SEMESTER STUDY PLAN
COMPLEX FUNCTION 1
(COMPULSORY COURSE)
(Case-Based Method)

DEPARTMENT OF MATHEMATICS AND DATA SCIENCE
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS ANDALAS
2024

SEMESTER STUDY PLAN (SSP)
BACHELOR PROGRAM OF MATHEMATICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS ANDALAS

Course Name	Course Code	URL *I-Learn*	Credits	Semester	Compilation Date
Complex Function 1	MAT61123	https://sci.ilearn.unand.ac.id	2	3	15 May 2024

	Study Plan Creator	Head of Research Group	Head of Study Program
Person In Charge	Zulakmal, M.Si Efendi, M.Si Dr. Haripamyu Dr. Shelvi Ekariani	Dr. Haripamyu	Dr. Noverina Alfiany

	Intended Learning Outcomes	
Intended Learning Outcomes (ILO) and Performance Indicator (PI)	ILO-2	Possesses profound knowledge of the basic concept mathematics PI-1: An ability to explain basic mathematical concepts PI-2: An ability to provide examples that are relevant to basic mathematical concepts PI-3: An ability to determine solutions to simple problems using basic mathematical concepts
	ILO-3	An ability to identify, explain and generalize simple mathematical PI-1: An ability to identify simple mathematical problems PI-2: An ability to explain simple mathematical problems
	ILO-4	An ability to use concept and fundamental technique of mathematics in solving simple mathematical problems. PI-1: Able to choose the right basic mathematical concepts and techniques in solving simple math problems; PI-2: Able to illustrate simple mathematical problems based on appropriate basic mathematical concepts and techniques; PI-3: Able to solve simple mathematical problems using appropriate basic mathematical concepts and techniques.

	Course Learning Outcomes	
	1	Students are able to define complex numbers
	2	Students can identify, explain and generalize problems that require the concept of complex numbers
	3	Students can understand the concepts of limits and continuity
	4	Students can understand the concepts of analytic function.
	5	Students can apply the concepts of limits and continuity as well as analytical functions correctly
	6	Students can explain concepts related to complex numbers orally and in writing
Brief Description	In general, the course studies complex numbers, roots of complex numbers, limits and continuity, the Cauchy-Riemann equation, analytical functions, original exponential and logarithmic functions, inverse trigonometric functions and hyperbolic inverses, each of which is applied. The output of this course is that students are able to operate complex numbers, find the roots of complex numbers and solve equations on original exponential and logarithmic functions, trigonometric inverse and hyperbolic inverse functions involving complex numbers.	
Course Materials	1. Complex numbers 2. Root of complex number 3. Limit and continuity 4. Cauchy- Riemann equation 5. Analytic function 6. Exponential function 7. Natural logarithmic inverse of trigonometric function and inverse of hyperbolic function with their applications.	
References	**Main**	
	1. Churchill, R, 1899, *Complex Variable and Applications*, McGraw-Hill. 2. Saff, E.B.,2003. *Fundamentals of Complex Analysis with Applications to Engineering and Science*. Printice Hall.	
	proponent	
	1. Spiegel,R, *Peubah Kompleks,* (terjemahan Koko Martono, Gelora Aksara Pratama) 2. John-M.-Howie-Complex-Analysis-Springer-Undergraduate-Mathematics-Series-Springer-2007	
	Software:	**Hardware:**

Learning Media	• LMS Unand (http://fmipa.ilearn.unand.ac.id/) • Whatsapp	• computer/Laptop • Smartphone
Team Teaching	Zulakmal, M.Si Efendi, M.Si Dr. Haripamyu Dr. Shelvi Ekariani	
Assessment	1. Tasks : 10% 2. Quiz : 20 % 3. Mid Semester : 35% 4. Final Semester : 35% **Formative Assessment**: 1. Thumb up and thumb down 2. Minutes paper	
Required courses	1. MAT61121 Calculus 1; 2. MAT62121 Calculus 2	
Academic Norms	https://akademik.unand.ac.id/images/2022-03-30%20Peraturan%20Rektor%20Nomor%207%20Tahun%202022%20Penyelenggaraan%20Pendidikan-khusus%20Bab%20II.pdf	

Weekly Study Plan:

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
1	Students are able to define complex numbers. (ILO-2; PI-1) Students are able to identify decision-making problems that require complex number concepts. (ILO-3; PI-1, PI-2) Students are capable apply the concept complex numbers appropriately. (ILO-4; PI-1; ILO-3,PI-2)	Accuracy in defining complex numbers Accuracy in identifying decision making problems that require complex number concepts Accuracy in applying the concept of complex numbers	* Mid Semester (5%)	- Studying; Introduction to RPS. - Explanation of tasks and group division task. - The lecturer provides several case examples related to the lecture material on complex numbers. - The lecturer asks questions that make students think about how to solve the given case. - Student groups are asked to look for their own cases that are related to complex numbers and solve them this problem in the group each. - - Discussion and Questions - Answer lecture material - and tasks [1 x 2 x 50 minutes]	Students look for references and study about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	Complex Numbers and their applications.	6%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
2	Students are able to analyze the results of calculations in group assignments related to cases of complex numbers. (ILO-4; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving problems decision making with complex numbers. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to complex numbers. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases of complex numbers. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems with complex numbers Accuracy in communicating verbally and in writing about related material complex numbers	Group Report Mid Semester (5%)	●Group presentations ●Discussion and Q&A on lecture material and group assignments ● [1 x 2 x 50 minutes]	Students look for references and learn about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	Complex Numbers and their applications.	7%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
3	Students are able to define the roots of complex numbers. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concept of roots of complex numbers. (ILO-3; PI-1, PI-2) Students are capable apply the concept of roots of complex numbers appropriately. (ILO-3; PI-1; CP-4,PI-2)	Accuracy in defining roots of complex numbers. Accuracy in identifying decision making problems that require the concept of complex number roots. Accuracy in applying the roots of complex numbers.	Mid Semester (5%)	- Studying; -The lecturer provides several case examples related to the lecture material on roots of complex numbers. - The lecturer asks questions that make students think about how to solve the given case. -Groups of students are asked to find their own cases that are related to the roots of complex numbers and solve them this problem in the group each. - Discussion and questions - Answer lecture material and tasks [1 x 2 x 50 minutes]	Students look for references and study about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	Number roots complex and its application	6%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous *	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
4	Students are able to analyze the results of calculations in group assignments related to cases of roots of complex numbers. (ILO-4; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving problems decision making with roots of complex numbers. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to the roots of complex numbers. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases of roots of complex numbers. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems with complex number roots. Accuracy in communicating verbally and in writing about material related to roots of complex numbers.	Group Report Mid Semester (10%)	Group presentations Discussion and Q&A on lecture material and group assignments [1 x 2 x 50 minutes]	Students look for references and study about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	Roots of complex numbers and their applications	7%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
5	Students are able to define limits and continuity. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concepts of limits and continuity. (ILO-3; PI-1, PI-2) Students are able to apply the concepts of limits and continuity appropriately. (ILO-4; PI-1; ILO-4,PI-2)	Accuracy in defining limits and continuity. Accuracy in identifying decision making problems that require the concept of limits and continuity. Accuracy in applying the concept of limits and continuity.	* Mid Semester (5%)	- Studying; The lecturer gave several case examples related to lecture material on the topic of limits and continuity. - The lecturer asks questions that make students think about how to solve the given case. -Groups of students are asked to look for their own cases that are related to limits and continuity and solve them these problems in each group. - Discussion and Q&A on lecture materials and assignments [1 x 2 x 50 minutes]	Students look for references and learn about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	Limits and continuity and their applications	5%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
6	Students are able to analyze the results of calculations in group assignments related to cases of limits and continuity. (ILO-4; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving problems decision making with limits and continuity. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to limits and continuity. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases of limits and continuity. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems with limits and continuity. Accuracy in communicating verbally and in writing about material related to limits and continuity.	Group Report • Mid Semester (10%)	Group presentations Discussion and Q&A on lecture material and group assignments [1 x 2 x 50 minutes]	Students look for references and study about lecture material • [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Limits and continuity and their applications.	6%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous *	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
7	Students are able to define the Cauchy-Riemann equation. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concept of the Cauchy-Riemann equation. (ILO-3; PI-1, PI-2) Students are able to apply the concept of the Cauchy-Riemann equation correctly. (ILO-4; PI-1; ILO-4,PI-2)	Accuracy in defining the Cauchy-Riemann equation. Accuracy in identifying decision making problems that require the concept of the Cauchy-Riemann equation. Accuracy in applying the concept of the Cauchy-Riemann equation.	* Mid Semester (5%)	- Studying; The lecturer gave several case examples related to the Cauchy-Riemann equation lecture material - The lecturer asks questions that make students think about how to solve the given case. -Groups of students are asked to look for their own cases that are related to the Cauchy-Riemann equation and solve them these problems in each group. - Discussion and question and answer lecture material and assignments	Students look for references and study about lecture material [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	The Cauchy-Riemann equation and its applications	7%

				[1 x 2 x 50 minutes]				

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		
8	Students are able to analyze the results of calculations in group assignments related to cases of the Cauchy-Riemann equation. (ILO-4; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving problems decision making with the Cauchy-Riemann equation. (ILO-4;PI-1) Students are able to communicate orally and in writing about material related to the Cauchy-Riemann equation. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to the case of the Cauchy-Riemann equation. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems using the Cauchy-Riemann equation Accuracy in communicating verbally and in writing about material related to the Cauchy-	Group Report • Final Semester (10%)	•Group presentations • Discussion and question and answer lecture material and group assignments [1 x 2 x 50 minutes]	Students look for references and learn about lecture material [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and task to be carried out. * [1 x 2 x 60 minutes]	The Cauchy-Riemann equation and its applications.	7%

		Riemann equation						

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		

9	Students are able to define analytical functions. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concept of analytical functions. (ILO-3; PI-1, PI-2) Students are able to apply the concept of analytical functions correctly. (ILO-3; PI-1; ILO-4; PI-2)	Accuracy in defining analytical functions. Accuracy in identifying decision making problems that require the concept of analytical functions. Accuracy in applying the concept of analytical functions.	* Final Semester (5%)	- Studying; The lecturer gave several case examples related to the analytical function lecture material. - The lecturer asks questions that make students think about how to solve the given case. - Student groups are asked to look for their own cases that are related to the analytical function and solve these problems in their respective groups. - Discussion and questions and answers about lecture materials and assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material. [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Its analytical and applied functions.	5%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		

10	Students are able to analyze the results of calculations in group assignments related to cases of analytical functions. (ILO-2; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving decision-making problems with analytical functions. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to analytical functions. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases using analytical functions. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems with analytical functions. Accuracy in communicating verbally and in writing about material related to analytical functions..	Group Report • Final Semester (10%)	•Group presentation •Discussion and question and Answer lecture material and group assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material . [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Its analytical and applied functions.	7%

Week / Meet (1)	**Course Outcomes (2)**	**Indicator (3)**	**Assessment (4)**	**Activities/Forms of Learning [Time estimated]**			**Subject, references (10)**	**Weight (11)**
				Synchronous*	**Asynchronous****			
				Face to face Offline (5)	**Individual (7)**	**Collaboration (8)**		

11	Students are able to define real exponential and logarithmic functions. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concept of genuine exponential and logarithmic functions. (ILO-3; PI-1, PI-2) Students are able to apply the concept of original exponential and logarithmic functions correctly. (ILO-3; PI-1; ILO-4,PI-2)	Accuracy in defining original exponential and logarithmic functions. Accuracy in identifying decision making problems that require the concept of original exponential and logarithmic functions. Accuracy in applying the original exponential and logarithmic function concepts.	* Final Semester (5%)	- Studying; The lecturer gave several case examples related to lecture material on the topic of exponential functions and original logarithms - The lecturer asks questions that make students think about how to solve the given case. -Groups of students are asked to look for their own cases that are related to the original exponential and logarithmic functions and solve these problems in their respective groups. -Discussions and questions and answers about lecture materials and assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material. [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Original and applied exponential and logarithmic functions.	6%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		

12	Students are able to analyze the results of calculations in group assignments related to cases of exponential and logarithmic functions. (ILO-2; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving decision-making problems using original exponential and logarithmic functions. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to real exponential and logarithmic functions. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases of original exponential and logarithmic functions. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems with original exponential and logarithmic functions. Accuracy in communicating verbally and in writing about material related to real exponential and logarithmic functions.	Group Report • Final Semester (5%)	Group presentation Discussion and question and Answer lecture material and group assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material. [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Original and applied exponential and logarithmic functions.	7%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		

13	Students are able to define inverse trigonometric and inverse hyperbolic functions. (ILO-2; PI-1) Students are able to identify decision-making problems that require the concepts of inverse trigonometric and inverse hyperbolic functions. (ILO-3; PI-1, PI-2) Students are able to apply the concepts of inverse trigonometric and inverse hyperbolic functions correctly. (ILO-3; PI-1; ILO-4,PI-2)	Accuracy in defining inverse trigonometric and inverse hyperbolic functions. Accuracy in identifying decision making problems that require the concept of inverse trigonometric and inverse hyperbolic functions. Accuracy in applying the concept of inverse trigonometric and inverse hyperbolic functions.	* Final Semester (10%)	- Studying; The lecturer gave several case examples related to lecture material on the topic of exponential functions and original logarithms - The lecturer asks questions that make students think about how to solve the given case. -Groups of students are asked to look for their own cases that are related to the original exponential and logarithmic functions and solve these problems in their respective groups. -Discussions and questions and answers about lecture materials and assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material. [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Trigonometric inverse and hyperbolic inverse functions and their applications.	6%

Week / Meet (1)	Course Outcomes (2)	Indicator (3)	Assessment (4)	Activities/Forms of Learning [Time estimated]			Subject, references (10)	Weight (11)
				Synchronous*	Asynchronous**			
				Face to face Offline (5)	Individual (7)	Collaboration (8)		

14	Students are able to analyze the results of calculations in group assignments related to cases of inverse trigonometric and inverse hyperbolic functions. (ILO-2; PI-1) Students are able to interpret the data taken and the results of the process of each step in solving problems decision making with inverse trigonometric and inverse hyperbolic functions. (ILO-3;PI-1) Students are able to communicate orally and in writing about material related to inverse trigonometric and inverse hyperbolic functions. (ILO-4; PI-1,2,3)	Accuracy in analyzing calculation results in group assignments related to cases of inverse trigonometric and inverse hyperbolic functions. Accuracy in interpreting the data taken and the process results of each step in solving decision-making problems using inverse trigonometric and inverse hyperbolic functions. Accuracy in communicating verbally and in writing about material related to inverse trigonometric and inverse hyperbolic functions.	Group Report ● Final Semester (10%)	•Group presentation •Discussion and question and Answer lecture material and group assignments. [1 x 2 x 50 minutes]	Students look for references and learn about lecture material. [1 x 2 x 60 minutes]	Students discuss in groups about lecture material and tasks to be carried out. * [1 x 2 x 60 minutes]	Trigonometric inverse and hyperbolic inverse functions and their applications.	6%

Assessment rubric

Assessment at each meeting is related to the following criteria:
a. Accuracy in defining …..*)
b. Accuracy in defining decision-making problems that require concepts *)
c. Accuracy in applying concepts *)

d. Accuracy in analyzing calculation results in group assignments related to cases in ……*)
e. Accuracy in interpreting the data taken and the results of the process of each step in solving decision-making problems with *)
f. Accuracy in communicating verbally and in writing about related material *)

*) Complex numbers, roots of complex numbers, limits and continuity, Cauchy-Riemann equation, analytic functions, original exponential and logarithmic functions,
trigonometric inverse and hyperbolic inverse functions.

Group	**Criterion 1**				**…. Criterion 6**				**FINAL EXAM SCORES**
	4	**3**	**2**	**1**	**4**	**3**	**2**	**1**	
1									
2									
4									
5									
. . .									

Value (i-th criterion) = $\frac{\text{score}}{4} \times 100$, final value of exam……..*) = $\frac{\text{value 1} + \cdots + \text{value 6}}{6}$

Criterion 1:

score	Indicator
4	Presents definitions precisely, clearly and can interpret the meaning well
3	Presenting the definition precisely, clearly, cannot interpret the meaning properly
2	Presents definitions precisely, clearly, and cannot interpret the meaning.
1	Unable to present definitions precisely, clearly.

Criterion 2:

score	Indicator
4	Define decision-making problems that require the concept ……*) correctly, and the reasons can be explained well
3	Define decision making problems that require the concept of..... *) correctly, and the reasons cannot be explained well.
2	Define a decision-making problem that requires the concept of..... *) correctly, and the reasons cannot be explained well.
1	Unable to define decision-making problems that require concepts..... *).

Criterion 3:

score	Indicator
4	Can apply the concept of …….*) correctly, and the reasons can be explained well
3	Can apply the concept …….*) correctly, and the reasons cannot be explained well
2	Can apply the concept of …….*) correctly, and the reasons cannot be explained well
1	Unable to apply concept …….*)

Criterion 4:

score	Indicator
4	Can analyze the results of calculations in group assignments related to cases in ……*) correctly, and the reasons can be explained well
3	Can analyze the results of calculations in group assignments related to cases in ……*) correctly, and the reasons cannot be explained well
2	Can analyze the results of calculations in group assignments related to cases in ……*) correctly, and the reasons cannot be explained well
1	Unable to analyze calculation results in group assignments related to cases on ……*)

Criterion 5:

Skor	Indicato r
4	Can interpret the data taken and the results of the process of each step in solving decision-making problems... *) correctly, and the reasons can be explained well
3	Can interpret the data taken and the results of the process of each step in solving decision-making problems with..... *) correctly, and the reasons cannot be explained well
2	Can interpret the data taken and the results of the process of each step in solving decision-making problems correctly.... *) and the reasons cannot be explained well
1	Unable to interpret the data taken and the results of the process of each step in solving the problem decision making with..... *)

Criterion 6:

score	Indicator
4	Can write reports in accordance with scientific principles and present the results of group work very well on related material ……*)
3	Can write reports in accordance with scientific principles and present the results of group work well on related material……*)
2	Can write reports in accordance with scientific principles and present the results of group work in a concise manner good about related material ……*)
1	Can write reports in accordance with scientific principles and present the results of group work

	very poorly on related material ……*)

Assessment Plan Table:

No.	CLO	Assessment			Weight (%)
		Mid Semester	Final Semester	Group Task (Case Base Method)	
1	Students are able to define complex numbers (ILO-2; PI-1);	5%	5%		10%
2	Students are able to identify decision-making problems that require complex number concepts (ILO-2; PI-1, PI-2);	10%	10%		20%
3	Students are able to apply the concept of complex numbers correctly (ILO-2; PI-1; ILO-3, PI-2)	10%		10%	20%
4	Students are able to analyze the results of calculations in group assignments related to cases of complex numbers. (ILO-4; PI-1);		10 %	15%	25%
5	Students are able to interpret the data taken and the results process each step in solving decision-making problems with complex numbers. (ILO-4,;PI-1,2);			15%	15%
6	Students are able to communicate orally and in writing about material related to complex numbers. (CP-4; PI-1,2,3)			10%	10%
Total		25%	25%	50%	100%