	Universitas Negeri Surabaya Vocational Faculty, D4 Civil Engineering Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
CIVIL ENGINEERING COMPUTER APPLICATIONS	2230502031		T=2	P=0	ECTS=3.18	4	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Puguh Novi Prasetyono, S.Pd., M.T.

Learning model	**Case Studies**	
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**	
	Program Objectives (PO)	
	PO - 1	Students have faith and devotion to God Almighty and have good morals, ethics and personality in learning computer programming for engineering mathematics and numerical applications based on civil engineering knowledge.
	PO - 2	Students are able to master scientific subjects and skills related to mathematics, physics, chemistry, statics and other civil engineering sciences
	PO - 3	Students are able to apply arithmetic and logic algorithms in the form of flowcharts that suit the operating system characteristics of identifying or formulating civil engineering problems.
	PO - 4	Students are able to know the properties of operating systems and file management and know visual or graphically oriented programming languages
	PO - 5	Students know and write source code for visually oriented applications and are able to create application programs in the field of civil engineering

PLO-PO Matrix

P.O
PO-1
PO-2
PO-3
PO-4
PO-5

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																

Short Course Description	This course examines and provides testimony on problems in the world of civil engineering and identifies them logically to provide a solution in the form of a flowchart. Create algorithms from flowcharts and problems to make it easier to create programming languages so that students can create computer programming. Learning is carried out in a constructivist form and learning activities end by creating a program to solve civil engineering problems.
References	**Main :**

1. Atkinson, Kendal E. 1978. An Introduction to Numerical Analysis . Toronto: John Wiley &Sons
2. Atkinson, L.V., Harley, P.J. 1983. An Introduction to Numerical Methods with Pascal. Tokyo :Addison-Wesley Publishing Co
3. Djojodihardjo, H., Sudarmo, M.S. 1985. Pengantar Pemrograman Dengan Bahasa Fortran IV . Gramedia,Jakarta
4. Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta

	Supporters:	
Supporting lecturer	Feriza Nadiar, S.T., M.T. Puguh Novi Prasetyono, S.Pd., 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 understand logically the concepts of mathematical applications in computer programming.	1. Explain the purpose of using computer applications in solving mathematics and civil engineering problems. 2. Explains the concept of logical thinking in mathematics and numbers.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities	- Presentation-Lecture 2 X 50		**Material:** Discuss how to understand mathematical solutions using computer programming based on the book An Introduction to Numerical Analysis. **References:** *Atkinson, Kendal E. 1978. An Introduction to Numerical Analysis. Toronto: John Wiley & Sons* **Material:** Discuss how to understand mathematical solutions using computer programming based on the book An Introduction to Numerical Analysis. **References:** *Atkinson, LV, Harley, PJ 1983. An Introduction to Numerical Methods with Pascal. Tokyo :Addison-Wesley Publishing Co*	5%

2	Students are able to understand logically the concepts of mathematical applications in computer programming.	1. Explain the purpose of using computer applications in solving mathematics and civil engineering problems. 2. Explains the concept of logical thinking in mathematics and numbers.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Tests	- Presentation- Lecture 2 X 50		**Material:** Discuss how to understand mathematical solutions using computer programming based on the book An Introduction to Numerical Analysis. **References:** *Atkinson, Kendal E. 1978. An Introduction to Numerical Analysis. Toronto: John Wiley & Sons* **Material:** Discuss how to understand mathematical solutions using computer programming based on the book An Introduction to Numerical Analysis. **References:** *Atkinson, LV, Harley, PJ 1983. An Introduction to Numerical Methods with Pascal. Tokyo :Addison-Wesley Publishing Co*	5%
3	Students are able to understand numerical concepts and errors in mathematical applications, inherent errors, relative errors and absolute errors.	1. Explain the concept of logic in numerical. 2. Explain the logical concepts of inherent, relative and absolute error. 3. Can apply the concept of error logic to mathematics.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities	- Presentation- Lecture 2 X 50		**Material:** Introduction to the concept of reasoning in mathematics and numericals. **References:** *Atkinson, Kendal E. 1978. An Introduction to Numerical Analysis. Toronto: John Wiley & Sons*	5%
4	Students are able to understand the function of flowcharts and create algorithms from flowcharts to identify cases of civil engineering problems.	1. Understand the function of the flowchart parts. 2. Using flowcharts to create a problem solution. 3. Explains how to create an algorithm from a flowchart.	**Criteria:** Full marks are obtained if the work report is sequential, clear, well presented, and can answer participants' questions well **Form of Assessment** : Participatory Activities	Introduction to flowcharts and algorithms. 2 X 50		**Material:** Discuss and explain the functions and parts of a flowchart and create an algorithm from the flowchart based on an introductory computer programming book. **References:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming Using Fortran IV. Gramedia, Jakarta*	5%

5	Students get to know several computer programming software and their advantages.	1. Explain the function and purpose of computer programs. 2. Explain the advantages and disadvantages of computer programming.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities	- Presentation - Group discussion - Case study 2 X 50		**Material:** Introduction to computer programming software applications **Reference:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming Using Fortran IV. Gramedia, Jakarta*	5%
6	Students are able to understand the syntax of Fortran software in the form of arithmetic calculations, keywords and writing formats in Fortran.	1. Explain the syntax in Fortran. 2. Explain the function of syntax operations in Fortran.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities	- Presentation- Lecture 2 X 50		**Material:** Introduction to syntax in the Fortan program **Reader:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
7	Students are able to understand and operate IF-END (logical expression), IF-THEN - END IF in the Fortran program.	- Explain the function of Logical IF. - Provide examples of Logical IF operations.	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practices / Performance	- Presentation - Group discussion - Case study 2 X 50		**Material:** Logical IF Operations in Fortran **Reader:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
8	Master the material from meetings 1 - 7 by taking the midterm exam (UTS)	Complete UTS questions on time and get maximum marks	**Form of Assessment** : Test	2 X 50			15%
9	Students are able to understand and operate the DO and LOOPING DO syntax in the Fortran program.	1. Explain the function of DO and LOOPING DO. 2. Provide examples of DO and LOOPING DO operations.	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Forms of Assessment** : Participatory Activities, Practical Assessment, Practical / Performance	- Presentation - Group discussion - Case study 2 X 50		**Material:** DO Operations and DO Looping in Fortran **Reference:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming with Fortran IV. Gramedia, Jakarta* **Material:** DO Operations and DO Looping in Fortran **Library:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
10	Students are able to understand and operate ARRAY and DIMENSION syntax in the Fortran program	1. Explain the function of ARRAY and DIMENSION. 2. Provides examples of ARRAY and DIMENSION operations.	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Tests	- Presentation - Group discussion - Case study 2 X 50		**Material:** ARRAY and DIMENSION Operations in Fortran **Reference:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming in Fortran IV. Gramedia, Jakarta*	5%

11	Students are able to understand and operate the GOTO syntax in the Fortran program	1. Explain the function of GOTO. 2. Provides an example of a GOTO operation.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Practice/Performance	- Presentation - Group discussion - Case study 2 X 50		**Material:** GOTO Operation in Fortran **Reference:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
12	Students are able to understand and operate the GOTO syntax in the Fortran program	1. Explain the function of GOTO. 2. Provides an example of a GOTO operation.	**Criteria:** Full marks are obtained if you do all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Practice/Performance	- Presentation - Group discussion - Case study 2 X 50		**Material:** GOTO Operation in Fortran **Reference:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
13	Students are able to operate LOOPING DO and ARRAY syntax in the Fortran program	Provides an example of the combined operation of LOOPING DO and ARRAY	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Practical Assessment	- Presentation - Group discussion - Case study 2 X 50		**Material:** DO and ARRAY Looping Operations in Fortran **Reference:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming with the Fortran IV Language. Gramedia, Jakarta*	5%
14	Students are able to operate LOOPING DO and ARRAY syntax in the Fortran program	Provides an example of the combined operation of LOOPING DO and ARRAY	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Form of Assessment** : Participatory Activities, Practical Assessment	- Presentation - Group discussion - Case study 2 X 50		**Material:** DO and ARRAY Looping Operations in Fortran **Reader:** *Nasution, Amrinsyah. 1987. FORTRAN 77 . Erlangga, Jakarta*	5%
15	Students are able to operate the SUBROUTINE syntax in the Fortran program.	1. Explain the function of SUBROUTINE. 2. Provides an example of a SUBROUTINE operation.	**Criteria:** Full marks are obtained if you practice all the questions correctly and correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment, Practical / Performance	- Presentation - Group discussion - Case study 2 X 50		**Material:** SUBROUTINE Operations in Fortran **Reference:** *Djojodihardjo, H., Sudarmo, MS 1985. Introduction to Programming in Fortran IV. Gramedia, Jakarta*	5%
16			**Form of Assessment** : Test	2 X 50			15%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	44.59%
2.	Project Results Assessment / Product Assessment	2.92%
3.	Practical Assessment	7.92%
4.	Practice / Performance	9.59%
5.	Test	35%
		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.