SEMESTER LEARNING PLAN

Courses		CODE	Course Family		Credit Weight			SEMESTER	Compilation Date
Economic math		8721103030			**T=3**	**P=0**	**ECTS=4.77**	2	July 19, 2024

AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator
	....		....	Dr. Tri Sudarwanto, S.Pd., MSM.

Learning model	**Project Based Learning**

Program Learning Outcomes (PLO)	PLO study program that is charged to the course	
	PLO-8	PLO-S4 Able to demonstrate a responsible attitude for achieving work results both individually and in groups
	PLO-10	Able to make appropriate decisions to solve problems in the educational and scientific fields of Commerce (Business and Marketing) based on information and data analysis by utilizing technology and information
	Program Objectives (PO)	
	PO - 1	Demonstrate a responsible attitude towards work independently and in groups
	PO - 2	Formulate and operate basic mathematical concepts in solving economic problems
	PO - 3	Utilizing information technology in solving economic problems procedurally
	PO - 4	Solving economic problems using a mathematical approach
	PLO-PO Matrix	

P.O	PLO-8	PLO-10
PO-1		
PO-2		
PO-3		
PO-4		

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																

Short Course Description	Understanding the use of mathematics in the field of economics which includes: understanding the function and supply and demand curves of market balance, the effect of taxes and subsidies on market balance, break even points, calculation of national income, single and partial differential functions, elasticity, marginal value, indefinite integrals and certain integrals, as well as consumer and producer surplus. Course Description Understanding of the use of mathematics in economics which includes: understanding the function and supply and demand curves of the market balance, the effect of taxes and subsidies on the market balance, break even points, calculation of national income, single and partial differential functions, elasticity, marginal value, indefinite integral and certain integrals, as well as consumer and producer surplus.

References	**Main :**
	1. Bumulo, Hussain., Mursito, Djoko. 2011. Matematika untuk Ekonomi dan Aplikasinya. Bayumedia Publishing 2. Dumairy. 2010.Matematika Terapan untuk Bisnis dan Ekonomi.edisi ketiga.Yogyakarta:BPFE 3. Kalangi, Josep Bintang. 2014.Matematika Ekonomi & Bisnis edisi ke-3. Jakarta: Salemba Empat 4. Sarjono, Haryadi. dan Sanny, Lim 2012. Aplikasi Matematika Untuk Bisnis Dan Manajemen. Jakarta: Salemba Empat
	Supporters:

Supporting lecturer	Dwi Yuli Rakhmawati, S.Si., M.Si., Ph.D. Septyan Budy Cahya, S.Pd., M.Pd. Putri Hestiningrum, M.Pd.						
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	analyzing series and their application in economics	1.able to understand geometric series 2.able to calculate and analyze business developments 3.able to calculate arithmetic series 4.able to calculate and analyze compound interest and population growth	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	Reading literature and listening to explanations, counting case examples, and peer discussions 3 X 50		**Material:** 1. Understanding geometric series 2. Understanding arithmetic series 3. Simple interest 4. Compound interest 5. Business development 6. Population growth projections **References:** _Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat_	3%
2	analyzing series and their application in economics	1.able to understand geometric series 2.able to calculate and analyze business developments 3.able to calculate arithmetic series 4.able to calculate and analyze compound interest and population growth	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	Reading literature and listening to explanations, counting case examples, and peer discussions 3 X 50		**Material:** 1. Understanding geometric series 2. Understanding arithmetic series 3. Simple interest 4. Compound interest 5. Business development 6. Population growth projections **References:** _Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat_	3%
3	Identifying the elements and forms of linear functions, compiling linear functions, calculating the values of linear function variables.	1.know the types of functions 2.able to understand the form of linear functions 3.able to compose linear function equations	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	reading literature and listening to explanationsreading literature and listening to explanations, counting case examples and practicing 3 X 50 questions		**Material:** 1. Types of functions 2. Forms of linear functions 3. Equations of linear functions **References:** _Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat_	3%

| 4 | applying linear functions in economics | 1. able to construct demand and supply functions 2. able to calculate market equilibrium prices and quantities 3. able to calculate and analyze market balance after taxes and subsidies 4. able to calculate and analyze cost, revenue, profit, loss and breakevent functions 5. able to calculate sewera and analyze the functions of consumption, savings and investment 6. able to calculate and analyze transfer, tax and import functions 7. able to calculate and analyze national income | **Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests | reading literature and listening to explanations, calculating case examples, and practicing 3 X 50 questions | | **Material:** 1. Demand function 2. Supply function 3. Market balance 4. Market balance after taxes and subsidies 5. Cost function 6. Total revenue 7. Total cost 8. Break event point **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat* | 3% |

| 5 | applying linear functions in economics | 1. able to construct demand and supply functions
2. able to calculate market equilibrium prices and quantities
3. able to calculate and analyze market balance after taxes and subsidies
4. able to calculate and analyze cost, revenue, profit, loss and breakevent functions
5. able to calculate sewera and analyze the functions of consumption, savings and investment
6. able to calculate and analyze transfer, tax and import functions
7. able to calculate and analyze national income | **Criteria:** Writing test

Form of Assessment : Participatory Activities, Tests | reading literature and listening to explanations, calculating case examples, and practicing
3 X 50 questions | | **Material:** 1. Demand function 2. Supply function 3. Market balance 4. Market balance after taxes and subsidies 5. Cost function 6. Total revenue 7. Total cost 8. Break event point
References: *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat* | 3% |
| 6 | Applying linear functions in macroeconomics | 1. able to calculate and analyze market balance after taxes and subsidies
2. able to calculate and analyze cost, revenue, profit, loss and breakevent functions
3. able to calculate sewera and analyze the functions of consumption, savings and investment
4. able to calculate and analyze transfer, tax and import functions
5. able to calculate and analyze national income | **Criteria:** Writing test

Form of Assessment : Participatory Activities, Tests | reading literature and listening to explanations, calculating case examples, and practicing
3 X 50 questions | | **Material:** 1. Functions of consumption, savings and investment 2. Functions of transfers, taxes and imports 3. National income
References: *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat* | 3% |

7	Applying linear functions in macroeconomics	1. able to calculate and analyze market balance after taxes and subsidies 2. able to calculate and analyze cost, revenue, profit, loss and breakevent functions 3. able to calculate sewera and analyze the functions of consumption, savings and investment 4. able to calculate and analyze transfer, tax and import functions 5. able to calculate and analyze national income	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	reading literature and listening to explanations, calculating case examples, and practicing 3 X 50 questions		**Material:** 1. Functions of consumption, savings and investment 2. Functions of transfers, taxes and imports 3. National income **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	5%
8	Midterm exam	1. Calculate and analyze compound interest and population growth 2. Calculate and analyze cost, revenue, profit, loss and breakeven functions. 3. Calculate and analyze national income	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	3 X 50		**Material:** 1. Calculating and analyzing compound interest and population growth 2. Calculating and analyzing the functions of costs, revenues, profits, losses and breakevens 3. Calculating and analyzing national income **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	20%

9	analyze the form of non-linear functions and their application in economics	1. able to analyze non-linear functions 2. able to analyze non-linear supply and demand functions 3. able to calculate and analyze market balance for non-linear functions 4. able to calculate and analyze market balance after taxes and subsidies for non-linear functions 5. able to calculate and analyze cost, revenue, BE functions for non-linear functions	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Non-linear functions 2. Non-linear supply and demand functions 3. Non-linear market balance 4. Market balance after taxes and subsidies for non-linear functions 5. Cost function, total revenue, and break even point **References:** *Kalangi, Josep Star. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	3%
10	analyze the form of non-linear functions and their application in economics	1. able to analyze non-linear functions 2. able to analyze non-linear supply and demand functions 3. able to calculate and analyze market balance for non-linear functions 4. able to calculate and analyze market balance after taxes and subsidies for non-linear functions 5. able to calculate and analyze cost, revenue, BE functions for non-linear functions	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Non-linear functions 2. Non-linear supply and demand functions 3. Non-linear market balance 4. Market balance after taxes and subsidies for non-linear functions 5. Cost function, total revenue, and break even point **References:** *Kalangi, Josep Star. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	5%

11	analyze the rule of differentiation and its application in economics	1. able to show differential rules 2. able to calculate and analyze the elasticity of demand, supply and production 3. able to calculate margin costs, marginal revenue and marginal product 4. able to calculate the optimum value (maximum profit, minimum total cost, maximum revenue)	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Differential rule 2. Elasticity of demand and supply 3. Marginal cost, marginal revenue, and marginal product 4. Optimum value **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	3%
12	analyze the rule of differentiation and its application in economics	1. able to show differential rules 2. able to calculate and analyze the elasticity of demand, supply and production 3. able to calculate margin costs, marginal revenue and marginal product 4. able to calculate the optimum value (maximum profit, minimum total cost, maximum revenue)	**Criteria:** Writing test **Form of Assessment** : Test	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Differential rule 2. Elasticity of demand and supply 3. Marginal cost, marginal revenue, and marginal product 4. Optimum value **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	5%

13	analyze the rules of partial and integral differentiation and their application in economics	1. able to understand the partial differential rule 2. able to calculate and analyze maximum and minimum functions 3. able to calculate the Lagrange function 4. able to calculate and analyze cross elasticity 5. able to calculate and analyze the maximum profit of 2 types of goods 6. able to calculate and analyze the balance of production and consumption 7. able to understand integral rules 8. able to calculate and analyze consumer and producer surplus	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Partial differential 2. Maximum and minimum functions 3. Lagrange function 4. Cross elasticity 5. Maximum profit from 2 types of goods 6. Balance of production and consumption **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	3%
14	analyze the rules of partial and integral differentiation and their application in economics	1. able to understand the partial differential rule 2. able to calculate and analyze maximum and minimum functions 3. able to calculate the Lagrange function 4. able to calculate and analyze cross elasticity 5. able to calculate and analyze the maximum profit of 2 types of goods 6. able to calculate and analyze the balance of production and consumption 7. able to understand integral rules 8. able to calculate and analyze consumer and producer surplus	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Partial differential 2. Maximum and minimum functions 3. Lagrange function 4. Cross elasticity 5. Maximum profit from 2 types of goods 6. Balance of production and consumption **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	3%

15	Analyze integral rules and apply them in economics	1. Calculating integrals 2. Calculate and analyze consumer and producer surplus	**Criteria:** Writing test **Form of Assessment** : Participatory Activities, Tests	Read literature and listen to explanations, count case examples, and practice 3 X 50 questions		**Material:** 1. Integral 2. Consumer and producer surplus **References:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	5%
16	Final exams	UAS	**Criteria:** Writing test **Form of Assessment** : Participatory Activities	UAS 3 x 50		**Material:** UAS **Literature:** *Kalangi, Josep Bintang. 2014. Economics & Business Mathematics 3rd edition. Jakarta: Salemba Empat*	30%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	79.5%
2.	Test	20.5%
		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.