		Universitas Negeri Surabaya Faculty of Engineering, Undergraduate Study Program in Informatics Engineering				**Document Code**

SEMESTER LEARNING PLAN

Courses		CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Object Oriented Programming		5520203058	Compulsory Study Program Subjects	**T=3**	**P=0**	**ECTS=4.77**	3	July 17, 2024
AUTHORIZATION		**SP Developer**		**Course Cluster Coordinator**			**Study Program Coordinator**	
		Drs. Bambang Sujatmiko, M.T.		....			Aditya Prapanca, S.T., M.Kom.	

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	PLO-2 — Able to design and simulate multi-platform technology applications that are relevant to the needs of industry and society using theoretical concepts in the field of computer science/informatics knowledge (KNO-02)
	Program Objectives (PO)
	PLO-PO Matrix

P.O	PLO-2

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	This course teaches object-oriented programming concepts and techniques. In teaching the PBO concept, the Java programming language will be used because Java uses the concepts of objects and classes in making programs. Teaching materials include an introduction to OOP concepts, Java Virtual Machine (JVM), objects, classes, methods, constructors, I/O, inheritance, encapsulation, polymorphism, overloading, UML, files, AWT, Swing, applets and exceptions.

References	**Main :**
	1. Harold, E.R. 2014. Java Network Programming, 4th edition. O'Reilly. 2. Jaworski, J. 1998. Java 2 Unleashed. Sams Publishing. 3. Modul Teori dan Student Activity 4. Holmes, B.J., Joice D.T. 2001. Object-Oriented Programming With Java, second edition. 5. Bakker, J. 2005. Beginning Java Objects From Concepts to Code, second edition, Apress.
	Supporters:

Supporting lecturer	Drs. Bambang Sujatmiko, M.T. Agus Prihanto, S.T., M.Kom. I Made Suartana, S.Kom., M.Kom. Dr. Ricky Eka Putra, S.Kom., M.Kom.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (offline)	Online (online)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

| 1 | Students are able to understand the basics of Java programming | 1.Identify the basics of Java programming 2.Identify Java literals, primitive data types, variable types, identifiers and operators in Java | **Criteria:** 1.Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2.Character/Attitude Score Score 1 - 100 3.Performance Value Score 1 - 100 **Form of Assessment** : Participatory Activities | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** Identifying the basics of Java programs, Java literals, primitive data types, variable types, identifiers and operators in Java **Library:** *Harold, ER 2014. Java Network Programming, 4th edition. O'Reilly.* | 3% |

| 2 | Students are able to understand classes and methods in Java to receive input and produce output | 1. Identify the types of classes and methods in input and output 2. Explain classes and methods in input and output in an interactive program 3. Explain the use of packages and their relationship to classes | **Criteria:** 1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2. Character/Attitude Score Score 1 - 100 3. Performance Value Score 1 - 100

 Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** 1. Identifying types of classes and methods in input and output, 2. Explaining classes and methods in input and output in an interactive program, 3. Explaining the use of packages and their relationship with classes. **Reference:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 3% |

| 3 | Students are able to understand control structures | 1. Explain the decision control structure 2. Explain the structure of repetition control 3. Explain branching statements | **Criteria:** 1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2. Character/Attitude Score Score 1 - 100 3. Performance Score Score 1 - 100 **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** 1. decision control structures, 2. repetition control structures, and 3. branching statements **References:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 3% |

| 4 | Students are able to understand the concept of Java Arrays | 1. Explain the definition of an array 2. Explain the declaration and use of 1-dimensional arrays 3. Describes the elements in the array 4. Explains determining the number of elements in an array 5. Explains the declaration and use of multidimensional arrays | **Criteria:** 1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2. Character/Attitude Score Score 1 - 100 3. Performance Value Score 1 - 100 **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** 1. Array Definition, 2. Declaration and use of 1-dimensional arrays, 3. Elements in an array, 4. Determining the number of elements in an array, and 4. Declaration and use of multidimensional arrays **Library:** *Theory Module and Student Activity* | 3% |

| 5 | Students are able to understand the classes available in the Java Class Library | 1. Explain the concept of Object Oriented Programming
2. Explain the difference between objects and classes
3. Explain the difference between instance variables/methods and class (static) variables/methods
4. Explains methods and how to call and provide parameters to methods
5. Identify the range of variables
6. Casting primitive and object data types
7. Comparing objects
8. Determines the class of an object | **Criteria:**
1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100
2. Character/Attitude Score Score 1 - 100
3. Performance Value Score 1 - 100

Form of Assessment : Participatory Activities, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 x 50 | **Material:** 1. Object Oriented Programming concepts, 2. differences between objects and classes, 3. differences between instance variables/methods and class (static) variables/methods, 4. methods and how to call and provide parameters to methods, 5. Identifying the range of variables, 6. Casting primitive data types and objects, 7. Comparing objects, and 8. Determining the class of an object. **Reference:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 3% |

| 6 | Students are able to understand the concept of class by designing their own classes | 1. Explains how to create your own class
2. Explains the attribute and method declarations for classes
3. Explains reference this to access instance data
4. Explains the creation and calling of overloaded methods
5. Explains how to import and create packages
6. Explain the use of access modifiers | **Criteria:**
1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100
2. Character/Attitude Score Score 1 - 100
3. Performance Value Score 1 - 100

Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** Explains 1. creating your own class, 2. declaring attributes and methods for a class, 3. reference this to access instance data, 4. creating and calling overload methods, 5. how to import and create packages, and 6. using **library access modifiers :** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 3% |

| 7 | Students are able to understand the concepts of inheritance, polymorphism and interfaces | 1. Describe superclasses and subclasses in inheritance 2. Explain overriding methods from superclasses 3. Explain final methods and final classes 4. Explaining polymorphism (abstract classes and interfaces) | **Criteria:** 1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2. Character/Attitude Score Score 1 - 100 3. Performance Value Score 1 - 100 **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** 1. Describe superclasses and subclasses in inheritance, 2. Explain overriding methods from superclasses, final methods and final classes, and polymorphism (abstract classes and interfaces) **References:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 3% |
| 8 | UTS (USS) | Cognitive Values, Character Values, and Psychomotor Values | **Form of Assessment** : Test | Offline Quiz 2 X 50 | Online Quiz 2 x 50 | **Material:** All material that has been taught **Library:** *Theory Module and Student Activity* <hr> **Material:** All material that has been taught. **Reference:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 20% |

| 9 | Students are able to understand design with an object-oriented approach using UML notation | 1. Explains how to design in Object Oriented Programming using UML
2. Explaining use case diagrams in object-oriented application design
3. Explaining class diagrams in object-oriented application design
4. Explaining activity diagrams in object-oriented application design
5. Explain sequence diagrams in object-oriented application design | **Criteria:**
1. Group Value (20%)
2. Individual Value (35%)
3. Project Value (30%)
4. Report Value (15%)

Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 x 50 | **Material:** Explains 1. how to design in Object-Oriented Programming using UML, 2. use case diagrams in object-oriented application design, 3. class diagrams in object-oriented application design, 4. activity diagrams in object-oriented application design, and 5. sequence diagrams in object-oriented application design
Bibliography: *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.*

Material: Explains 1. how to design in Object-Oriented Programming using UML, 2. use case diagrams in object-oriented application design, 3. class diagrams in object-oriented application design, 4. activity diagrams in object-oriented application design, and 5. sequence diagrams in designing object-oriented applications
Library: *Theory and Student Activity Modules* | 9% |

| 10 | Students are able to understand the basics of exception handling and assertions in advanced programming | 1. Explain exceptions 2. Explains exception handling using a simple try-catch-finally block 3. Explain recursive programming 4. Explain abstract data types in programming 5. Explaining algorithms in programming | **Criteria:** 1. Group Value (20%) 2. Individual Value (35 %) 3. Project Value (30 %) 4. Report Value (15 %) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** Explains 1. Exceptions, 2. handling exceptions using a simple try-catch-finally block, 3. recursive programming, 4. abstract data types in programming, and 5. algorithms in programming **Library:** *Theory Module and Student Activity* - - - - - - - - - - - - - **Material:** Explains 1. Exceptions, 2. exception handling using a simple try-catch-finally block, 3. recursive programming, 4. abstract data types in programming, and 5. algorithms in programming **References:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 10% |

| 11 | Students are able to understand the User Interface using the Abstract Windowing Toolkit (AWT) and Swing | 1. Explain the definitions of AWT and Swing
2. Explain the AWT components in program creation
3. Explain the components of Layout Managers in program creation
4. Explain the components of Swing GUI in making programs | **Criteria:**
1. Group Value (20%)
2. Individual Value (35%)
3. Project Value (30%)
4. Report Value (15%)

Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
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4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
2 x 50 | **Material:** Explains 1. Definition of AWT and Swing, 2. AWT components in making programs, 3. Layout Managers components in making programs, 4. Swing GUI components in making programs
Library: *Theory Module and Student Activity*

Material: Explains 1. Definition of AWT and Swing, 2. AWT components in making programs, 3. Layout Managers components in making programs, 4. Swing GUI components in making programs
References: *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 10% |

| 12 | Students are able to understand User Interface handling using User Interface Handling | 1. Explain the definition and use of the delegation event model 2. Identify event classes 3. Explaining event listeners in programming 4. Explain event handling techniques in application creation 5. Explaining adapter classes in programming 6. Explaining inner classes and anonymous inner classes in programming | **Criteria:** 1. Group Value (20%) 2. Individual Value (35%) 3. Project Value (30%) 4. Report Value (15%) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** Explains 1. Definition and use of the delegation event model, 2. event listeners in programming, 3. event handling techniques in creating applications, 4. adapter classes in programming, 5. inner classes and anonymous inner classes in programming, and identifying classes-class event **Library:** *Theory and Student Activity Modules* **Material:** Explains 1. Definition and use of the delegation event model, 2. event listeners in programming, 3. event handling techniques in making applications, 4. adapter classes in programming, 5. inner classes and anonymous inner classes in programming, and identifying classes-class event **Bibliography:** *Holmes, BJ, Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 10% |

| 13 | Students are able to understand threads in programming | 1. Explain the definition of thread 2. Explains the basics of threads 3. Explaining thread classes in programming 4. Explaining the thread 5. Explains synchronization 6. Explains communication methods between threads (interthread) 7. Explain concurrency capabilities | **Criteria:** 1. Cognitive Value (C3, C4, C5, and C6) Score 1 - 100 2. Character/Attitude Score Score 1 - 100 3. Performance Value Score 1 - 100 **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 2 x 50 | **Material:** Explains 1. definition of thread, 2. basics of threads, 3. thread classes in programming, 4. threads, 5. synchronization, 6. communication methods between threads (interthread), and 7. concurrency capabilities **Reader:** *Holmes, BJ , Joice DT 2001. Object-Oriented Programming With Java, second edition.* | 5% |

| 14 | Students are able to understand the concept of network-based programming and applets in making programs | 1. Explain the basic concepts of networking
2. Identify the types of Java network packages
3. Explain the definition of Applet
4. Explain how to use Applets
5. Explain the Applet method in programming | **Criteria:**
1. Group Value (30%)
2. Individual Value (25 %)
3. Project Value (30 %)
4. Report Value (15 %)

Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face.
2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared
3. Students prepare a schedule for completing the project that will be worked on
4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on)
5 . Students make reports related to projects that have been carried out within the specified time period.
6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed.
2 x 50 | **Material:** Explains 1. basic networking concepts, 2. Applet definition, 3. How to use Applets, 4. Applet methods in programming, and Identifying types of Java network packages
Library: *Theory and Student Activity Modules* | 5% |

| 15 | Students are able to understand I/O Stream in managing files | 1. Explain the types of streams in general 2. Explaining Reader classes 3. Explaining Writer classes 4. Explain the InputStream classes 5. Explain the OutputStream classes 6. Explain serialization and deserialization | **Criteria:** 1. Group Value (30%) 2. Individual Value (25 %) 3. Project Value (30 %) 4. Report Value (15 %) **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 X 50 | 1. Students observe the problems given by the lecturer, referring to the topics agreed upon during the lesson. In groups, students discuss to formulate hypotheses related to the problems they face. 2. Students begin to prepare the project that will be worked on to answer the hypothesis that has been prepared 3. Students prepare a schedule for completing the project that will be worked on 4. Students carry out the stages of the project according to the schedule that they have prepared (the lecturer observes each stage of the student project that is being worked on) 5 . Students make reports related to projects that have been carried out within the specified time period. 6. Students reveal the experiences that have been carried out by displaying the outcomes of projects that have been completed. 3 x 50 | **Material:** Students can explain 1. types of streams in general, 2. Reader classes, 3. Writer classes, 4. InputStream classes, 5. OutputStream classes, and 6. serialization and deserialization **Library:** *Theory and Student Activity Modules* | 10% |
| 16 | Students are able to understand generic concepts (classes and methods) in programming | 1. Visual Design (15 %) 2. At least 2 algorithms involved (Sorting and Searching) (25%) 3. Program complexity (20 %) 4. Functionality and Originality (15 %) 5. Packaging (10 %) 6. Databases (15 %) | **Criteria:** 1. Group Value (25 %) 2. Individual Value (25 %) 3. Project Value (40 %) 4. Report Value (10 %) **Forms of Assessment** : Project Results Assessment / Product Assessment, Portfolio Assessment, Practice / Performance, Tests | End of Course Project Presentation for each group 3 X 50 | End of Course Project Presentation for each group | **Material:** Accumulated competency during one semester which is implemented in the form of a Final Project for Library Courses : *Theory Module and Student Activity* | 0% |

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	29.16%
2.	Project Results Assessment / Product Assessment	24.66%
3.	Practical Assessment	26.16%
4.	Test	20%
		99.98%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.

2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.

3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.

4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.

5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.

6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.

7. **Forms of assessment:** test and non-test.

8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.

9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.

10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.

11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.

12. TM=Face to face, PT=Structured assignments, BM=Independent study.