SEMESTER LEARNING PLAN
TOPIC IN COMBINATORICS MATHEMATICS 2
(COMPULSORY COURSE)

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

SEMESTER STUDY PLAN (SSP)
MASTER OF MATHEMATICS PROGRAM
FACULTY OF MATHEMATICS AND NATURAL SCIENCE
UNIVERSITAS ANDALAS

RENCANA PEMBELAJARAN SEMESTER

Course Name	Code	Course URL *i-Learn*	Credits	Semester	DATE
Topic in Combinatorics Mathematics 2	**MAT82153**	https://sci.ilearn.unand.ac.id	3	2	February 24th , 2024

Person in Charge	Create by	Head of Research Group	Head of Master Program
	Dr. Des Welyyanti	Prof. Dr. Syafrizal Sy	Prof. Dr. Ferra Yanuar

Intended Learning Outcomes (ILO) and Course Learning Outcomes (CLO)	Intended L earning Outcomes	
	ILO-3	Comprehensive mastery of one or several theories for development in the fields of analysis, algebra, applied mathematics, statistics and combinatorial mathematics. PI-1 An ability to identify theories used in related mathematical problems. PI-2 An ability to apply theories for advancement in related fields (advanced theory). PI-3 An ability to use advanced theory to solve related mathematical problems.

	ILO-4	Mastering scientific techniques and developing them in solving research problems through multidisciplinary or interdisciplinary approaches. PI-1 An ability to apply mathematical techniques in research problem-solving. PI-2 An ability to analyze research problems. PI-3 An ability to formulate theorems/models and prove their validity. PI-4 An ability to use various mathematical software to solve complex mathematical problems,
	ILO-5	An ability to work and conduct research in the field of mathematics and related fields of science by developing the latest issues independently or collaboratively and communicating them academically. PI-1 Capable of formally and correctly proving mathematical statements. PI-2 An ability to employ relevant techniques for conducting research. PI-3 Capable of communicating research findings in an academic manner.
	Course Learning Outcomes	
	1. Have the understanding about the metric dimension of a graph and determine the metric dimension of a given graph.	
	2. Have the understanding about the partition dimension of a graph and determine the partition dimension of a given graph	
	3. Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph	
Brief description	This course discusses about the metric dimension, partition dimension and locating chromatic number of a graph. This course also gives some newest results related to metric dimension, partition dimension and locating chromatic number.	
Course Materials	1. Connectivity 2. Metric dimension of a graph 3. Partition dimension of a graph 4. Coloring in Graphs: Vertex, edge, and map colorings 1. Vertex-chromatic, edge-chromatic, and locating chromatic number of graphs	
References	**Main:**	

<table>
<tr><td></td><td colspan="2">1. Chartrand, G., Zhang, P., Introduction to Graph Theory, McGraw-Hill, New York, 1st ed, 2005
2. Chartrand, G., Zhang, P., Chromatic Graph Theory, CRC Press, Taylor and Francis Group, New York, 1st ed, 2009
Additional
1. Recent papers in metric dimension, partition dimension, and locating chromatic numbers.</td></tr>
<tr><td rowspan="2">Learning Media</td><td>Software :</td><td>Hardware :</td></tr>
<tr><td>● LMS Unand (http://fmipa.ilearn.unand.ac.id/)
● Zoom meeting
● Whatsapp</td><td>● Komputer/Laptop
● Smartphone</td></tr>
<tr><td>Team Teaching</td><td colspan="2">Dr.Des Welyyanti, Dr Lyra Yulianti</td></tr>
<tr><td>Required courses</td><td colspan="2">MAT82151 Combinatorial Theory</td></tr>
<tr><td>Academic Norms</td><td colspan="2">https://akademik.unand.ac.id/images/2022-03-30%20Peraturan%20Rektor%20Nomor%207%20Tahun%202022%20Penyelenggaraan%20Pendidikan-khusus%20Bab%20II.pdf</td></tr>
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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)	Face to face Online (6)	Individual (7)	Collaboration (8)	Media (9)		
1/1	Review some materials in Graph Theory and Discrete Mathematics	• Discipline in carrying out course contracts • Accurate understanding of related material	Activeness in lectures	Teaching and discussion: - Introduction to SSP - material explanation - task explanation - discussion and question-and-answer lecture material - brief explanation of the final project [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	• PPT • i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video	Assessment Rules, SSP, Syllabus, Tuition Contract Review of some definitions in graph theory	
2/2	**CLO-1** Have the understanding about the metric	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: - material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually	Students discuss in groups about lecture material [1 x	• PPT • i-learn (LMS Unand) Specific condition:	Definition of metric dimension, resolving set and basis	

	dimension of a graph and determine the metric dimension of a given graph					[1 x 3 x 60 minute]	3 x 60 minute]	Zoom meeting, WA group, learning video	Some previous results on metric dimension of graphs	
3/3	**CLO-1** Have the understanding about the metric dimension of a graph and determine the metric dimension of a given graph	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video	Determine the metric dimension of given graphs	
4/4	**CLO-2** Have the understanding about the partition dimension of a graph and determine the partition dimension of a given graph	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	The partition dimension of a connected graph and the resolving partition of a given graph	
5/5	**CLO-2** Have the understanding about the partition dimension of a graph and	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) Specific condition: Zoom meeting, WA	Determine the partition dimension of given connected graphs	

	determine the partition dimension of a given graph							group, learning video)		
6/6	**CLO-2** Have the understanding about the partition dimension of a graph and determine the partition dimension of a given graph	Accurate understanding of related material	Task 1	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	• PPT • i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	The partition dimension of a disconnected graph and the resolving partition of a given graph	10%
7/7	**CLO-2** Have the understanding about the partition dimension of a graph and determine the partition dimension of a given graph	• Accurate understanding of related material • Accuracy in answering assignment questions • Neatness of task execution • Originality of task	Quiz 1	Teaching and discussion: • explanation of learning material • explanation of the task • explanation of the assessment [1 x 3 x 50 minutes]		• Students read and study learning materials • Students do assignments independently [1 x 3 x 120 minute]		• PPT • i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	Determine the partition dimension of given disconnected graphs	10 %
8 and 9	**MID-TERM EXAM**									
10/10	**CLO-3** Have the understanding about the locating chromatic	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	• PPT • i-learn (LMS Unand) • Specific condition: Zoom	Vertex coloring, locating chromatic number and color code	

	number of a graph and determine the locating chromatic number of a given graph							meeting, WA group, learning video)		
11/11	**CLO-3** Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph	Accurate understanding of related material	Activeness in lectures		Teaching and discussion: explanation of learning material [1 x 3 x 50 minutes] (Specific conditions: The total number of blended learning meetings is 40 % of the total number of meetings)	Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	• PPT • i-learn (LMS Unand) • Specific condition: Zoom meeting, WA group, learning video)	The locating chromatic number of some simple graphs	
12/12	**CLO-3** Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a	Accurate understanding of related material	Activeness in lectures		Teaching and discussion: explanation of learning material [1 x 3 x 50 minutes] Specific conditions: The total number of blended learning	Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	• PPT • i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	Some previous results on the characterizations of graphs with certain given locating chromatic number	

	given graph				meetings is 40 % of the total number of meetings)					
13/13	**CLO-3** Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph	Accurate understanding of related material	Activeness in lectures		Teaching and discussion: explanation of learning material [1 x 3 x 50 minutes] (Specific conditions: The total number of blended learning meetings is 40 % of the total number of meetings)	Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	The locating chromatic number of disconnected graphs	
14/14	**CLO-3** Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph.	Accurate understanding of related material	Activeness in lectures	Teaching and discussion: material explanation [1 x 3 x 50 minute]		Students read and study the learning materials individually [1 x 3 x 60 minute]	Students discuss in groups about lecture material [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) Specific condition: Zoom meeting, WA group, learning video)	Some previous results on the locating chromatic number of disconnected graphs	
15/15	**CLO-3** Have the	Accurate understanding of	Task 2	Teaching and discussion:		Students read and study the learning	Students discuss in	● PPT ● i-learn (LMS	Determination of the locating	

	understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph	related material		material explanation [1 x 3 x 50 minute]		materials individually [1 x 3 x 60 minute]	groups about lecture material [1 x 3 x 60 minute]	Unand) Specific condition: Zoom meeting, WA group, learning video)	chromatic number of homogeneous disconnected graphs	
16/16	**CLO-3** Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph.	● Accurate understanding of related material ● Accuracy in answering assignment questions ● Neatness of task execution Originality of task	Quiz 2	Teaching and discussion: ● explanation of learning material ● explanation of the task ● explanation of the assessment [1 x 2 x 50 minutes]		●Students read and study learning materials ● Students do assignments independently	Students discuss in groups about lecture material and assignment [1 x 3 x 60 minute]	● PPT ● i-learn (LMS Unand) ● Specific condition: Zoom meeting, WA group, learning video)	Determination of the locating chromatic number of non-homogeneous disconnected graphs	10 %
17 s/d 18	**FINAL EXAMINATION**									**30 %**

1 credit = *50* minutes face-to-face meeting, *60* minutes structured study, *60* minutes independent study
Each meeting duration is 3 credits = 3×50 minutes

Indicators, Criteria, and Assessment Weights

1. Assessment weight for each Assessment

No	Assessment	Weight (%)
1	Mid-Term Exam	30
2	Final Exam	30
3	Homework	20
4	Quiz	20
TOTAL		**100**

2. Assessment weight for Intended Learning Outcome
   a) CLO-1: 25 %
   b) CLO-2. 25 %
   c) CLO-3: 50 %

Assessment Plan Table:

No	CLO	ASSESSMENT						
		Task		Quiz		Mid-term Exam	Final Exam	TOTAL
		1	2	1	2			
1	CLO-1 Have the understanding about the metric dimension of a graph and determine the metric dimension of a given graph.	5%		5%		15%		25%
2	CLO-2 Have the understanding about the partition dimension of a graph and determine the partition dimension of a given graph	5%		5%		15%		25%
3	CLO-3 Have the understanding about the locating chromatic number of a graph and determine the locating chromatic number of a given graph		10%		10%		30%	50%
TOTAL		**20%**		**20%**		**30%**	**30%**	**100%**

Matrix of CLO and ILO

CLO	ILO									
	4			**5**				**6**		
	PI			**PI**				**PI**		
	1	2	3	1	2	3	4	1	2	3
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓