



28. Course Specification of Programming Language 3 (Java)

I. Course Identification and General Information:						
1.	Course Title	Programming Language 3(Java)				
2.	Course Code & Number:	CCE244				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		2	-	2	-	3
4.	Study level/ semester at which this course is offered:	3 rd Year – 1 st semester				
5.	Pre-requisite (if any):	Programming Language 2 (C/C++) (CCE143)				
6.	Co-requisite (if any):	None.				
7.	Program(s) in which the course is offered:	Electrical Engineering – Computer and Control section				
8.	Language of teaching the course:	English				
9.	Location of teaching the course:	Electrical Engineering Department, Faculty of Engineering				
10.	Prepared By:	Asst. Prof. Dr. Sami Al-Maqtari				
11.	Date of Approval:					

II. Course Description:	
<p>This course aims to provide students with advanced programming concepts and techniques required for building of projects to social, marketing and business issues. It covers the following subjects: Data Types, Variables, Operators, and Arrays, Control Statements, Methods and classes in details, OOP concepts, GUI, Web-Applets, Multimedia, Multithreading and Network programming in Java language. throughout lectures, laboratory sessions and term projects for solving some marketing & business software applications issues, students will</p>	

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develop their personal programming skills, team working skills and problem-solving related to computer application developments.

III. Course Intended learning outcomes (CILOs) of the course		Reference PILOs
a1	Demonstrate knowledge of Java's advanced topics such as classes and objects, inheritance, polymorphism, Applets and multithreading programming and their applications to software projects development.	A1, A2
a2	Explain the capability of Java in the development of market, business and social applications considering professional & ethical responsibilities.	A3, A4
b1	Interpret the fundamental Java syntax and semantics and be fluent in the use of Java control flow statements.	B2
b2	Express proficiency in the handling of advance programming technics like interfaces, generics, multithreading, and networking to different environmental issues.	B3, B4
c1	Use appropriate programming & modularization techniques and software tools in solving programming problems using Java.	C1, C4
c2	Develop Java programs and applications based on modular units like classes, objects, packages, methods and applets to meet desired specifications and imposed constraints.	C2
d1	Enhance problem-solving and team-work skills, and applying them for solving of different engineering problems.	D1
d2	Conduct searches on solutions for engineering problems related to Java Programming language.	D5

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(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Demonstrate knowledge of Java's advanced topics such as classes and objects, inheritance, polymorphism, Applets and multithreading programming and their applications to software projects development.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes, • Lab Assessments.
a2- Explain the capability of Java in the development of market, business and social applications considering professional & ethical responsibilities.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions, • Projects. 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes, • Lab & Project Reports.

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Interpret the fundamental Java syntax and semantics and be fluent in the use of Java control flow statements.	<ul style="list-style-type: none"> • Active Lectures. • Homework & Assignments, • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes. • Lab Assessments.
b2- Express proficiency in the handling of advance programming technics like interfaces, generics, multithreading, and networking to different environmental issues.	<ul style="list-style-type: none"> • Active Lectures. • Projects, • Homework & Assignments, • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes. • Lab Assessments.

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(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Use appropriate programming & modularization techniques and software tools in solving programming problems using Java.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions, • Homework & Assignments, • Project. 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes • Lab & Project Reports.
c2- Develop Java programs and applications based on modular units like classes, objects, packages, methods and applets to meet desired specifications and imposed constraints.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions, • Project. • Use of IT Tools 	<ul style="list-style-type: none"> • Written Assessment. • Quizzes • Lab & Project Reports.

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Enhance problem-solving and team-work skills, and applying them for solving of different engineering problems.	<ul style="list-style-type: none"> • Laboratory Sessions • Projects. 	<ul style="list-style-type: none"> • Lab & Project Reports.
d2- Conduct searches on solutions for engineering problems related to Java Programming language.	<ul style="list-style-type: none"> • Projects, • Use of IT Tools 	<ul style="list-style-type: none"> • Lab & Project Reports

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IV. Course Content:					
A- Theoretical Aspect					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	Introduction	a1, a2, b1, b2	<ul style="list-style-type: none"> • The history and evolution of java. • Java vs c++. • Compiled vs interpreted languages. • Java as a pure OOP language. • Security in java. • Structure of simple java programs. 	1	2
2.	Data Types, Variables, and Operators	a1, b1, b2	<ul style="list-style-type: none"> • The primitive data types. • Reference type (implicit pointers). • Object vs class concepts. • A closer look at literals • Variables. • Type conversion and casting. • Automatic type promotion in expressions. • Arithmetic operators. • The bitwise operators. • Relational operators. • Boolean logical operators. 	1	2

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			<ul style="list-style-type: none"> • The assignment operator. • The ?: ternary operator. • Precedence and associativity. 		
3.	Control Statements	a1, b1, b2	<ul style="list-style-type: none"> • Selection statements (if and switch statements). • Iteration statements (while, do-while, for, for-each version of for, and nested loops). • Jump statements (break, continue, and return statements). 	1	2
4.	Arrays	a1, b1, b2, c1	<ul style="list-style-type: none"> • Arrays are objects. • One-dimensional arrays. • Multidimensional arrays. • Alternative array declaration syntax. 	1	2
5.	Classes	a1, b1, b2, c1	<ul style="list-style-type: none"> • Class fundamentals. • Creating and destroying objects • Declaring objects. • Assigning object reference variables. • Introducing methods. • Constructors. • The this keyword. • Java garbage collection 	1	2
6.	Methods and more about classes	a1, b1, b2, c1, c2	<ul style="list-style-type: none"> • Declaring methods. • Overloading methods. • Using objects as parameters. 	1	2

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			<ul style="list-style-type: none"> • Argument passing. • Returning objects. • Recursion. • Introducing access control. • Understanding static. • Introducing final. • Introducing nested and inner classes. • Using command-line arguments. • Varargs: variable-length arguments. • Local variable type inference with reference types 		
7.	Inheritance	a1, b1, b2, c1	<ul style="list-style-type: none"> • Inheritance basics. • Using super. • Creating a multilevel hierarchy. • Constructors execution order. • Method overriding. • Abstract classes: usage and implementation. • Using final to prevent inheritance. • The object class. • Inheritance and polymorphism. 	1	2
8.	Packages and Interfaces	a1, b1, b2, c1, c2	<ul style="list-style-type: none"> • Package declaration and member access. • Importing packages. 	1	2

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			<ul style="list-style-type: none"> • Interfaces: declaration and implementation. • Nested interfaces. • Variables in interfaces. • Default interface methods. • Private interface methods. • Runnable interface for multithreading. 		
9.	GUI Programming with Java	a1, a2, b1, b2, c1, c2	<ul style="list-style-type: none"> • Introduction to GUI programming, • Frames, containers, and components, • Container Layouts such as Flow-Layout and Grid-Layout, • Building GUI Applications, • Graphical Components, 1-d & 3-d Graphics using Java, • Action-Listener Concepts and Programming based GUI Application, 	3	6
10.	Web Based Applets Applications & Multimedia	a1, a2, b1, b2, c1, c2	<ul style="list-style-type: none"> • Introduction to Web Programming, • Applets in Java and HTML, • Building Web-Application based on Applets and Action Listeners, 	1	2

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			<ul style="list-style-type: none"> • Multimedia Programming, • Build Applet application with Multimedia. 		
11.	Multithreading Programming in Java	a2, b1, b2, c1, c2	<ul style="list-style-type: none"> • Introduction to Multithreading, • Multithreading Package in Java, • Building Java program based Multithreading. 	1	2
12.	Network Programming in Java	a2, b1, b2, c1, c2	<ul style="list-style-type: none"> • Introduction to Network Programming, • Client-Server Programming, • Socket building in Java, • Building Simple Server-Client Chat Program. 	1	2
Number of Weeks /and Units Per Semester				14	28

B- Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1.	Java Software environment Preparation & installations	1	2	a1, a2, d1
2.	Data types Variables & Operators in Java	1	2	a1, b1, c1, d1
3.	Control Structures Manipulation	1	2	a1, b1, c1, d1
4.	Arrays Manipulation in Java	1	2	a1, b1, c1, d1
5.	Classes & OOP concepts, Encapsulation, Inheritance and Polymorphism	2	2	a1, b1, c1, c2, d1

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6.	Packages & Interface Manipulation in Java	1		a1, a2, b1, b2, c1, c2, d1
7.	GUI programming and Graphics in Java	2.5	5	a1, a2, b1, b2, c1, c2, d1
8.	Web-based Applets Manipulation in Java	1	2	a1, a2, b1, b2, c1, c2, d1
9.	Multithreading Manipulation in Java and Networking	1.5	3	a2, b1, b2, c1, c2, d1
10.	Review	1	2	a1, a2, b1, b2, c1, c2, d1, d2
11.	Project Presentations	1	2	a1, a2, b1, b2, c1, c2, d1, d2
Number of Weeks /and Units Per Semester		14	28	

V. Teaching strategies of the course:	
<ul style="list-style-type: none"> • Active Lectures, • Laboratory Sessions, • Homework & Assignments, • Projects, • Use of IT Tools. 	

VI. Assignments & Reports:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Control Statements & Arrays	a1, b1, b2, c1, d1	3 rd & 4 th	1
2.	OOP Concepts and Packages & Interfaces	a1, a2, b1, b2, c1, c2, d1	6 th & 9 th	2
3.	GUI, APPLETs, Multithreading and Networking Programming,	a1, a2, b1, b2, c1, c2, d1, d2	10 th to 14 th	4

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	Short Projects Reports based on Lecturer Opinions			
4.	Lab Reports	a1, a2, b1, b2, c1, c2, d1	3 rd to 12 th	8
	Total			15

VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignments & Reports	3 rd to 14 th	15	10%	a1, a2, b1, b2, c1, c2, d1, d2
2.	Quizzes	5 th , 10 th & 14 th	10	6.67%	a1, a2, b1, b2, c2, d1
3.	Mid-Term Exam (Theory)	8 th	20	13.33%	a1, b1, b2, c1
4.	Final Exam (practical including Term Project Evaluation)	14 th & 15 th	30	20%	a1, a2, b1, b2, c1, c2, d1
5.	Final Exam (Theory)	16 th	75	50%	a1, a2, b1, b2, c1, c2
	Total		150	100%	

VIII. Learning Resources:	
<i>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
1- Required Textbook(s) (maximum two).	
	Herbert Schildt, 2019, “Java: The Complete Reference”, 11 th Edition, McGraw Hill Professional. ISBN-13: 978-1260440232
2- Essential References.	
	Kishori Sharan, 2017, “Beginning Java 9 Fundamentals”, 2 nd Edition, Apress. ISBN-13: 978-1484228432

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3- Electronic Materials and Web Sites etc.	

IX. Course Policies:	
1.	Class Attendance: - The students should have more than 75% of attendance according to rules and regulations of the faculty.
2.	Tardy: - The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture.
3.	Exam Attendance/Punctuality: - The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam.
4.	Assignments & Projects: - The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5.	Cheating: - If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquiries .
6.	Plagiarism: - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university.
7.	Other policies: - All the teaching materials should be kept out the examination hall and mobile phones are not allowed. - Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university.

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Reviewed By	<u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u> <u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u> <u>Name of Reviewer from the Department: Assoc. Prof. Dr. Farouk Al-Fuhaidy</u>
	<u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u> <u>Assoc. Prof. Dr. Ahmed Mujahed</u> <u>Asst. Prof. Dr. Munasar Alsubri</u>

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28. Course Plan of Programing Language 3 (Java)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Sami AL-MAQTARI	Office Hours					
Location & Telephone No.	771010885	SAT	SUN	MON	TUE	WED	THU
E-mail	dr.samiaziz@gmail.com			10-12			

II. Course Identification and General Information:						
1.	Course Title:	Programing Language 3 (Java)				
2.	Course Code & Number:	CCE244				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		2	-	2	-	3
4.	Study level/ semester at which this course is offered:	3 rd Year – 1 st semester				
5.	Pre-requisite (if any):	Programing Language 2 (C/C++) (CCE143)				
6.	Co-requisite (if any):	None.				
7.	Program(s) in which the course is offered:	Electrical Engineering – Computer and Control section				
8.	Language of teaching the course:	English				
9.	System of Study:	Semester				
10.	Mode of delivery:	Lecture				
11.	Location of teaching the course:	Electrical Engineering Department, Faculty of Engineering				

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III. Course Description:

This course aims to provide students with advanced programming concepts and techniques required for building of projects to social, marketing and business issues. It covers the following subjects: Data Types, Variables, Operators, and Arrays, Control Statements, Methods and classes in details, OOP concepts, GUI, Web-Applets, Multimedia, Multithreading and Network programming in Java language. throughout lectures, laboratory sessions and term projects for solving some marketing & business software applications issues, students will develop their personal programming skills, team working skills and problem-solving related to computer application developments.

IV. Intended learning outcomes (ILOs) of the course:

Brief summary of the knowledge or skill the course is intended to develop:

- 1- Demonstrate knowledge of Java's advanced topics such as classes and objects, inheritance, polymorphism, Applets and multithreading programming and their applications to software projects development.
- 2- Explain the capability of Java in the development of market, business and social applications considering professional & ethical responsibilities.
- 3- Interpret the fundamental Java syntax and semantics and be fluent in the use of Java control flow statements.
- 4- Express proficiency in the handling of advance programming technics like interfaces, generics, multithreading, and networking to different environmental issues.
- 5- Use appropriate programming & modularization techniques and software tools in solving programming problems using Java.
- 6- Develop Java programs and applications based on modular units like classes, objects, packages, methods and applets to meet desired specifications and imposed constraints.
- 7- Enhance problem-solving and team-work skills, and applying them for solving of different engineering problems.
- 8- Conduct searches on solutions for engineering problems related to Java Programming language.

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V. Course Content:				
Distribution of Semester Weekly Plan of Course Topics/Items and Activities.				
A- Theoretical Aspect:				
Order	Topics List	Sub Topics List	Week Due	Contact Hours
1.	- Introduction	<ul style="list-style-type: none"> • The history and evolution of java. • Java vs c++. • Compiled vs interpreted languages. • Java as a pure OOP language. • Security in java. • Structure of simple java programs. 	1 st	2
2.	- Data Types, Variables, and Operators	<ul style="list-style-type: none"> • The primitive data types. • Reference type (implicit pointers). • Object vs class concepts. • A closer look at literals • Variables. • Type conversion and casting. • Automatic type promotion in expressions. • Arithmetic operators. • The bitwise operators. • Relational operators. • Boolean logical operators. • The assignment operator. • The ?: ternary operator. • Precedence and associativity. 	2 nd	2
3.	- Control Statements	<ul style="list-style-type: none"> • Selection statements (if and switch statements). • Iteration statements (while, do-while, for, for-each version of for, and nested loops). • Jump statements (break, continue, and return statements). 	3 rd	2

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4.	- Arrays	<ul style="list-style-type: none"> • Arrays are objects. • One-dimensional arrays. • Multidimensional arrays. • Alternative array declaration syntax. 	4 th	2
5.	- Classes	<ul style="list-style-type: none"> • Class fundamentals. • Creating and destroying objects • Declaring objects. • Assigning object reference variables. • Introducing methods. • Constructors. • The this keyword. • Java garbage collection 	5 th	2
6.	- Methods and more about classes	<ul style="list-style-type: none"> • Declaring methods. • Overloading methods. • Using objects as parameters. • Argument passing. • Returning objects. • Recursion. • Introducing access control. • Understanding static. • Introducing final. • Introducing nested and inner classes. • Using command-line arguments. • Varargs: variable-length arguments. • Local variable type inference with reference types 	6 th	2
7.	- Inheritance	<ul style="list-style-type: none"> • Inheritance basics. • Using super. • Creating a multilevel hierarchy. • Constructors execution order. • Method overriding. • Abstract classes: usage and implementation. 	7 th	2

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		<ul style="list-style-type: none"> • Using final to prevent inheritance. • The object class. • Inheritance and polymorphism. 		
8.	- Mid-Term Exam	<ul style="list-style-type: none"> • ALL Previous Topics 	8 th	2
9.	- Packages and Interfaces	<ul style="list-style-type: none"> • Package declaration and member access. • Importing packages. • Interfaces: declaration and implementation. • Nested interfaces. • Variables in interfaces. • Default interface methods. • Private interface methods. • Runnable interface for multithreading. 	9 th	2
10.	- GUI Programming with Java	<ul style="list-style-type: none"> • Introduction to GUI programming, • Frames, containers, and components, • Container Layouts such as Flow-Layout and Grid-Layout, • Building GUI Applications, • Graphical Components, 1-d & 3-d Graphics using Java, • Action-Listener Concepts and Programming based GUI Application, 	10 th , 11 th , 12 th	6
11.	- Web Based Applets Applications & Multimedia	<ul style="list-style-type: none"> • Introduction to Web Programming, • Applets in Java and HTML, • Building Web-Application based on Applets and Action Listeners, • Multimedia Programming, • Build Applet application with Multimedia. 	13 th	2

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12.	- Multithreading Programming in Java	<ul style="list-style-type: none"> • Introduction to Multithreading, • Multithreading Package in Java, • Building Java program based Multithreading. 	14 th	2
13.	- Network Programming in Java	<ul style="list-style-type: none"> • Introduction to Network Programming, • Client-Server Programming, • Socket building in Java, • Building Simple Server-Client Chat Program. 	15 th	2
14.	- Final Exam	• ALL Topics	16 th	2
Number of Weeks/Units Per Semester			16	32

B- Practical Aspect:			
Order	Topics List	Week Due	Contact Hours
1.	- Java Software environment Preparation & installations	1 st	2
2.	- Data types Variables & Operators in Java	2 nd	2
3.	- Control Structures Manipulation	3 rd	2
4.	- Arrays Manipulation in Java	4 th	2
5.	- Classes & OOP concepts, Encapsulation, Inheritance and Polymorphism	5 th , 6 th	2
6.	- Packages & Interface Manipulation in Java	7 th	2
7.	- GUI programming and Graphics in Java	8 th , 9 th , 10 th	5
8.	- Web-based Applets Manipulation in Java	10 th , 11 th	2
9.	- Multithreading Manipulation in Java and Networking	11 th , 12 th	3
10.	- Review	13 th	2
11.	- Project Presentations	14 th	2

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12.	- Final Lab Exam	15 th	2
Number of Weeks/Units Per Semester		15	30

VI. Teaching strategies of the course:	
<ul style="list-style-type: none"> • Active Lectures, • Laboratory Sessions, • Homework & Assignments, • Projects, • Use of IT Tools. 	

VII. Assignments & Reports:				
No	Assignments	Aligned CIOS(symbols)	Week Due	Mark
1.	Control Statements & Arrays	a1, b1, b2, c1, d1	3 rd & 4 th	1
2.	OOP Concepts and Packages & Interfaces	a1, a2, b1, b2, c1, c2, d1	6 th & 9 th	2
3.	GUI, APPLETs, Multithreading and Networking Programming, Short Projects Reports based on Lecturer Opinions	a1, a2, b1, b2, c1, c2, d1, d2	10 th to 14 th	4
4.	Lab Reports	a1, a2, b1, b2, c1, c2, d1	3 rd to 12 th	8
Total				15

VIII. Schedule of Assessment Tasks for Students During the Semester:				
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1.	Assignments & Reports	3 rd to 14 th	15	10%

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2.	Quizzes	5 th , 10 th & 14 th	10	6.67%
3.	Mid-Term Exam (Theory)	8 th	20	13.33%
4.	Final Exam (practical including Term Project Evaluation)	14 th & 15 th	30	20%
5.	Final Exam (Theory)	16 th	75	50%
	Total		150	100%

IX. Learning Resources:	
Written in the following order: (Author - Year of publication - Title - Edition - Place of publication - Publisher).	
1- Required Textbook(s) (maximum two).	
	Herbert Schildt, 2019, "Java: The Complete Reference", 11 th Edition, McGraw Hill Professional. ISBN-13: 978-1260440232
2- Essential References.	
	Kishori Sharan, 2017, "Beginning Java 9 Fundamentals", 2 nd Edition, Apress. ISBN-13: 978-1484228432
3- Electronic Materials and Web Sites etc.	

X. Course Policies:	
1.	Class Attendance: - The students should have more than 75% of attendance according to rules and regulations of the faculty.
2.	Tardy: - The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture.
3.	Exam Attendance/Punctuality: - The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam.

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4.	<p>Assignments & Projects:</p> <ul style="list-style-type: none"> - The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5.	<p>Cheating:</p> <ul style="list-style-type: none"> - If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquiries.
6.	<p>Plagiarism:</p> <ul style="list-style-type: none"> - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university.
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - All the teaching materials should be kept out the examination hall and mobile phones are not allowed. - Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university.

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