	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
Basic Programming	5520204059	Compulsory Study Program Subjects	T=4	P=0	ECTS=6.36	1	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	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-1	Able to analyze complex computing problems to identify technology project management solutions in the field of informatics/computer science by considering insights into the development of transdisciplinary science (KNO-01)
	PLO-5	Able to communicate the results of studies on the implications of developing or implementing information technology science (SKI-02)
	PLO-8	Able to implement computing needs by considering various appropriate methods/algorithms (COM-03)
	Program Objectives (PO)	
	PO - 1	Students have the ability to define a problem and how to solve it,
	PO - 2	Students have the ability to design algorithms to solve a problem in the form of a flowchart.
	PO - 3	Students have the ability to practically apply algorithm and flowchart design into a program using the C++ programming language

PLO-PO Matrix

P.O	PLO-1	PLO-5	PLO-8
PO-1			
PO-2			
PO-3			

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
PO-1																
PO-2																
PO-3																

Short Course Description	This course teaches basic programming concepts, practical and technical knowledge and experience regarding algorithms, flowcharts and their application in the C++ programming language. The basic materials for making programs are programming basics, introduction to the C++ programming language, C++ control structures, completing conditions, loops, arrays, strings, pointers, functions, abstract data types/structures, and file operations.

References

Main :

1. Ekohariadi, Qoiriah, A. 2007.Bahasa Pemrograman C. Unipress UNESA.
2. Jeri R. Hanly and Eliiot B. Koffman. 2002.Problem Solving and Program Design in C.Addison Wesley Publishing.
3. Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C++: an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.
4. The Waite Group's. 1992. C++ Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.
5. Kadir, A dan Heriyanto. 2005.Algoritma Pemrograman Menggunakan C++. Yogyakarta: Penerbit Andi.
6. Pranata, A. 2005.Algoritma dan Pemrograman. Yogyakarta: Penerbit Graha Ilmu.
7. Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C++ in one hour a day. Sams.

Supporters:

Supporting lecturer	Anita Qoiriah, 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 apply algorithms and flowcharts in problem solving	1.Explain the basic concepts of algorithms 2.Identify flowchart notations 3.Applying algorithms and flowcharts to solve problems	**Criteria:** 1.Assessment rubric (attached) 2.Students respond to the lecture material, each response is worth 5 **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** flowchart **References:** *Ekohariadi, Qoiriah, A. 2007. Programming Language C. Unipress UNESA.*	2%
2	Students are able to explain the structure of writing the C programming language	1.Identify types of data types 2.Explain the rules for defining identifiers 3.Identify the difference between variables and constants 4.Identify the types of operators 5.Explain the precedence of arithmetic operators	**Criteria:** 1.Assessment rubric (attached) 2.Students respond to the lecture material, each response is worth 5 **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Cooperative Method: Discussion, Presentation, Practical 4 X 50		**Material:** variables **References:** *Ekohariadi, Qoiriah, A. 2007. Programming Language C. Unipress UNESA.* **Material:** data type **Bibliography:** *Kadir, A and Heriyanto. 2005. Programming Algorithms Using C. Yogyakarta: Andi Publishers.* **Material:** operators **References:** *Pranata, A. 2005. Algorithms and Programming. Yogyakarta: Graha Ilmu Publishers.*	2%

3	Students are able to apply input and output functions in making programs	1. Identify the types of input and output functions 2. Implement input and output functions in the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** input output **References:** *Ekohariadi, Qoiriah, A. 2007. Programming Language C. Unipress UNESA.* **Material:** input output **Library:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.* **Material:** input output **Reference:** *Pranata, A. 2005. Algorithms and Programming. Yogyakarta: Graha Ilmu Publishers.* **Material:** input output **Reference:** *Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C in one hour a day. Sams.*	2%
4	Students are able to create programs with the branching concept	1. Identify differences in conditions and actions 2. Explain single, compound and multilevel branching 3. Explaining branching using case selection 4. Implement the concept of branching into the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** branching **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** Bibliography **:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.* **Material:** branching **Bibliography:** *Kadir, A and Heriyanto. 2005. Programming Algorithms Using C. Yogyakarta: Andi Publishers.*	2%

5	Students are able to create programs with the branching concept	1. Identify differences in conditions and actions 2. Explain single, compound and multilevel branching 3. Explaining branching using case selection 4. Implement the concept of branching into the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** branching References **:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** Bibliography **:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.* **Material:** branching References **:** *Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C in one hour a day. Sams.*	25%
6	Students are able to create programs with the concept of repetition	1. Identify types of repetition 2. Explain the loop structure 3. Apply the concept of repetition to the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** looping **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** looping **Bibliography:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** looping **Reference:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.*	2%

7	Students are able to create programs with the concept of repetition	1. Identify types of repetition 2. Explain the loop structure 3. Apply the concept of repetition to the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Project Results Assessment / Product Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** looping **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** looping **Bibliography:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.*	10%
8	Subsummative Exam / Midterm Exam	Subsummative Exam / Midterm Exam	**Criteria:** Subsummative Exam / Midterm Exam **Form of Assessment** : Project Results Assessment / Product Assessment, Test	Subsummative Exam / Midterm Exam 4 X 50		**Material:** variables **References:** *Ekohariadi, Qoiriah, A. 2007. Programming Language C. Unipress UNESA.* **Material:** looping **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** Bibliography **:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.* **Material:** operators **References:** *Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C in one hour a day. Sams.*	15%

9	Students are able to create programs using array concepts	1. Explain the definition of an array 2. Identify types of arrays 3. Explains how to declare each array 4. Implementing arrays in programs	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Participatory Activities, Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** array **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** arrays **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** Array **Reference:** *Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C in one hour a day. Sams.*	2%
10	Students are able to create programs with string concepts	1. Explains the definition of a string 2. Explains how to declare string variables 3. Explains how to enter and display the contents of a string variable 4. Explains how to access string elements 5. Implementing strings in programs	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Participatory Activities	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** strings **Library:** *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.* **Material:** string **Reference:** *Liberty, J., Rao, S., Jones, B. 2008.Sams teach yourself C in one hour a day. Sams.*	2%

11	Students are able to use functions in making programs	1. Explain the basic concept of function 2. Explains how to declare a function 3. Explains how to call a function 4. Implement functions in programs	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** function **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** function **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.*	2%
12	Students are able to use recursive functions in making programs	1. Explain the definition of a recursive function 2. Explains how to declare a recursive function 3. Explains how to call a recursive function 4. Identify the similarities and differences between iterative and recursive functions 5. Identify the advantages and disadvantages of recursive functions 6. Implementing recursive functions in programs	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** recursive **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** recursive **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.*	3%

13	Students are able to use pointers in making programs	1. Explain the basic concept of pointers 2. Explain how to use pointers 3. Applypointer in the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** pointers **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** pointers **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.*	3%
14	Students are able to create programs with the concept of structure	1. Explain the basic concepts of structure 2. Explains how to declare structure variables 3. Implementing structure variables in the program	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Project Results Assessment / Product Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** structure **References:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** structure **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** structure **References:** *Kadir, A and Heriyanto. 2005. Programming Algorithms Using C. Yogyakarta: Andi Publishers.*	5%

15	Students are able to create programs for file operations	1. Identify the differences between text files and binary files 2. Identify types of file operations in text files and binary files 3. Implementing file operations in program creation	**Criteria:** Assessment rubric (attached) **Form of Assessment** : Practical Assessment	Approach: Scientific Model: Problem-based learning Method: Discussion, Presentation, Practical 4 X 50		**Material:** **Library** file : *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** **Library** files : *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.*	3%
16	Summative Exam / Final Semester Exam	Summative Exam / Final Semester Exam	**Criteria:** Summative Exam / Final Semester Exam **Form of Assessment** : Project Results Assessment / Product Assessment	Summative Exam / Final Exam 4 X 50 Semester		**Material:** Array **Reference:** *Ekohariadi, Qoiriah, A. 2007. Programming Language C. Unipress UNESA.* **Material:** recursive **Bibliography:** *Jeri R. Hanly and Eliiot B. Koffman. 2002. Problem Solving and Program Design in C. Addison Wesley Publishing.* **Material:** structure **References:** *Barton, John J., Nackman, Lee R. 1994.Scientific and Engineering C : an introduction with advanced techniques and examples. Addison Wesley Longman, Inc.* **Material:** **Library** files : *The Waite Group's. 1992. C Programming, Second Edition. SAMS a division of Prentice Hall Computer Publishing.*	20%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage

1.	Participatory Activities	19.5%
2.	Project Results Assessment / Product Assessment	55%
3.	Practical Assessment	18%
4.	Test	7.5%
		100%

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** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities 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.