



COURSE PLANNING (RPKPS) UNIVERSITAS MULTIMEDIA NUSANTARA

Validation Form

Course Name : Discrete Mathematics
Course Code : IF120
Course Coordinator : Angga Aditya Permana
Team of Lecturers : Seng Hansun, Rahmi Andarini, Ananda Kusuma, Yaman Khaeuzzaman

NO	NAME	NIK/NID	SIGN
1.	Angga Aditya Permana, M.Kom	076481	
2.	Seng Hansun		
3.	Rahmi Andarini		
4.	Ananda Kusuma		
5.	Yaman Khaeuzzaman		

On behalf of the team,
Date:

digitally signed by

869E2139-D07C-4DC8-B7B4-832EC3EBC886

(Angga Aditya Permana, M.Kom)

Approved by,
Date:

UNIVERSITAS
MULTIMEDIA
NUSANTARA

(Marlinda Vasty Overbeek,
M.Kom.)

Has been checked and considered
comply appropriate with to UMN standard
Date:

(_____)

Course Coordinator

Head of Department

Internal Quality Assurance Office
Control Bureau

COURSE PLANNING (RPKPS) UNIVERSITAS MULTIMEDIA NUSANTARA

COURSE NAME : Discrete Mathematics
 CODE / CREDIT : IF120/ 3 SKS
 SEMESTER : 1
 PREREQUISITE : -
 COURSE STATUS : Mandatory

A. COURSE DESCRIPTION

Discrete Mathematics aims to teach the students to know and understand some basic concepts on Discrete Mathematics. Some topics being covered in this course are the concepts of sets, Mathematics logics and proofs, basic concept of functions, sequences, and series, relations and matrices of relations, number theory, counting methods, discrete probability, recurrence relations, graph theory, trees, combinatorial circuits and Boolean algebras.

B. LEARNING OUTCOMES

B.1. Program Expected Learning Outcomes (ELO) Related to the Course

Indonesian Qualification Framework (IQF) Level: 3

- CPL-03 Problem Solving Skill – Has the ability to identify, formulize, and solve problems in Informatics field
- CPL-07 Scientific Expertise – Has the knowledge in Informatics and Engineering fields and other related specific skills

B.2. Course Learning Outcomes (CLO)

After passing this course, students will be able to use the skills and knowledge from this course as a Scientist in beginner level with competences as follow:

- CPL-07 CPMK-01 Explain the basic concepts on Discrete Mathematics (C2)
- CPL-03 CPMK-02 Apply the basic concepts on Discrete Mathematics to solve given problems (C3)

B.3. Course Sub Learning Outcomes

CPMK-01	SCPMK-01	Students could explain the sets concept (C2)
CPMK-01, CPMK-02	SCPMK-02	Students could explain and implement Mathematics logics in solving some given problems (C3)
CPMK-01, CPMK-02	SCPMK-03	Students could explain and implement different proof methods (C3)
CPMK-01, CPMK-02	SCPMK-04	Students could explain and use the concept of functions and sequences (C3)
CPMK-01, CPMK-02	SCPMK-05	Students could explain and use the concept of relations and matrices of relations (C3)
CPMK-01, CPMK-02	SCPMK-06	Students could explain and implement the number theory (C3)
CPMK-01, CPMK-02	SCPMK-07	Students could explain and implement different counting methods (C3)
CPMK-01, CPMK-02	SCPMK-08	Students could explain and use the concept of discrete probability (C3)
CPMK-01, CPMK-02	SCPMK-09	Students could explain and use the concept of recurrent relations (C3)
CPMK-01, CPMK-02	SCPMK-10	Students could explain and implement basic graph theory (C3)
CPMK-01, CPMK-02	SCPMK-11	Students could explain and implement advance graph theory (C3)
CPMK-01, CPMK-02	SCPMK-12	Students could explain and implement basic trees theory (C3)
CPMK-01, CPMK-02	SCPMK-13	Students could explain and implement advance trees theory (C3)
CPMK-01, CPMK-02	SCPMK-14	Students could explain and use the concept of combinatorial circuits and Boolean algebra (C3)

C. LEARNING ANALYSIS*-Figure is attached-*

D. TOPICS

1. Sets
2. Logics
3. Proofs
4. Functions and Sequences
5. Relations and Matrices of Relations
6. Number Theory
7. Counting Methods
8. Discrete Probability
9. Recurrence Relations
10. Graph 1 (Basic)
11. Graph 2 (Advance)
12. Trees 1 (Basic)
13. Trees 2 (Advance)
14. Combinatorial Circuits and Boolean Algebra

E. EVALUATION

1. Attending lecture punctually is mandatory. Students will be considered absent if coming over the specified time.
2. Attending 14 lectures is mandatory. Attending minimum of 11 from 14 meetings is required to be able to take the final test.
3. Final grade is determined by following components:
 - a. Midterm Exam (UTS) : 30%
 - b. Final Exam (UAS) : 40%
 - c. Activities : 30%

FINAL GRADING:

Score	Alphabetical Grade	Numerical Grade	Remarks
85 – 100	A	4	Excellent

80 – 84,99	A-	3.7	Good
75 – 79,99	B+	3.3	
70 – 74,99	B	3.0	
65 – 69,99	B-	2.7	Satisfactory
60 – 64,99	C+	2.3	
55 – 59,99	C	2.0	
45 – 54,99	D	1.0	Poor
0 – 44,99	E	0	Very Poor
	F	0	Academic Violation

F. REFERENCE AND RESOURCES

Main:

1. Johnsonbaugh, R., 2005, *Discrete Mathematics*, New Jersey: Pearson Education, Inc.
2. Rosen, Kenneth H., 2005, *Discrete Mathematics and Its Applications*, 6th edition, McGraw-Hill.
3. Hansun, S., 2021, *Matematika Diskret Teknik*, Deepublish.

Additional/ Supporting:

1. Lipschutz, Seymour, Lipson, Marc Lars, *Schaum's Outline of Theory and Problems of Discrete Mathematics*, McGraw-Hill.
2. Liu, C.L., 1995, *Dasar-Dasar Matematika Diskret*, Jakarta: Gramedia Pustaka Utama.

G. WEEKLY LESSON PLAN

Week	Course Sub-Learning Outcomes (Sub-CLO)	Topics & Sub-Topics	Learning Method and Activities	Timing	Assessment			Ref
					Type and Grading System	Indicators	Weight	
1.	Students could explain the sets concept (SCPMK-01)	<u>Main Topic:</u> Sets <u>Sub Topics:</u> <ul style="list-style-type: none"> Motivation Sets Basic Operation on Sets 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture <u>E-learning:</u> https://elearning.umn.ac.id/ <u>Tasks:</u> 4 Practices on Sets and Operation on Sets	3 x 50' 3 x 60' 1 x 50'	<u>Form:</u> Individual Assignment <u>Grading:</u> Points for each question	Correctness in answering each question	1%	1 (Chapter 1.1)
2.	Students could explain and implement Mathematics logics in solving some given problems (SCPMK-02)	<u>Main Topic:</u> Logics <u>Sub Topics:</u> <ul style="list-style-type: none"> Proposition Logics Operators and Truth Table Conditional Propositions and Logical Equivalence Arguments and Rules of Inference Quantifiers 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture <u>E-learning:</u> https://elearning.umn.ac.id/ <u>Tasks:</u> 6 Practices on Logics	3 x 50' 3 x 60' 1 x 50'	<u>Form:</u> Individual Assignment <u>Grading:</u> Points for each question	Correctness in answering each question	2%	1 (Chapter 1.2 - 1.5)
3.	Students could explain and implement different proof methods (SCPMK-03)	<u>Main Topic:</u> Proofs <u>Sub Topics:</u> <ul style="list-style-type: none"> Direct Proofs and Indirect Proofs Other Proofs Methods Mathematical Induction 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture <u>E-learning:</u> https://elearning.umn.ac.id/ <u>Tasks:</u> 4 Practices on Proofs	3 x 50' 3 x 60' 1 x 50'	<u>Form:</u> Individual Assignment <u>Grading:</u> Points for each question	Correctness in answering each question	1%	1 (Chapter 2.1, 2.2, 2.4)

Week	Course Sub-Learning Outcomes (Sub-CLO)	Topics & Sub-Topics	Learning Method and Activities	Timing	Assessment			Ref
					Type and Grading System	Indicators	Weight	
4.	Students could explain and use the concept of functions and sequences (SCPMK-04)	<u>Main Topic:</u> Functions and Sequences <u>Sub Topics:</u> <ul style="list-style-type: none"> • Functions • Sequences and Strings • Strings 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture E-learning: https://elearning.umn.ac.id/ <u>Tasks:</u> 5 Practices on Functions and Sequences	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 3.1, 3.2)
5.	Students could explain and use the concept of relations and matrices of relations (SCPMK-05)	<u>Main Topic:</u> Relations and Matrices of Relations <u>Sub Topics:</u> <ul style="list-style-type: none"> • Relations • Equivalence Relations • Matrices of Relations 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture E-learning: https://elearning.umn.ac.id/ <u>Tasks:</u> 4 Practices on Relations and Matrices of Relations	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 3.3 - 3.5)
6.	Students could explain and implement the number theory (SCPMK-06)	<u>Main Topic:</u> Number Theory <u>Sub Topics:</u> <ul style="list-style-type: none"> • Number System • Binary, Octal, and Hexadecimal System Numbers • Euclid Algorithm 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Discussion: Two-way communication during lecture E-learning: https://elearning.umn.ac.id/ <u>Tasks:</u> 5 Practices on Number Theory	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 5.1 - 5.3)

Week	Course Sub-Learning Outcomes (Sub-CLO)	Topics & Sub-Topics	Learning Method and Activities	Timing	Assessment			Ref
					Type and Grading System	Indicators	Weight	
7.	Students could explain and implement different counting methods (SCPMK-07)	<u>Main Topic:</u> Counting Methods <u>Sub Topics:</u> <ul style="list-style-type: none"> Counting Method Principle Permutation and Combination 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture <u>E-learning:</u> https://elearning.umn.ac.id/ <u>Tasks:</u> 4 Practices on Counting Methods <u>Quiz:</u> Mid Term Quiz covering all learnt materials	3 x 50' 3 x 60' 1 x 50' 3 x 50'	<i>Form:</i> Quiz and Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1% 10%	1 (Chapter 6.1, 6.2)
Mid Term Examination Essay Questions							25%	W1-W7
8.	Students could explain and use the concept of discrete probability (SCPMK-08)	<u>Main Topic:</u> Discrete Probability <u>Sub Topics:</u> <ul style="list-style-type: none"> Discrete Probability Binomial Coefficient Combinatorics Identity 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture <u>E-learning:</u> https://elearning.umn.ac.id/ <u>Tasks:</u> 3 Practices on Discrete Probability	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 6.5 - 6.7)
9.	Students could explain and use the concept of recurrent relations (SCPMK-09)	<u>Main Topic:</u> Recurrence Relations <u>Sub Topics:</u> <ul style="list-style-type: none"> Recursive Algorithm Recurrence Relations 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture	3 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i>	Correctness in answering each question	1%	1 (Chapter 7.1 - 7.3)

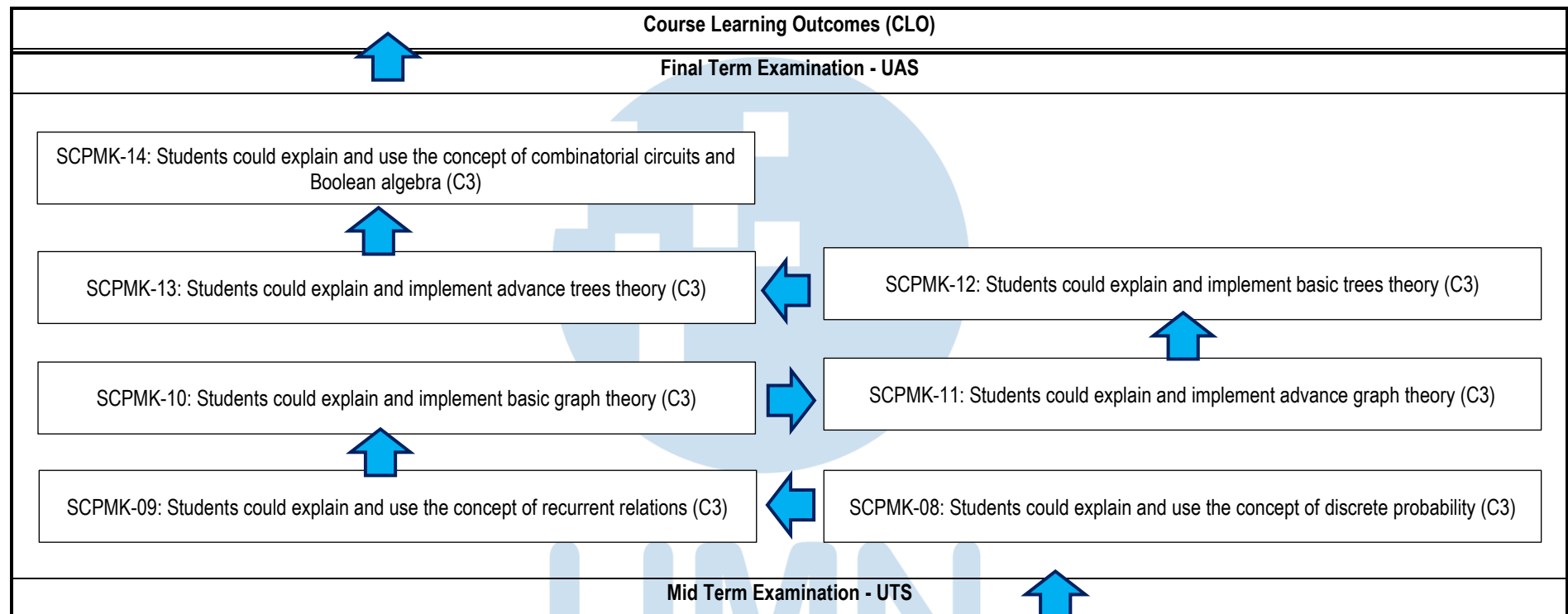
Week	Course Sub-Learning Outcomes (Sub-CLO)	Topics & Sub-Topics	Learning Method and Activities	Timing	Assessment			Ref
					Type and Grading System	Indicators	Weight	
		<ul style="list-style-type: none"> Solving Recurrence Relations 	<i>E-learning:</i> https://elearning.umn.ac.id/ <i>Tasks:</i> 3 Practices on Recurrence Relations	3 x 60' 1 x 50'	Points for each question			
10.	Students could explain and implement basic graph theory (SCPMK-10)	<u>Main Topic:</u> Graph 1 (Basic) <u>Sub Topics:</u> <ul style="list-style-type: none"> Graph Terminologies Path and Cycle Euler Cycle and Hamiltonian Cycle 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture <i>E-learning:</i> https://elearning.umn.ac.id/ <i>Tasks:</i> 4 Practices on Basic Graph	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 8.1 - 8.4)
11.	Students could explain and implement advance graph theory (SCPMK-11)	<u>Main Topic:</u> Graph 2 (Advance) <u>Sub Topics:</u> <ul style="list-style-type: none"> Graph Representation Isomorphism Planar Graph Shortest Path Problem 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture <i>E-learning:</i> https://elearning.umn.ac.id/ <i>Tasks:</i> 5 Practices on Advance Graph	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 8.5 - 8.7)
12.	Students could explain and implement basic trees theory (SCPMK-12)	<u>Main Topic:</u> Trees 1 (Basic) <u>Sub Topics:</u> <ul style="list-style-type: none"> Trees Terminologies Spanning Trees Binary Trees 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> Two-way communication during lecture <i>E-learning:</i>	3 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 9.1-9.5)

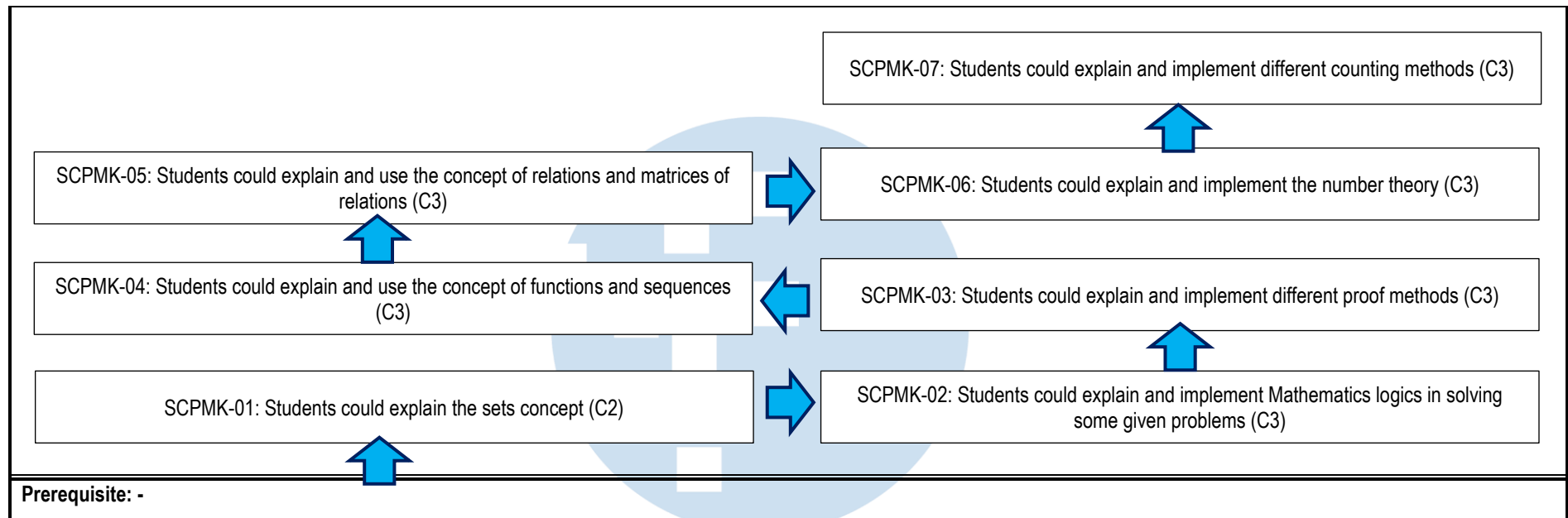
Week	Course Sub-Learning Outcomes (Sub-CLO)	Topics & Sub-Topics	Learning Method and Activities	Timing	Assessment			Ref
					Type and Grading System	Indicators	Weight	
			https://elearning.umn.ac.id/ <i>Tasks:</i> 5 Practices on Basic Trees	3 x 60' 1 x 50'				
13.	Students could explain and implement advance trees theory (SCPMK-13)	<u>Main Topic:</u> Trees 2 (Advance) <u>Sub Topics:</u> <ul style="list-style-type: none"> Tree Traversals Decision Trees Trees Isomorphism Game Trees 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> <i>Discussion:</i> Two-way communication during lecture <i>E-learning:</i> https://elearning.umn.ac.id/ <i>Tasks:</i> 4 Practices on Advance Trees	3 x 50' 3 x 60' 1 x 50'	<i>Form:</i> Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1%	1 (Chapter 9.6-9.9)
14.	Students could explain and use the concept of combinatorial circuits and Boolean algebra (SCPMK-14)	<u>Main Topic:</u> Combinatorial Circuits and Boolean Algebra <u>Sub Topics:</u> <ul style="list-style-type: none"> Combinatorial Circuits Boolean Algebra 	<u>Method:</u> - Online Materials Discourse <u>Activities:</u> <i>Discussion:</i> Two-way communication during lecture <i>E-learning:</i> https://elearning.umn.ac.id/ <i>Tasks:</i> 5 Practices on Combinatorial Circuits and Boolean Algebra <i>Project:</i> Final Project to summarize and make a report on 'Analysis of Algorithms' or 'Complex Number'	3 x 50' 3 x 60' 3 x 50' 6 x 50'	<i>Form:</i> Project and Individual Assignment <i>Grading:</i> Points for each question	Correctness in answering each question	1% 15%	1 (Chapter 11.1-11.4)
Final Term Examination Essay Questions							35%	W8-W14

H. Task/ Project Details:**Week 14:**

Mata Kuliah	:	Matematika Diskret	Kode MK	:	IF120
Judul Tugas	:	Proyek Akhir membuat laporan materi pengayaan Matematika Diskret	Bobot Tugas	:	15%
Sub-CPMK terkait tugas	:	SCPMK 14			
A. AKTIVITAS MANDIRI					
Deskripsi		Mahasiswa ditugaskan untuk mencari, mempelajari, dan membuat laporan terkait materi pengayaan Matematika Diskret			
B. TUGAS TERSTRUKTUR					
Bentuk Tugas	:	Proyek Individu			
Deskripsi	:	Mahasiswa ditugaskan untuk mencari, mempelajari, dan membuat laporan dengan arahan berikut: 1. Topik yang diangkat terkait dengan 'Analisis Algoritma' atau 'Sistem Bilangan Kompleks' atau materi lainnya yang akan diberikan di kelas 2. Laporan dikumpulkan pada waktu Ujian Akhir Semester dengan estimasi waktu pengerjaan sekitar 2-3 minggu 3. Laporan yang dikumpulkan harus merupakan karya original mahasiswa, tindakan plagiarisme dapat menyebabkan mahasiswa gagal mendapatkan penilaian 4. Tidak ada template laporan yang diberikan, namun tiap mahasiswa diharapkan untuk memperhatikan poin-poin penilaian yang diberikan			
Bentuk dan Format Luaran	:	Bentuk Luaran: Laporan Proyek Individu Format Luaran: Laporan Tertulis			
Indikator, Kriteria, dan Bobot Penilaian	:	Indikator Isi Laporan (Bobot 15%) - Halaman muka (1%) - Kerangka Isi yang logis dan sistematis (3%) - Kelengkapan materi – disertai contoh (10%) - Referensi (1%)			
Ketentuan terkait waktu pengerjaan	:	Total waktu pengerjaan : dengan rincian: a. Studi literatur b. Penyusunan dan pembuatan laporan	2 minggu 1 minggu dari pemberian Tugas 2 minggu dari pemberian Tugas		
Lain-lain	:	Laporan yang terindikasi plagiat akan mendapatkan sanksi sesuai dengan peraturan yang berlaku di UMN			
Referensi	:	-			

Attachment: Learning Outcome Analysis





I. Revision History

Course Code	Revision No	Date in Effect	Changes
IF120	0		Change to new RPKPS format