INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad -500 043

INFORMATION TECHNOLOGY

COURSE DESCRIPTOR

Course Title	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA**				
Course Code	ACS003				
Programme	B.Tech				
Semester	IV	IT			
Course Type	Core				
Regulation	IARE - R16				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	3	1	4	3	2
Chief Coordinator	Mr. G Chandra Sekhar, Assistant Professor				
Course Faculty	Mr. G Chandra Sekhar, Assistant Professor				

I. COURSE OVERVIEW:

This course is introduced to understand the basic concepts of Java, Class syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, recursion, and graphical user interfaces (GUIs). Writing and testing applets for potential inclusion in web pages. Understanding how to access enterprise data bases from the application programs.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	ACSB01	II	Programming for Problem Solving	3

III. MARKS DISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
OBJECT ORIENTED PROGRAMMING THROUGH JAVA	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:

✔	Chalk & Talk	✘	Quiz	✘	Assignments	✘	MOOCs
✔	LCD / PPT	✘	Seminars	✘	Mini Project	✔	Videos
✔	Open Ended Experiments						

V. EVALUATION METHODOLOGY:

Each laboratory will be evaluated for a total of 100 marks consisting of 30 marks for internal assessment and 70 marks for semester end lab examination. Out of 30 marks of internal assessment, continuous lab assessment will be done for 20 marks for the day to day performance and 10 marks for the final internal lab assessment.

Semester End Examination (SEE): The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being Internal Examiner and the other being External Examiner, both nominated by the Principal from the panel of experts recommended by Chairman, BOS.

The emphasis on the experiments is broadly based on the following criteria:

20 %	To test the preparedness for the experiment.
20 %	To test the performance in the laboratory.
20 %	To test the calculations and graphs related to the concern experiment.
20 %	To test the results and the error analysis of the experiment.
20 %	To test the subject knowledge through viva – voce.

Continuous Internal Assessment (CIA):
CIA is conducted for a total of 30 marks (Table 1), with 20 marks for continuous lab assessment during day to day performance, 10 marks for final internal lab assessment.

Table 1: Assessment pattern for CIA

Component	**Laboratory**		**Total Marks**
Type of Assessment	Day to day performance	Final internal lab assessment	
CIA Marks	20	10	30

Continuous Internal Examination (CIE):
One CIE exams shall be conducted at the end of the 16th week of the semester. The CIE exam is conducted for 10 marks of 3 hours duration.

Preparation	**Performance**	**Calculations and Graph**	**Results and Error Analysis**	**Viva**	**Total**
2	2	2	2	2	10

VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (POs)		**Strength**	**Proficiency assessed by**
PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	2	Solving real world applications
PO 2	**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.	2	Videos
PO 3	**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	3	Solving real world applications

Program Outcomes (POs)		Strength	Proficiency assessed by
	safety, and the cultural, societal, and environmental considerations.		
PO 5	**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.	2	Guest Lecturers
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	2	Mini Project
PO 12	**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.	2	Certifications

3 = High; 2 = Medium; 1 = Low

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 1	**Professional Skills:** The ability to understand, analyze and develop 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.	2	Solving real world applications
PSO 2	**Software Engineering Practices:** The ability to apply standard practices and strategies in software service management using open-ended programming environments with agility to deliver a quality service for business success.	2	Solving real world applications
PSO 3	**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.	1	Guest lecturer

3 = High; 2 = Medium; 1 = Low

VIII. COURSE OBJECTIVES (COs):

The course should enable the students to:	
I	Practice object-oriented programs and build java applications.
II	Implement java programs for establishing interfaces
III	Implement sample programs for developing reusable software components.
IV	Create database connectivity in java and implement GUI applications.

IX. COURSE LEARNING OUTCOMES (CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
ACS003.01	CLO 1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.	PO 1, PO2, PO3, PO5, PO9 , PO12	2

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
ACS003.02	CLO 2	Use overloading methodology and overriding on methods and constructors to develop application programs.	PO 1, PO 2,	2
ACS003.03	CLO 3	Develop and implement Java programs for simple applications that make use of abstract classes, packages and interfaces.	PO 1, PO 3, PO 5, PO 9	1
ACS003.04	CLO 4	Understand the use of different exception handling mechanisms and concept of multithreading for robust and efficient application development.	PO 1, PO 2, PO 3 PO 12	1
ACS003.05	CLO 5	Understand and implement concepts on file streams and operations in java programming for a given application programs.	PO 1, PO 2, PO 5, PO 9	1
ACS003.06	CLO 6	Develop java application to interact with database by using relevant software component (JDBC Driver).	PO 1, PO 3, PO 5 PO 9	2
ACS003.07	CLO 7	Understand the basic principles of creating Java applications with graphical user interface (GUI).	PO 1, PO 2, PO 3, PO 9, PO 12	2
ACS003.08	CLO 8	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.	PO 1, PO 2, PO 3, PO 5, PO 9, PO 12	3

3 = High; 2 = Medium; 1 = Low

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

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 1	3	2	3		1				2			1	1		
CLO 2	2	2											2		1
CLO 3	2		2		1				1						
CLO 4	1	2	2									2		2	1
CLO 5	2	1			2				1				2		
CLO 6	1		3		3				1						
CLO 7	2	2	2						2			2	1	2	1
CLO 8	2	3	3		3				3			3	2		

3 = High; 2 = Medium; 1 = Low

XI. ASSESSMENT METHODOLOGIES – DIRECT

CIE Exams	PO 1, PO 2 PO 3, PO 5, PO 9, PO 12	SEE Exams	PO 1, PO 2 PO 3, PO 5, PO 9, PO 12	Assignments	-	Seminars	-
Laboratory Practices	PO 1, PO 2 PO 3, PO 5, PO 9, PO 12	Student Viva	PO 1, PO 2, PO 3	Mini Project	PO 9	Certification	-

XII. ASSESSMENT METHODOLOGIES - INDIRECT

✔	Early Semester Feedback	✔	End Semester OBE Feedback
✘	Assessment of Mini Projects by Experts		

XIII. SYLLABUS

LIST OF EXPERIMENTS	
Week-1	**BASIC PROGRAMS**
a. Try debug step by step with small program of about 10 to 15 lines which contains at least one if else condition and a for loop. b. Write a java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula. c. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a java program that uses both recursive and non recursive functions.	
Week-2	**MATRICES, OVERLOADING, OVERRIDING**
a. Write a java program to multiply two given matrices. b. Write a java program to implement method overloading and constructors overloading. c. Write a java program to implement method overriding.	
Week-3	**PALINDROME, ABSTRACT CLASS**
a. Write a java program to check whether a given string is palindrome. b. Write a java program for sorting a given list of names in ascending order. c. Write a java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.	
Week-4	**INTERFACE**
Write a program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.	
Week-5	**MULTITHREADING**
a. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number. b. Write a java program that correct implements of producer consumer program.	

Week-6	FILES

a. Write a java program that reads a file name from the user, and then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
b. Write a java program that displays the number of characters, lines and words in a text file.
c. Write a java program that reads a file and displays the file on the screen with line number before each line.

Week-7	FILES

a. Suppose that table named table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using labels in grid layout.
b. Write a java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.

Week-8	JAVA PROGRAM WITH DATABASE

a. Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (/t). It takes a name or phone number as input and prints the corresponding other value from the hash table. Hint: Use hash tables.
b. Implement the above program with database instead of a text file.

Week-9	FILES

a. Write a java program that takes tab separated data (one record per line) from a text file and insert them into a database.
b. Write a java program that prints the metadata of a given table.

Week-10	TRAFFIC LIGHT

Write a java program that simulates a traffic light. The program lets the user select one of three lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriate message with "STOP" or "READY" or "GO" should appear above the buttons in selected color. Initially, there is no message shown.

WeeK-11	MOUSE EVENTS

a. Write a java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.
b. Write a java program to demonstrate the key event handlers.

Week-12	CALCULATOR

Write a java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*, % operations. Add a text field to display the result. Handle any possible exception like divided by zero.

Week-13	APPLET

a. Develop an applet that displays a simple message.
b. Develop an applet that receives an integer in one text field and computes its factorial value and returns it in another text field, when the button named "compute" is clicked.

Reference Book:

1. P. J. Deitel, H. M. Deitel, "Java for Programmers", Pearson Education, PHI, 4th Edition, 2007.
2. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press, 2nd Edition, 2007
3. Bruce Eckel, "Thinking in Java", Pearson Education, 4th Edition, 2006.
4. Sachin Malhotra, Saurabh Chaudhary, "Programming in Java", Oxford University Press, 5th Edition, 2010.

XIV. COURSE PLAN:

The course plan is meant as a guideline. Probably there may be changes.

Week No.	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1	BASIC PROGRAMS	CLO 1	T1
2	MATRICES, OVERLOADING, OVERRIDING	CLO 2	T1
3	PALINDROME, ABSTRACT CLASS	CLO 3	T1
4	INTERFACE	CLO 3	T1
5	MULTITHREADING	CLO 4	T1
6	FILES	CLO 5	T1
7	FILES	CLO 5	T2
8	JAVA PROGRAM WITH DATABASE	CLO 6	T2
9	FILES	CLO 6	T1
10	TRAFFIC LIGHT	CLO 7	T1
11	MOUSE EVENTS	CLO 7	T2
12	CALCULATOR	CLO 8	T2
13	APPLET	CLO 8	T1

XV. GAPS IN THE SYLLABUS - TO MEET INDUSTRY / PROFESSION REQUIREMENTS:

S No	Description	Proposed actions	Relevance with POs	Relevance with PSOs
1	Encourage the students to learn and develop more GUI based programs.	Seminars	PO 1, PO 3	PSO 1
2	Encourage students to develop web applications using IDE‟s.	Seminars / NPTEL	PO 5, PO 12	PSO 2
3	Encourage students to solve real time applications and prepare towards competitive examinations.	NPTEL	PO 1, PO 2	PSO 1

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