total	**36**	**50**

Outcomes:

Upon the completion of this course, the student will be able to:

(1) Understand and appreciate the basic concepts of Quantitative techniques useful in decision making.
(2) Decide which technique to use in different situations.
(3) Apply the chosen technique in decision making.

Reference Books:

(1) Operations Research Theory and Applications, J K Sharma, 3rd Edition, Macmillan.

Additional Reference Books:

(1) Quantitative Techniques in Management, N D Vohra, 2nd Edition, TMH.
(2) Operations Research, Taha-Natarajan-Balasubramanie, 8th Edition, Pearson Education.

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AES INSTITUTE OF COMPUTER STUDIES

Master of Computer Applications (M.C.A.)

Second Year MCA **Trimester IV**

Subject Code: MCA 244 **Subject: Enterprise Application Development using .NET**

Lectures per week : 3 Lectures + 1 Tutorial
Practical Sessions per Week : 4
Internal Assessment : 50
External Assessment : 50 Theory + 50 Practical
Total Credit : (2 Theory + 1 Tutorial+ 4 Practical): Total-6

Prerequisite:

Awareness of Object-oriented programming concept

Aim:

The course is aimed to introduce the enterprise application development using VB.NET.

Objectives:

(1) To understand the concept of object oriented development using VB.NET.
(2) To develop enterprise applications more efficiently.
(3) To make students familiar with RAD like Visual Studio 2008.
(4) To provide knowledge of database connectivity.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	**Introduction to VB.NET** Overview of .NET framework - understanding IDE components - namespaces - coding methods. **Programming with VB.NET** Variables - operators - subroutines - functions - looping and testing structures - creating forms - page lifecycle - event handling - project types - MDI application. **Using controls** Textbox - masked textbox - button - checkbox - radio button - combobox - listbox - checked listbox - scrollbar - trackbar - richtextbox - common dialog controls - listview - treeview - menustrip - timer – calendar	9	10
Unit II	**Using OOP concepts** Class – get and set properties – object – methods – constructor – inheritance – polymorphism – abstraction – encapsulation **Use of basic classes** Array – arraylist – hashtable – sortedlist – char class – string class – string builder class - Datetime class – timespan class – directory class - directoryinfo class – path class	9	15

Unit III	**Working with Database Applications** Architecture of ADO.NET Data objects: Connection – command – dataadapter – dataset – datareader Database operations : add – update- delete – display – navigation Data controls : datagridview – datarepeater	9	15
Unit IV	**Exception handling,reports and custom controls** Types of errors – exception handling and debugging – crystal reports XI – working with custom controls **Working with files** File class – fileinfo class - Filestream - streamreader - streamwriter - binaryreader – binarywriter – serialization class	9	10
	Total	**36**	**50**

Outcomes:

Upon the completion of this course, the student will be able to:

(1) Develop object-oriented programming based applications.
(2) Access and manipulate data by using Microsoft ADO.NET.
(3) Resolve syntax, run-time, and logic errors by using the debugger and exception handling.
(4) Understand file operations.
(5) Creating and using crystal reports XI.
(6) Creating and using custom controls.

Reference Books:

(1) Mastering Visual Basic .NET, Evangelos Petroutsos. 1st Edition, John Wiley and Sons.
(2) Visual Basic .NET Programming, Harold Davis. 1st Edition, John Wiley and Sons.

Additional Reference Books:

(1) Microsoft Visual Basic 2008, Michael Halvorson. 1st Edition, PHI.
(2) Professional Visual Basic 2008, Bill Evjen, Billy Hollis, Bill Sheldon, Kent Sharkey, 1st Edition, Wiley – India.
(3) The Complete Reference Visual Basic .NET, Jeffrey R. Shapiro. 1st Edition, Tata McGraw-Hill.
(4) Programming ADO.NET, Hundhausen, R.Borg, 1st Edition, S. John Wiley and Sons.
(5) Visual Basic Developer's guide to ADO, Gunderloy,M. 3rd Edition, Sybex.

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Master of Computer Applications (M.C.A.)

Subject Code: MCA 244 **Subject: Enterprise Application Development using .NET**

Topics to be covered in Practical Sessions

Total Marks: 50

Sr. No.	Topics to be Covered	No. of Practicals
1.0	**Classes and Files** Add class file, Set and Get properties, Class method, Making class object, Accessing class elements using object, Constructor, Inheritance	7
2.0	**ADO.NET and Exception Handling** Database connectivity, Data Manipulation(add ,update ,delete), Data display and Navigation (Using Textbox, Datagridview, DataRepeater) Exception Handling using try, catch and finally	14
3.0	**Crystal Reports and Custom Controls** Creating custom controls, Create using basic controls, Create new custom control, Custom Events, Custom Properties	9
4.0	**File** and FileInfo Classes, Read and Write in Text Files, Read and Write in Binary File, Serialization	6
	Total	**36**

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Master of Computer Applications (M.C.A.)

Second Year MCA : Trimester IV

Subject Code: MCA 245 **Subject:** System Software

Lectures per week (hours) **:** 3 Lectures + 1 Tutorial
Practicals per week (hours) : 4
Internal Assessment **:** 50 Marks
External Assessment **:** 50 Marks (Theory) + 50 Marks (Practical)
Total Credits **:** 8

Prerequisite:

The basic knowledge of business data processing and logical organization of computers are required.

Aim:

The course is aimed to understand design and implementation of various types of system software.

Objectives:

(1) To study the relationship between machine architecture and system software
(2) To study various kind of system softwares like assembler, macro processor compiler and interpreter.

Unit No.	Topics to be Covered	No. of Lectures	Marks per Unit
Unit I	**Language Processor** Introduction – language processing activity – fundamentals of language processing – fundamentals of language specification **Scanning and Parsing** Scanning (Introduction to finite state automata – regular expression – building DFAs) – Parsing (Parse tree – abstract syntax tree – top down parsing – bottom up parsing).	8	12
Unit II	**Assemblers** Elements of Assembly language programming – symbol table – mnemonics table – pass structure of assembler (pass I and pass II) – assembler directives.	8	10
Unit III	**Macro and Macro Processors**: Macro definition and call – macro expansion – nested macro calls - advanced macro facilities - design of macro processor	7	12
Unit IV	**Compiler and Interpreters** Aspects of compilation – memory allocation – compilation of expressions – compilation of control structures – code optimization – interpreters.	13	16

Linker
Translated, linked and load time addresses, Relocation and Linking Concepts, Self Relocating Programs

Loaders
Binary Image – Types of Loaders

Total	**36**	**50**

Outcomes:

Upon the completion of this course, the student will be able to:

(1) Understand the relationship between machine architecture and system softwares
(2) Implement scanner, parser, assembler, and macro processor practically.

Reference Books:

(1) Systems Programming and Operating Systems, D.M. Dhamdhere, 2nd Edition, Tata Mcgraw – Hill Publishing Company.
(2) System Software, Santanu Chattopadhyay, 1st Edition, PHI Private Ltd.

Additional Reference Books:

(1) Systems Programming, Donovan J.J., 1st Edition, Tata Mcgraw – Hill Publishing Company.
(2) Compilers: Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, 2nd Edition, Pearson Education.

Subject Code: MCA 245 **Subject Name**: System Software
Practicals per week (hours) : 4
Total Marks (Practical Exam) : 50

Topics to be covered in Practical Sessions

Sr. No.	Topics to be covered	No. of Practicals
1.0	**Introduction to Assembly Language** 1.1 Data Transfer Instructions 1.2 Arithmetical Instructions 1.3 String Instructions 1.4 Logical Instructions	6
2.0	**Scanning and Parsing** 2.1 Scanner 2.2 Parser	10
3.0	**Assemblers And Macro Processors** 3.1 Assembler Pass – I 3.2 Assembler Pass - II	10
4.0	**Compiler** **??????**	10
	Total	36

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VALUABLE LESSONS OF LIFE

- ***Don't take everything so serious, have a sense of humor.***
- ***People like to help or do business with people they already know, networking is critical. Meet and serve as many people as you can.***
- ***You didn't die from your mistakes, but you may have to repeat them, if you didn't learn the lesson.***
- ***Stay away from negative, critical, judgmental, gossipy people.***
- ***Spend as much time as possible around nature and beautiful environments.***
- ***Sometimes things you can't learn in a book or from a parent, teacher or pastor, you have to experience it for yourself.***
- ***Acknowledge your shortcomings and work to improve them acknowledge your strengths, be humble but don't diminish or deny them.***
- ***I didn't die from the painful times in my life, they made me stronger.***
- ***Have a life, don't depend on others to make you happy and fulfilled.***
- ***Find ways to show appreciation to those you love and care about, not just on holidays or birthdays.***
- ***Pay attention to details and keep good records.***
- ***If you take it, return it. If you break it, fix it. If you know it, live it. If you want it, ask for it. If you use it, clean it. If you wear it, hang it up. If made a mistake, take responsibility for it. If you have some share it. If you own it, protect it. If you believe it, you can achieve it.***

"Nobody can go back and start a new beginning, but anyone can start today and make a new ending."

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Carry on! Carry on!

When it's ten against one, and hope there is none,
Buck up, little soldier, and try your best
And so in the trouble of the battle of life
It's a different song when everything's wrong.
It's easy to fight when you're winning;
It's easy to slave, and starve and be brave,
When the dawn of success is beginning.
But the man who can meet despair and defeat
With a cheer, there's a man of God's choosing;
The man who can fight to Heaven's own height
Is the man who can fight when he's losing.
Fight the good fight and true;
Believe in you mission, greet life with a cheer;
There's big work to do, and that's why you are here.
It's easy to cheer when victory's near.

Carry on! Carry on!

"Enthusiasm is the genius of sincerity and truth accomplishes no victories without it."