| | Universitas Negeri Surabaya<br>Faculty of Engineering,<br>Electrical Engineering Undergraduate Study Program | Document Code |
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# SEMESTER LEARNING PLAN

| Courses | CODE | Course Family | Credit Weight | | | SEMESTER | Compilation Date |
|---|---|---|---|---|---|---|---|
| Basic Algorithm and Programming Practicum I | 2020101396 | | T=0 | P=1 | ECTS=1.59 | 2 | July 18, 2024 |

| AUTHORIZATION | SP Developer | Course Cluster Coordinator | Study Program Coordinator |
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| | ..... | ..... | Dr. Lusia Rakhmawati, S.T., M.T. |

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| **Learning model** | **Project Based Learning** | |
| **Program Learning Outcomes (PLO)** | **PLO study program that is charged to the course** | |
| | **Program Objectives (PO)** | |
| | **PO - 1** | Demonstrate the ability to relate digital technology concepts to computer programming |
| | **PO - 2** | Demonstrate the ability to analyze an algorithm |
| | **PO - 3** | Demonstrate the ability to design an algorithm |
| | **PO - 4** | Demonstrate the ability to analyze the structure contained in a program |
| | **PO - 5** | Demonstrate the ability to evaluate the use of variables, data types, constants, and operators in a program |
| | **PO - 6** | Demonstrate the ability to analyze how branching and looping statements work in a program |
| | **PO - 7** | Demonstrate the ability to analyze the use of functions in a program |
| | **PO - 8** | Demonstrate the ability to analyze the use of array elements in a program |
| | **PO - 9** | Demonstrate ability to apply algorithms and programming languages to case examples |
| | **PLO-PO Matrix** | |

| P.O |
|---|
| PO-1 |
| PO-2 |
| PO-3 |
| PO-4 |
| PO-5 |
| PO-6 |
| PO-7 |
| PO-8 |
| PO-9 |

**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 | | | | | | | | | | | | | | | | |
| PO-4 | | | | | | | | | | | | | | | | |
| PO-5 | | | | | | | | | | | | | | | | |
| PO-6 | | | | | | | | | | | | | | | | |
| PO-7 | | | | | | | | | | | | | | | | |
| PO-8 | | | | | | | | | | | | | | | | |
| PO-9 | | | | | | | | | | | | | | | | |

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| **Short Course Description** | This course discusses the introduction and understanding of programming languages, basic programming, program structure, data types, algorithm notation, control, repetition, functions, sequential processing, as well as simple problem practice questions to be able to analyze problems related to logic or methods. thinking which is then implemented into a programming language. |
| **References** | **Main :** |
| | 1. 1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United State of America: Pearson Education, Inc.<br>2. 2. Kulikov, Alexander S., and Pevzner, P. 2018. Learning Algorithms Through Programming and Puzzle Solving. United States of America: Active Learning Technologies. |
| | **Supporters:** |
| **Supporting lecturer** | Miftahur Rohman, S.T., M.T.<br>Pradini Puspitaningayu, S.T., M.T., Ph.D.<br>Parama Diptya Widayaka, S.ST., M.T.<br>Sayyidul Aulia Alamsyah, S.T., M.T. |

| 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 explain the relationship between digital technology and computer programming | 1.Accuracy in explaining computer technology<br>2.Accuracy in explaining the differences between compilers and interpreters<br>3.Accuracy in explaining the relationship between digital technology and programming | **Criteria:**<br>Each measurement is given a maximum score of 25, if answered correctly<br><br>**Form of Assessment** :<br>Participatory Activities, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>History of computers, Binary numbers, Programming languages, Interpreters and compilers<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |

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| **2** | Students are able to explain the basic concepts of logic and algorithms, basic structures, characteristics of algorithms, and properties of algorithms | 1. accuracy in explaining basic logic and algorithms<br>2. accuracy in explaining the characteristics of the algorithm<br>3. accuracy in explaining the nature of the algorithm | **Criteria:**<br>The maximum score per item is 25<br><br>**Form of Assessment** :<br>Participatory Activities, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>Logic concepts, algorithm definitions, algorithm concepts, algorithm structures, properties and characteristics of algorithms<br>**References:**<br>*2. Kulikov, Alexander S., and Pevzner, P. 2018. Learning Algorithms Through Programming and Puzzle Solving. United States of America: Active Learning Technologies.* | 10% |
| **3** | Students are able to write notation for writing descriptive sentence algorithms, pseudocode, and flowcharts | 1. Accuracy in writing descriptive algorithm notation<br>2. Accuracy in writing pseudocode algorithm notation<br>3. Accuracy in writing flowchart algorithm notation | **Criteria:**<br>The maximum score for each item is 25 if answered correctly<br><br>**Form of Assessment** :<br>Participatory Activities, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>Descriptive algorithm notation, pseudocode, flowcharts<br>**References:**<br>*2. Kulikov, Alexander S., and Pevzner, P. 2018. Learning Algorithms Through Programming and Puzzle Solving. United States of America: Active Learning Technologies.* | 0% |
| **4** | Students are able to evaluate several examples of algorithms in everyday life/case studies | 1. Accuracy in explaining several simple algorithms based on cases<br>2. Accuracy in evaluating several algorithms based on the algorithm writing structure<br>3. Accuracy in implementing algorithms in solving certain problems | **Criteria:**<br>The maximum score for each item is 25 if answered correctly<br><br>**Form of Assessment** :<br>Participatory Activities | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>Case study of simple algorithms<br>**References:**<br>*2. Kulikov, Alexander S., and Pevzner, P. 2018. Learning Algorithms Through Programming and Puzzle Solving. United States of America: Active Learning Technologies.* | 0% |
| **5** | Students are able to show the parts or structure contained in a program | 1. Accuracy in explaining parts or structure of the program<br>2. Accuracy in explaining the function of each program structure | **Criteria:**<br>The maximum score for each item is 20 if answered correctly | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>Sequential structure, repetition structure, and branching structure<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |

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| **6** | Students are able to explain functions, variables, data types, constants and operators used in a program | 1. Accuracy in explaining the use of functions in a program<br>2. Accuracy in explaining the purpose of variable declarations<br>3. Accuracy in explaining various data types and their use in declaring variables<br>4. Accuracy in explaining the use of operators used in a program | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Form of Assessment** : Participatory Activities, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Program functions, variable declarations, data types, and operators<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **7** | Students are able to demonstrate basic input output operations in a simple program | Accuracy in applying programming skills in specific case studies | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Form of Assessment** : Participatory Activities | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Input and Output<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **8** | MIDTERM EXAM | Accuracy in completing the questions provided in the time provided | **Criteria:**<br>Each question item has an assessment weight adjusted to the student's ability to answer<br><br>**Form of Assessment** : Project Results Assessment / Product Assessment, Test | MID SEMESTER EXAMINATION<br>2 X 50 | MID SEMESTER EXAMINATION<br>2 X 50 | | 0% |
| **9** | Students are able to explain the concept of branching and looping in a program | 1. Accuracy in explaining the concept of repetition<br>2. Accuracy in explaining how the for loop works<br>3. Accuracy in explaining how the while loop works<br>4. Accuracy in explaining how the do-while loop works | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Form of Assessment** : Participatory Activities, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** The concept of repetition, repetition using for, while, and do-while **statements.**<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |

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| **10** | Students are able to analyze the use of functions in a program | 1. Accuracy in explaining the concept of using functions in a program<br>2. Accuracy in applying the use of functions in a program<br>3. Accuracy in explaining the concept of using functions with input, output and input-output parameters | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Form of Assessment** : Participatory Activities | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Function concepts, functions with return values, functions without return values, and functions with parameters.<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **11** | Students are able to explain the basic concepts of array elements | 1. Accuracy in explaining the concept of arrays<br>2. Accuracy in applying array data structures in a program | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Forms of Assessment** :<br>Participatory Activities, Practice/Performance, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Array concept<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **12** | Students are able to analyze the concept of object oriented programming (OOP) | 1. Accuracy in explaining OOP-based programming concepts<br>2. Accuracy in applying OOP concepts to programming | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Forms of Assessment** :<br>Participatory Activities, Practice/Performance, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** OOP-based programming concepts<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **13** | Case Study 1: Calculating the Area and Circumference of a Circle | 1. Accuracy in compiling algorithms in solving a problem<br>2. Accuracy in preparing a program to solve a problem<br>3. Accuracy in explaining the function of the program and the structure contained in it | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Forms of Assessment** :<br>Participatory Activities, Practice/Performance, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Case study<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **14** | Case Study 2: Temperature Conversion | 1. Accuracy in compiling algorithms in solving a problem<br>2. Accuracy in preparing a program to solve a problem<br>3. Accuracy in explaining the function of the program and the structure contained in it | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Forms of Assessment** :<br>Participatory Activities, Practice/Performance, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:** Case study<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |

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| **15** | Case Study 2: Temperature Conversion | 1. Accuracy in compiling algorithms in solving a problem<br>2. Accuracy in preparing a program to solve a problem<br>3. Accuracy in explaining the function of the program and the structure contained in it | **Criteria:**<br>The maximum score for each item is 20 if answered correctly<br><br>**Forms of Assessment** :<br>Participatory Activities, Practice/Performance, Tests | Presentations, lectures and discussions<br>2 X 50 | Presentations, lectures and discussions<br>2 X 50 | **Material:**<br>Case study<br>**References:**<br>*1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |
| **16** | FINAL EXAMS | | **Form of Assessment** :<br>Practice/Performance, Test | FINAL EXAMINATION OF SEMESTER<br>2 X 50 | | **Material:**<br>Final Semester Exam<br>**Literature:** *1. Deitel, Paul, and Deitel, Harvey. 2012. C How to Program 7th Edition. United States of America: Pearson Education, Inc.* | 10% |

**Evaluation Percentage Recap: Project Based Learning**

| No | Evaluation | Percentage |
|---|---|---|
| 1. | Participatory Activities | 56.65% |
| 2. | Practice / Performance | 21.65% |
| 3. | Test | 41.65% |
| | | 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** 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.