



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

ELECTRICAL AND ELECTRONICS ENGINEERING COURSE DESCRIPTOR

Course Title	JAVA PROGRAMMING				
Course Code	ACS552				
Programme	B.Tech				
Semester	VI	EEE ECE			
Course Type	Elective				
Regulation	IARE - R16				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	3	1	4	-	-
Chief Coordinator	Ms. Y Harika Devi, Assistant Professor				
Course Faculty	Mr. N V Krishna Rao, Assistant Professor Mr. S Laxman Kumar, Assistant Professor Ms. G Geetha , Assistant Professor Mr. Santosh patel, 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, packages, Exception handling, multithreading, files, JDBC. This course is presented to students by power point projections, course handouts, lecture notes, assignments, objective and subjective tests.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	ACS001	I	Computer Programming	3
UG	ACS002	II	Data Structures	4

III. MARKS DISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Java Programming	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:

The course will be evaluated for a total of 100 marks, with 30 marks for Continuous Internal Assessment (CIA) and 70 marks for Semester End Examination (SEE). Out of 30 marks allotted for CIA during the semester, marks are awarded by taking average of two CIA examinations or the marks scored in the make-up examination.

Semester End Examination (SEE): The SEE is conducted for 70 marks of 3 hours duration. The syllabus for the theory courses is divided into five units and each unit carries equal weightage in terms of marks distribution. The question paper pattern is as follows. Two full questions with “either” or “choice” will be drawn from each unit. Each question carries 14 marks. There could be a maximum of two sub divisions in a question.

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

50 %	To test the objectiveness of the concept.
50 %	To test the analytical skill of the concept OR to test the application skill of the concept.

Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 25 marks for Continuous Internal Examination (CIE), 05 marks for Quiz/ Alternative Assessment Tool (AAT).

Table 1: Assessment pattern for CIA

Component	Theory		Total Marks
Type of Assessment	CIE Exam	Quiz / AAT	
CIA Marks	25	05	30

Continuous Internal Examination (CIE):

Two CIE exams shall be conducted at the end of the 8th and 16th week of the semester respectively. The CIE exam is conducted for 25 marks of 2 hours duration consisting of two parts. Part–A shall have five compulsory questions of one mark each. In part–B, four out of five questions have to be answered where, each question carries 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

Quiz / Alternative Assessment Tool (AAT):

Two Quiz exams shall be online examination consisting of 25 multiple choice questions and are to be answered by choosing the correct answer from a given set of choices (commonly four). Marks shall be awarded considering the average of two quizzes for every course. The AAT may include seminars, assignments, term paper, open ended experiments, five minutes video and MOOCs.

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.	3	Seminars
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	Seminars
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 safety, and the cultural, societal, and environmental considerations.	3	Assignments
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	5 minutes Video

3 = High; 2 = Medium; 1 = Low

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 1	Problem Solving: Exploit the knowledge of high voltage engineering in collaboration with power systems in innovative, dynamic and challenging environment, for the research based team work.	2	Lectures, Assignments
PSO 2	Professional Skills: Identify the scientific theories, ideas, methodologies and the new cutting edge technologies in renewable energy engineering, and use this erudition in their professional development and gain sufficient competence to solve the current and future energy problems universally.	1	Lectures
PSO 3	Modern Tools in Electrical Engineering: Comprehend the technologies like PLC, PMC, process controllers, transducers and HMI and design, install, test, maintain power systems and industrial applications.	-	-

3 = High; 2 = Medium; 1 = Low

VIII. COURSE OBJECTIVES (COs):

The course should enable the students to:	
I	Understand the basic object oriented programming concepts and apply them in problem solving.
II	Illustrate inheritance concepts for reusing the program.
III	Demonstrate on the multi-tasking by using multiple threads.
IV	Develop data-centric applications using JDBC.
V	Understand the basics of java file management.

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
ACS552.01	CLO 1	Use object oriented programming concepts to solve real world problems.	PO 1,PO 2	2
ACS552.02	CLO 2	Explain the concept of class and objects with access control to represent real world entities.	PO 1,PO 3	3
ACS552.03	CLO 3	Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors.	PO 2	2
ACS552.04	CLO 4	Describe the concept of operators and variables, arrays, parameter passing.	PO 1	
ACS552.05	CLO 5	Use overloading methodology on methods and constructors to develop application programs.	PO1, PO 2	2
ACS552.06	CLO 6	Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords.	PO 1,PO 2	2
ACS552.07	CLO 7	Describe the concept of interface and abstract classes to define generic classes.	PO 1	3
ACS552.08	CLO 8	Use dynamic and static polymorphism to process objects depending on their class.	PO 1,PO 2	2
ACS552.09	CLO 9	Illustrate different techniques on creating and accessing packages (fully qualified name and import statements).	PO 2,PO 4	2
ACS552.10	CLO 10	Understand the impact of exception handling to avoid abnormal termination of program using checked and unchecked exceptions.	PO 2	2
ACS552.11	CLO 11	Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).	PO 1	3
ACS552.12	CLO 12	Use multithreading concepts to develop inter process communication.	PO 3	3
ACS552.13	CLO 13	Understand and implement concepts on file streams and operations in java programming for a given application programs.	PO 2	2
ACS552.14	CLO 14	Describe the backend connectivity process in java program by using JDBC drivers.	PO 2, PO 3	2
ACS552.15	CLO 15	Develop java application to interact with database by using relevant software component (JDBC Driver).	PO 2, PO 3	2
ACS552.16	CLO 16	Understand text, byte, and character input/output streams.	PO 2	2
ACS552.17	CLO 17	Demonstrate the import statement usage and built-in packages.	PO 1, PO 2	2
ACS552.18	CLO 18	Understand the use of interrupting threads in the real world.	PO 1, PO 2	2
ACS552.19	CLO 19	Demonstrate the use of programming in the real world.	PO 1, PO 2,PO 12	3
ACS552.20	CLO 20	Posses the knowledge and skills for employability and to succeed in national and international level competitive exams.	PO 1, PO 2, PO 12	3

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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											2	1	
CLO 2	3		3										2	1	
CLO 3		2													
CLO 4	3												2		
CLO 5	3	2												2	
CLO 6	3	2													
CLO 7	3												1	1	
CLO 8	3	2													
CLO 9		2												1	
CLO 10		2											2		
CLO 11	3													1	
CLO 12			3												
CLO 13		2													
CLO 14		2	3										2	2	
CLO 15		2	3											1	
CLO 16		2													
CLO 17	3	2													
CLO 18	3	2													
CLO 19	3	2	3									2	2	1	
CLO 20	3	2	3									1	2	1	

3 = High; 2 = Medium; 1 = Low

XI. ASSESSMENT METHODOLOGIES – DIRECT

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

XII. ASSESSMENT METHODOLOGIES - INDIRECT

✓	Early Semester Feedback	✓	End Semester OBE Feedback
✗	Assessment of Mini Projects by Experts		

XIII. SYLLABUS

UNIT-I	OOPS CONCEPTS AND JAVA PROGRAMMING
OOP concepts: Classes and objects, data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, constructors, methods, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow statements, arrays, parameter passing.	
UNIT-II	INHERITANCE
Inheritance: Inheritance hierarchies, super and subclasses, member access rules, Polymorphism: Dynamic binding, method overriding, abstract classes and methods	
UNIT-III	EXCEPTION HANDLING AND MULTITHREADING
Exception Handling: Benefits of exception handling, the classification of exceptions, usage of try, catch, throw, throws and finally. Multithreading: Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads.	
UNIT-IV	INTERFACES AND PACKAGES
Interface: Interfaces vs Abstract classes, defining an interface, implement interfaces, Packages: Defining, creating and accessing a package, importing packages.	
UNIT-V	FILES AND CONNECTING TO DATABASE
Files: streams – byte streams, character stream, text input/output, binary input/output, file management; Connecting to Database: Connecting to a database, querying a database and processing the results, updating data with JDBC.	
Text Books:	
1. Herbert Schildt and Dale Skrien, "Java Fundamentals – A comprehensive Introduction", McGraw Hill, 1 st Edition, 2013. 2. Herbert Schildt, "Java the complete reference", McGraw Hill, Osborne, 7 th Edition, 2011.2. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 43 rd Edition, 2012. 3. T.Budd, "Understanding Object- Oriented Programming with Java", Pearson Education, Updated Edition (New Java 2 Coverage), 1999.	
Reference Books:	
1. P.J.Dietel and H.M.Dietel, "Java How to program", Prentice Hall, 6 th Edition, 2005. 2. P.Radha Krishna, "Object Oriented programming through Java", CRC Press, 1 st Edition, 2007. 3. S.Malhotra and S. Choudhary, "Programming in Java", Oxford University Press, 2 nd Edition, 2014.	

XIV. COURSE PLAN:

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

Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1-4	Data abstraction, encapsulation, inheritance, polymorphism dynamic binding, Need of Classes and objects, Benefits of OOP, procedural and object oriented programming paradigm.	CLO 1	T1: 1.5, 4.1, 4.2 R2:1.2, 1.3, 1.5, 2.3
5-6	History of java, comments, data types Variables, constants, scope and life time of variables.	CLO 2	T1:1.4, 2.2, 2.5
7-9	Operators, operator hierarchy, expressions type	CLO 3	T1:2.6-2.14,

Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
	conversion and casting, Enumerated types, control flow control flow block scope conditional statements, loops, break and continue statements.		3.1-3.16 R2:3.5, 3.6
10	Simple java program.	CLO 3	T1: 2.15
11	Use of arrays, formatted input and output.	CLO 4	T1:5.1-5.4
12-13	Methods, parameter passing, constructors.	CLO 4, CLO 5	T1:22.8 R1:4.15
14-15	Static fields, static methods and user defined methods.	CLO 4, CLO 5	T1: 6.2-6.7 R2:4.1.5, 4.1.7, 4.1.8
16-18	Inheritance, Inheritance hierarchies, super and subclasses member access rules.	CLO 6	T1:7.1-7.3
19-20	Polymorphism, dynamic binding method overriding, abstract classes and methods.	CLO 8	T1:7.4, 7.5, 7.13, 7.14
21-24	Exception Handling , benefits of exception handling, the classification of exceptions, exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally.	CLO 10, CLO 11	T1: 7.9-7.12 R2:4.2
25-31	Multithreading, Differences between multiple processes and multiple threads, thread states.	CLO 12	T1:8.1-8.5 R2: 4.4
32-33	Creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.	CLO 12, CLO 18	T1:8.6, 8.7 R2:4.4
34-35	Interface, Interfaces VS Abstract classes, defining an interface implements interfaces.	CLO 7	T1:9.1-9.3 R2:4.3
36-37	Accessing implementations through interface references, extending interface.	CLO 7	T1: 10.1, 10.2, 10.7, 10.8, 10.10, 10.11 R2:5.5,5.6
38-40	Packages, Defining creating packages.	CLO 9, CLO 17	T1:10.12, 10.14 R2:5.8
40-41	Accessing a package, understanding CLASSPATH.	CLO 9	T1:12.1 R2: 6.2
42-44	Importing packages, programs.	CLO 17	T1:12.2- 12.11 R2:6.3, 6.4, 6.5, 6.8
45-46	Files, streams, byte streams, character stream.	CLO 13, CLO 16	T1:11.3-11.4 R2: 7.2, 7.3
47-48	Text input/output, binary input/output.	CLO 13	T1: 11.12 R2:7.1, 7.2.3
49	Random access files operations, file management.	CLO 13	T1:11.10 R2:7.6
50	File management using file class.	CLO 13	T1:11.12
51	Connecting to Database, JDBC Type 1 to 4 drivers.	CLO 14	R2:9.2
52	Connecting to a database, querying a database.	CLO 15	R2:9.4
53-55	Processing the results, updating data with JDBC.	CLO 15	R2:9.4
56-57	Application programming in the real world.	CLO 19	R2:8.3
58-60	The concept of complex programs which solved real world problems.	CLO 20	R2:12.8

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

S. No	Description	Proposed actions	Relevance with POs	Relevance with PSOs
1	GUI programming, Applets	Seminars / Assignments / NPTEL	PO 1	PSO 1
2	Swing components, applet applications	Seminars / Guest Lectures / NPTEL	PO1	PSO 1
3	J Frame, JApplet, JButton, Applet applications	Assignments / Laboratory Practices	PO 2	PSO 2

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