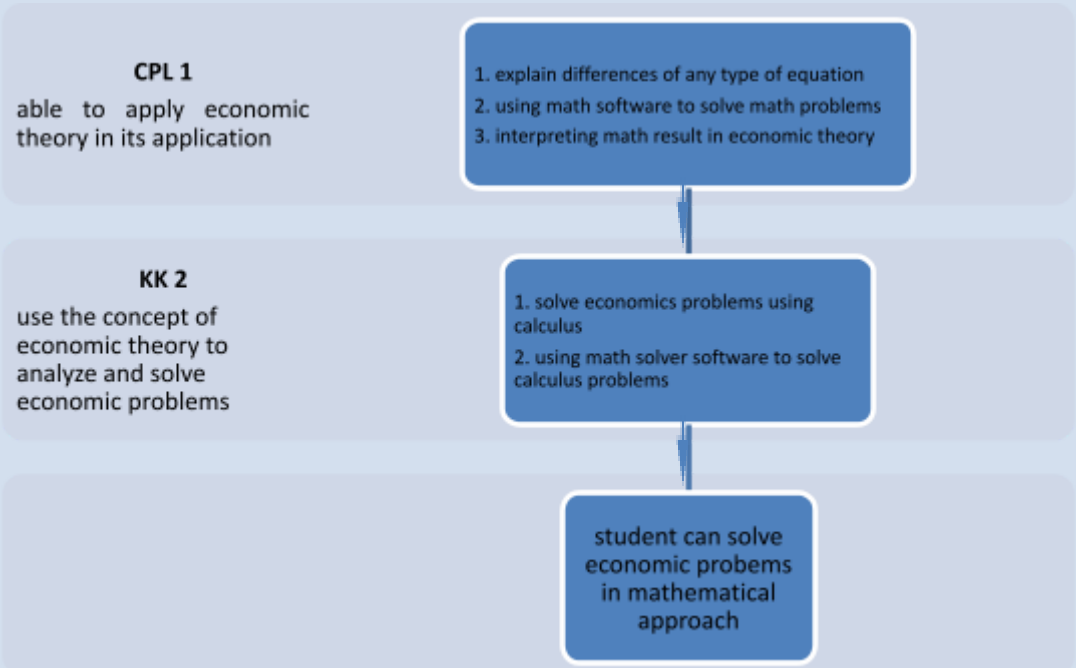
1. COURSE IDENTITY			
Subject	Mathematics for Economics and Business		
Faculty	Business and Economics	**Study Program**	Accounting
Code	31208321	**Credits**	3
Group	Compulsory Subjects	**Intake**	Compulsory
Semester	1	**Availability**	Odd Semesters
Methods	In Class	**Media**	Blended
Subject Category/ Block	Economics	**Prerequisite**	
Lecturer			

2. COURSE LEARNING OUTCOME						
	LO		**CLO**	**Indicators**	**Assessment / Evaluation**	**Weight**
GLO 1	Solve economic problems with a mathematical approach	CLO 1	Able to explain the type of function and the application of linear functions in a set of economics problems. Sub CLO1 A– Able to explain functions types and difference Sub CLO1 B – Able to describe various types of functions Sub CLO1 C – using linear approach and linear function graphics in applied economics. Sub CLO1 D – able to interpret the result of the linear set calculation in the economics theory	After finishing the course, the students are expected to be able to: a. Determine the slope of linear functions and tangents of nonlinear functions with graphical analysis. b. Calculate the demand, supply, price of items, balance and the effect of taxes and subsidies on the market balance from linear and quadratic equations. c. Make an equation in the form of linear functions and determine the total cost, total income, break even point analysis and national income.	Regular assignment and Written Exam	40%

				d. Determine and describe the graph of the objective function and constraint functions for the regions that are possible with existing constraints		
CPL1	Solve economic problems with a mathematical approach	CPMK 2	SubCP2A – able to calculate simple interest rate and compound interest rate SubCP2 B– able to calculate present value effective interest SubCP3 C – able to calculate annuity	Able to calculate interest rate, present value and annuity correctly		
KK 2	Able to use economic theory concepts to analyze and solve economic problems.		After completing the course, the students are able to apply differential functions to solve economic problems. Sub CLO3 A – able to solve differential equation Sub CLO3 B – able to solve a set of economic equations using differential approach. Sub CLO3 C - Sub CLO3D – able to use mathematical software to solve differential applications.	Able to apply differential function to solve economic problems correctly		
KU8	Able to carry out the self-evaluation process of the work group under their responsibility and able to manage learning independently.	CP 3	Students can solve economic problems in mathematical approach	Student can solve economic problems in mathematical approach	Case study completion presentation	20%

3. MAP OF LEARNING ACHIEVEMENT ANALYSIS



4. Learning Experience and References

Learning Experience	Students gain learning experience through assignments as follows: • Summarize in detail the rules in mathematical economics • Carry out online quizzes about differentials • Draw graphics and changes using software. • Understand the theory of micro, macro and applied economics
References	[1] Ian Jacques, 2018, *Mathematics for Economics and Business*, Ninth edition. Pearson Educational Limited [2] Frensidy, Budi, 2008, Matematika Keuangan, Jakarta: Salemba Empat [3] Budnick, 1993, *Applied Mathematical for Business, Economic and Social Sciences*, Mc Graw-Hill, Singapore.

5. Details of Learning Activities

Meeting	CLO/ Sub-CLO	Topic/Sub topic	Method/Learning Model	Implementation	References
1	Basic Competence	The Scope of Mathematics for Economics	TM : Lecturers discuss class regulations with students. The lecturer explains the basic		1,3

			knowledge about the study of economic mathematics through the lecture method. PT : Lecturers distribute pre-tests regarding basic rules of arithmetic and algebra to be done and submitted through the classroom. AM : The lecturer informs the link to download the self-learning module.		
2	CLO 1 SUB A SUB B	Function	TM : The class is divided into several groups. The students who get the pre-test best score become the leader of the group. The lecturer explains about functions and the application in economics. PT : Students do the assignment manually especially about the linear function and its explanation using graphs. AMD : The lecturers inform the link to download Maple application.		1,3
3	CLO 1 SUB 1C	The application of linear function in Economy.	TM : The lecturer and the students discuss the assigned tasks. The students are asked to explain their understanding of the video about the simultaneous linear equation, demand and supply function, market balance, government policy (tax and subsidy) in demand and supply function. PT : Students are asked to do the tasks referring to the given video. AMD : The lecturer evaluates the use of Excel and Maple.		1,3
4	CLO 2 SUB 1 D		TM : The lecturer explains the problem solving of the two- item market balance problem,		1,3

			Concept of Consumption, Savings, National income, and Disposable income PT: Students complete the assignments of the application of linear function in economy using Software. AM: The lecturer gives case studies about economic problems which should be discussed by the group and presented in front of the class in the following meeting.		
5	CLO 2 SUB A		TM : The lecturer discusses the quadratic functions, and non-linear function application in supply and demand function, and also in market balance. PT : The students are assigned to do the assignment which is submitted in google classroom by the specified time. AMD : The lecturer informs the video link through google classroom.		1,3
6	CLO 2 SUB 1B		TM The lecturer explains the government policy (tax and subsidy) towards the market balance, total revenue, total cost, and BEP PT ● Students are assigned to do non-linear function application tasks. AMD ● Students are asked to learn the main materials of the following discussion which is graphics optimization from the module or given reference.		1,3
7	CLO 2 SubCP C SubCP D	Graphics Optimization	TM The lecturer explains the objective function equation, the constraint function equation and draws the graph of the constraint		1,3

			function and determines the appropriate area with the constraint function PT Students are assigned to work on graphic optimization analysis exercises		
8	ELO12	Competence test	TM Students work on written tests about linear function, non-linear functions, and graphic optimization.		1,3
9	CLO 2 SUB B, C	Mathematics of finance	Review on exam result Lecturers explain scale factors associated with percentage changes and index number. In addition, the lecturer also explains adjusting value data for inflation. PT Student work out on percentage changes and adjust value data for inflation		2
10			TM The lecturer explains the basic analysis using arithmetic and geometric series in finance mathematics. PT Students are assigned to do the mathematics exercises which consist of economic mathematics including NPV, compound interest and growth rates. AMD Students seek examples of the application of financial mathematics in everyday life through online media. Students are asked to study the next subject matter, which is about a simple differential in the module or reference book that has been given		2
11	CLO 3 SUB A	Differentiation	TM The lecturer explains the definition of differential and marginal cost and marginal revenue with a differential approach ending with profit maximization. PT Students do simple differential exercises.		1

			AMD Students are asked to study the next materials, which is about applying differentials in the analysis of elasticity and Keynesian multiplier.		
12	CLO 3 SUB B		TM • The lecturer explains demand elasticity, supply elasticity and production elasticity and Keynesian Multiplier • Students continue to work on exercises about elasticity and Keynesian multiplier and draw conclusions PT• Students are assigned to work on the elasticity and Keynesian multiplier exercises and draw conclusions AMD • Students are asked to study the materials, which is about Unconstrained optimization		1
13	CLO 3 SUB B	*Unconstrained optimization*	TM Lecturers explain First-order conditions for maximization and minimization. Second order conditions for maximization and minimization, and profit maximization about mathematical models of assignment models. PT Students are assigned to work on unconditional optimization exercises. AMD Students are given a link to the video learning about profit maximization.		1
14	CLO 3 SUB C		TM Students present the materials from the video. The lecturer assesses the presentation and Dosen menilai presentasi and creates the same perception of the learning video. PT Students are assigned to do profit maximization exercises.		1

			AMD Students are given the task to complete profit maximization exercises with software. Students are assigned to study the next material about compound differentials		
15	CLO 3 SUB C	Compound Differential	TM The lecturer explains partial differentiation and marginal product. The lecturer explains the application of partial differential. The lecturer explains the derivative to two partial differentials. PT Students discuss compound differentials exercises. AMD Students are encouraged to learn the next material by creating resumes about unconstrained optimization: functions with two variables and total differential and total derivatives,		
16	ELO9	Competence Test	TM Students do written tests on mathematics of finance and application of calculus in economics.		

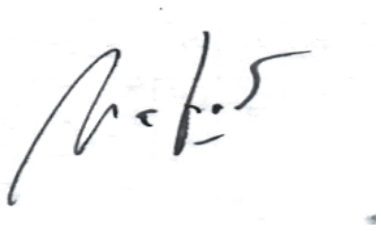
6. Assessment and Evaluation System

Assessment System

The Benchmark for Assessment Reference of this course employs assessment criteria and weights in accordance with the Rector's Decree No. 5/PR/Rek/BPA/III/2014 Article 12:

Total	Grade	Total	Grade
> 80,00	A	62,50 – 64,99	C+
77,50 – 79,99	A-	60,00 – 62,49	C
75,00 – 77,49	A/B	55,00 – 59,99	C-
72,50– 74,99	B+	50,00 – 54,99	C/D
70,00 – 72,49	B	45,00 – 49,99	D+
67,50 – 69,99	B-	40,00 – 44,99	D
65,00 – 67,49	B/C	< 40	E

Evaluation System	Each student must obtain at least C value / predicate for each CLO. If it has not been fulfilled, the student is required to carry out an examination / remedial test for the related CLO.

Date:	Date:	Date :
Validated by the Head of Study Program	Checked by Subject Group Coordinator	Prepared by Instructor
		
Dr. Mahmudi, S.E., M.Si., Ak, CMA		