



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTION FORM

Course Title	JAVA PROGRAMMING			
Course Code	A40503			
Regulation	R15-JNTUH			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	-	-	4
Course Coordinator	Mr. P Ravinder Assistant Professor			
Team of Instructors	Mr. N.V Krishna Rao Associate Professor , Ms. K. Radhika Assistant Professor			

I. COURSE OVERVIEW:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves OOP concepts, java basics, inheritance, polymorphism, interfaces, inner classes, packages, Exception handling, multithreading, collection framework, files, JDBC and GUI components. This course is presented to students by power point projections, course handouts, lecture notes, course handouts, assignments, objective and subjective tests.

II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	5	C,C++

II. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment. The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks. The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries half mark. First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.	75	100

Sessional Marks	University End Exam marks	Total marks
<p>Five marks are earmarked for assignments. There shall be two assignments in every theory course. Assignments are usually issued at the time of commencement of the semester. These are of problem solving in nature with critical thinking.</p> <p>Marks shall be awarded considering the average of two midterm tests in each course.</p>		

IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	80 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	80 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

V. COURSE OBJECTIVES:

- I. Understand object oriented programming concepts- and apply them in problem solving.
- II. Understand the basics of java Console and GUI based programming.
- III. Describe the basics of inheritance for reusing the program.
- IV. Demonstrate how the multi tasking is performed by using threads.
- V. Enumerate the types of exception handling.
- VI. Describe the byte streams and character streams for file management.

VI. COURSE OUTCOMES:

At the end of the course the students are able to:

1. **Understanding** of OOP concepts and basics of java programming.
2. **Learn** the concept of class and their properties.
3. **Compare** the concept of dynamic polymorphism with the static polymorphism.
4. **Describe** the concept of interfaces and abstract classes using extending and implementing keywords.
5. **Understand** the impact of exception handling with user defined exceptions as well as with the predefined exceptions.
6. **Choose** a suitable package to develop the inter process communication using multithreading.
7. **Build** collection framework, the dynamic applications using the concept of applets and JDBC Connectivity.

VII. HOW PROGRAMS ARE ACCESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	S	Assignments, Tutorials
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	H	Assignments
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	H	Mini Projects
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	S	Projects
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	H	Mini Projects
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	N	--
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	N	--
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	S	--
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	H	Tutorials, Exams
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	N	--
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	H	Future scope or projects discussion
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	S	Projects

N = None

S = Supportive

H = Highly Related

VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Professional Skills: The ability to research, understand and implement computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient analysis and design of computer-based systems of varying complexity.	H	Lectures, Assignments

Program Specific Outcomes		Level	Proficiency assessed by
PSO2	Problem-solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.	H	Projects
PSO3	Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths, to be an entrepreneur, and a zest for higher studies.	S	Guest Lectures

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IX. SYLLABUS:

UNIT-1

OOP concepts- Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, procedural and object oriented programming paradigm.

Java programming – History of java, comments data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow – block scope, conditional statements ,loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors ,methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

UNIT-2

Inheritance – Inheritance hierarchies, super and subclasses, member access rules, super keyword, preventing inheritance: final classes and methods, the object class and its methods

Polymorphism – dynamic binding, method overriding, abstract classes and methods

Interface – Interfaces VS Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface.

Inner classes – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

Packages – Defining, creating and accessing a package, understanding CLASSPATH, importing packages.

UNIT-3

Exception Handling – Dealing with errors, benefits of exception handling, the classification of exceptions , exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading – Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter – thread communication, producer consumer pattern

UNIT-4

Collection Framework in java – Introduction to java collections, overview of java collection frame work, generics, commonly used collection classes- Array List, vector ,hash table, stack, enumeration, iterator, string tokenizer ,random ,scanner ,calendar and properties

Files – streams – byte streams, character stream, text input/output, binary input/output, random access file operations, file management using file class.

Connecting to Database – JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

UNIT-5

GUI Programming with Java – The AWT class hierarchy, introduction to swing, swing Vs AWT, hierarchy for swing components, containers- JFrame, JApplet, JDialog, JPanel, overview of some swing components – JButton, JLabel, JTextField, JTextArea, java lab course description simple applications, Layout management – Layout manager types – border, grid and flow

Event Handling: Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Example: handling a button click, handling mouse events, Adapter classes.

Applets – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

Text books:

1. Java Fundamentals – A comprehensive Introduction- Herbert Schildt and Dale Skrien

References:

1. Java for programmers-P.J.Dietel and H.M.Dietel Pearson education(or)Java: How to program P.J.Dietel and H.M.Dietel-PHI
2. Object Oriented programming through Java -P.Radha Krishna -Universities Press
3. Thinking in Java- Bruce Eckel-Pearson Education
4. Programming in Java- S.Malhotra and S. Choudhary- Oxford University Press.

X.COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes.

Lecture No.	Topics to be covered	Course Learning Outcomes	References
1-3	Data abstraction, encapsulation, inheritance, polymorphism dynamic binding, Need of Classes and objects, Benefits of OOP, procedural and object oriented programming paradigm.	Understand and use OOP concepts.	T1, R2
4-6	History of java, comments, data types Variables, constants, scope and life time of variables	Understand variable and program.	T1,R2
7-9	Operators, operator hierarchy, expressions type conversion and casting, Enumerated types, control flow control flow block scope conditional statements, loops, break and continue statements	Understand operators and expressions and program	T1, R2
10	Simple java program	Understand the program on expressions, operators	T1
11-13	Arrays, console input and output, formatting output, Constructors, methods, parameter passing overloading methods and constructors, static fields and methods,	Use constructors and methods	T1, R2
14-15	access control, this reference, Recursion, garbage collection- building strings, exploring string class.	Use methods and their applications	T1, R2
16-17	Inheritance, Inheritance hierarchies, super and subclasses	Relate the concept of class and to the sub class	T1, R2

	member access rules,		
18-19	super keyword, preventing inheritance: final classes and methods, the object class and its methods	Explain the concept of final keyword with their usage	T1
20	Polymorphism, dynamic binding method overriding, abstract classes and methods	List the methods of polymorphism	T1
21-22	Interface, Interfaces VS Abstract classes, defining an interface implements interfaces, accessing implementations through interface references, extending interface.	Relate interfaces and abstract classes	T1,R2
23-24	Inner classes Uses of inner classes, local inner classes, anonymous inner classes, static inner classes- examples	Explain the concept of inner classes	T1,R2
25	Packages, Defining creating and accessing a package, understanding CLASSPATH, importing packages.	Define basic concepts of packages	T1
26-27	Exception Handling , Dealing with errors, benefits of exception handling the classification of exceptions, exception hierarchy, checked exceptions and unchecked exceptions usage of try, catch, throw, throws and finally	Illustrate the concept of exception handling	T1,R2
28-29	Re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.	Understand the concept of re-throwing exceptions	T1,R2
30-31	Multithreading , Differences between multiple processes and multiple threads, thread states	Define multithreading and able to explain the differences between multiple processes and states	T1
32-34	Creating threads, interrupting threads, thread priorities, synchronizing threads, inter , thread communication, producer consumer pattern	Analyze the problem of producer consumer pattern.	T1,R2
35-36	Collection Framework in java , Introduction to java collections, overview of java collection frame work	Explain the java collections and framework.	T1,R1
37	Generics, commonly used collection classes, Array List	Define generics, array list	T1,R2
38	Vector, hash table	State vector and hash table	T1
39-40	Stack, enumeration, iterator	Generalize the stack ,enumeration and iterator	T2,R2
41-42	String tokenizer , random, scanner,calendar and properties	Describe the concept of dividing the string into small token.	T1
43-44	Files , streams , byte streams, character stream	Explain files and their types of reading and writing data to the files	T1,R1
45	text input/output, binary input/output	Understand the concept of text and binary input/output.	T1
46	Random access file operations	Identify various random access file operations.	T1
47	File management using file class.	Analyze the methods of file class	T1

48	Connecting to Database , JDBC Type 1 to 4 drivers	Relate java program to JDBC	T2, R2
49	Connecting to a database, querying a database	Manage the connection to the data bases	T1, R2
50	Processing the results, updating data with JDBC	Understand the process of updating the data bases using JDBC	R2
51-52	The AWT class hierarchy, introduction to swing, swing Vs AWT, hierarchy for swing components	Classify the AWT class hierarchy	T1
53-54	Containers, JFrame, JApplet, JDialog, JPanel, overview of some swing components , JButton, JLabel , JTextField, JTextArea	List the swing compoents.	T1
55-56	Simple applications, Layout management , Layout manager types , border, grid and flow	Explain the types of layout managers	T1
57-58	Event Handling : Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners	Apply the techniques of event handling with listeners.	T1,R2
59-61	Delegation event model, Example: handling a button click, handling mouse events, Adapter classes.	Explain the concept of delegation event model.	T1
62	Inheritance ,hierarchy for applets, differences between applets and applications	Explain the differences between applets and applications	T1
63	Life cycle of an applet	Understand the life cycle of applet	T1
64	Passing parameters to applets	Explain the method of parameter passing to applets	T1
65	Applet security issues	Understand the applet security issues.	T1

X1. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objectives	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	S												H		
II			H										H	H	
III	S				H								H		
IV											H		H		
V	S								H				H		S
VI			H					H			S		H		

S = Supportive

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XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	S										H			H	
2					H										S
3	S								H						
4			H					S						H	
5		H											S		
6										H				H	
7	H														

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Prepared by: Mr. P Ravinder Assistant Professor

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