UNTAN
UNIVERSITAS TANJUNGPURA

MODULE HANDBOOK

BACHELOR PROGRAMME IN MATHEMATICS

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	English
Module level, if applicable	Bachelor
Code, if applicable	UMG-105
Subtitle, if applicable	-
Courses, if applicable	English
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Team of English Laboratory
Lecturer(s)	
Language	Bahasa Indonesia and English
Relation to curriculum	Compulsory course in the first year (1st semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam (150 minutes) and final exam (150 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students can choose a reading method that suits the purpose of reading texts using English. **CLO 2.** Students can practice their writing skills by making short paragraphs and simple letters **CLO 3.** Students can apply English language skills according to the material that has been studied
Content	1. *Student life* 2. *Where in the world ...?* 3. *Daily routines* 4. *Food, drink and culture* 5. *Newspaper article* 6. *Brain power* 7. *Modern technology* 8. *People: past and present*
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5

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	$70 \leq FS < 75$ | B | 3 $65 \leq FS < 70$ | C+ | 2,5 $60 \leq FS < 65$ | C | 2 $55 \leq FS < 60$ | D+ | 1,5 $50 \leq FS < 55$ | D | 1 $FS < 50$ | E | 0
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Harrison, Richard. Headway Academic Skills: Reading, Writing, And Study Skills L1. Britain: Oxford University Press 2. Betty S. Azar. 1989. *Understanding and Using English Grammar.* New Jersey: Prentice Hall Regents. 3. Harrison, Richard. *Headway Academic Skills: Reading, Writing, And Study Skills L1*. Britain: Oxford University Press. 4. Philpot, Sarah. *Headway Academic Skills: Reading, Writing, And Study Skills L2*. Britain: Oxford University Press.

CLO-ILO Mapping

	ILO 3	ILO 4
CLO 1	√	
CLO 2		√
CLO 3	√	

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Oral Presentation	Percentage (%)
CLO 1	4	8	14	14	40
CLO 2	4	8	14	14	40
CLO 3	2	4	7	7	20
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Pancasila
Module level, if applicable	Bachelor
Code, if applicable	MKWU2
Subtitle, if applicable	-
Courses, if applicable	Pancasila
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Ade Risna Sari, S.H., M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1st semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to analyze, compare, and reflect on the function and important position of Pancasila in the history of the nation. **CLO 2.** Students are able to analyze the relationship between the philosophical nature of the values of the Pancasila precepts and use it as a knife to analyze the nation's problems. **CLO 3.** Students are able to understand the supremacy of the constitution and the peculiarities of the 1945 Constitution of the Republic of Indonesia, which is based on the values of Pancasila and to sort out constitutional and unconstitutional behaviour in the life of the nation and state. **CLO 4.** Students are able to understand, identify, and account for the analysis of laws and policies that are idealistic, practical and pragmatic based on Pancasila. **CLO 5.** Students are able to build awareness of critical and innovative thinking in the development of science and technology based on Pancasila values.
Content	This course discusses Introduction to Pancasila Education, Pancasila in historical studies, Pancasila as a philosophical system, Pancasila as ideology, Pancasila as the state foundation, Pancasila as a system of ethics, Pancasila as the value foundation for the development of science
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and

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<table>
<tr><td></td><td>based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>[1]. Buku Pendidikan Pancasila, Dikti.
[2]. Kaelan, 2009, Filsafat Pancasila: Pandangan Hidup Bangsa Indonesia, Paradigma, Yogyakarta.
[3]. Hariyono, 2014, Ideologi Pancasila, Roh Progresif Nasionalisme Indonesia, Malang: Intrans.
[4]. Kaelan, 2013, Negara Kebangsaan Pancasila, Yogyakarta: Paradigma
[5]. Yudi Latief, 2011, Negara Paripurna: Historisitas, Rasionalitas, dan Aktualitas Pancasila, Jakarta: Gramedia
[6]. Yudi Latief, 2014. Mata Air Keteladanan: Pancasila dalam Perbuatan, Bandung: Mizan</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	√
CLO 3	√	
CLO 4	√	√
CLO 5	√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	4	5	5	16
CLO 2	2	4	10	5	21
CLO 3	2	4	10	5	21
CLO 4	2	4	5	10	21
CLO 5	2	4	5	10	21
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Physics
Module level, if applicable	Bachelor
Code, if applicable	MPU-112
Subtitle, if applicable	-
Courses, if applicable	Physics
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Physics Study Program
Lecturer(s)	Yuris Sutanto, M.Sc., Mega Nurhanisa, M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1rd semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks , 120 minutes of structured activities per week, and 120 minutes of individual study per week including mid exam and final exam.
Credit points	2 (1) = 3.34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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<table>
<tr><td>Module objectives (CO/CPMK)</td><td>After completing this course, the students should have the ability to
CLO 1. Students are able to master the fundamental laws of fluid mechanics and their applications.
CLO 2. Students are able to understand the basic concepts of temperature, heat, and the First Law of Thermodynamics.
CLO 3. Students are able to master the kinetic theory of gases.
CLO 4. Students are able to understand the principles of entropy and the Second Law of Thermodynamics.
CLO 5. Students are able to understand the basic concepts of equilibrium and elasticity.
CLO 6. Students are able to master the fundamental concepts of gravitation.</td></tr>
<tr><td>Content</td><td>1. Fluid
2. Temperature, Heat and the first law of thermodynamics
3. Kinetic Theory of Gases
4. Entropy and the second law of thermodynamics
5. Equilibrium and Elasticity
6. Gravity</td></tr>
<tr><td>Examination forms</td><td>Quantitative Participation Tracking, Structured assignments, Written Test</td></tr>
<tr><td>Study and examination requirements</td><td>study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)</td></tr>
</table>

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<table>
<tr><td></td><td>Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer and E-Learning</td></tr>
<tr><td>Reading list</td><td>1. Halliday, D., Resnick, R., Walker, J. , 2013. Fundamental of Physics. Ed 8th. John Wiley & Sons, Inc.
2. Rosyid, F., Firmansyah, E. & Dyan, P., 2014, Fisika Dasar, Jilid 1, penerbit periuk:Yogyakarta.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√
CLO 6	√	√	√

Assessment Plan

CO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	3		2	3		8
2	2	4		17		23
3	1		2	15	3	21
4	1	3	3		7	14
5	2	3			11	16
6	1		3		14	18
Percentage (%)	10	10	10	35	35	100

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Contextual Chemistry
Module level, if applicable	Bachelor
Code, if applicable	MPU-107
Subtitle, if applicable	-
Courses, if applicable	Contextual Chemistry
Semester(s) in which the module is taught	1th (first)
Person responsible for the module	Basic Science
Lecturer(s)	Afghani Jayuska, M.Si, Imelda Hotmarisi Silalahi, Ph.D., Dr. Ajuk Sapar, M.Si, Dr. Lia Destiarti, M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, for a total of 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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<table>
<tr><td>Module objectives (CLO)</td><td>After completing this course, the students should have the ability to
CLO 1. Students can explain the position of chemistry in other fields of science and the role of chemistry in the future.
CLO 2. Students can explain about the air we breathe.
CLO 3. Students can explain ozone depletion (causes, impacts, and countermeasures).
CLO 4. Students can explain the chemical aspects of global warming (causes, impacts, and countermeasures).
CLO 5. Students can explain about energy, chemistry, and society.2
CLO 6. Students can explain about water for life.
CLO 7. Students can explain acid rain (causes, impacts, and countermeasures).</td></tr>
<tr><td>Content</td><td>chemistry for the future, the air we breathe, protecting the ozone layer, energy, chemistry and society, water for life, acid rain, nutrition.</td></tr>
<tr><td>Examination forms</td><td>Essay</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.
Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.
Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
</table></td></tr>
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	65≤FS<70	C+	2.50
	60≤FS<65	C	2.00
	55≤FS<60	D+	1.50
	50≤FS<55	D	1.00
	FS<50	E	0.00
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list			

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√
CLO 6	√	√	√
CLO 7	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	5		8
2	1	2	5		8
3	1	2	10		13
4	2	4	15		21
5	1	1		5	7
6	2	4		15	21
7	2	4		15	**21**
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Contextual Biology
Module level, if applicable	Bachelor
Code, if applicable	MPU-111
Subtitle, if applicable	-
Courses, if applicable	Contextual Biology
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Biology Study Program
Lecturer(s)	Riyandi, S.Si, M.Si. & Firman Saputra, S.Si, M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to understand principles and theories related to the structure, function, and reproduction that occurs in plants, animals and humans. **CLO 2.** Students can explain the relationship between the dimension of space and time with the natural change and change on the body at a time. **CLO 3.** Students are able to describe the metabolism in the bodies of organisms. **CLO 4.** Students can understand the concepts of biological phenomena that occur in real life. **CLO 5.** Students are able to apply and integrate biology into other sciences.
Content	Contextual Biology discusses living creatures and symptoms full of life included in the material: biology as a science, the underlying material life, the cell as a unit and the structure and function, energy for life, genetic information, cell cycle, mutation, recommendations and gene engineering, growth and development, structure and function of organism that support life, regulation and coordination, evolution, biodiversity, ecology and behavior, developmental biology and utilization of biology in the future.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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	<table><tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr><tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr><tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr><tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr><tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr><tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr><tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr><tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr><tr><td>$FS < 50$</td><td>E</td><td>0</td></tr></table>
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	[1]. Brum, G.D., L.K. Mc. Kane, and G. Karp. 1991. Biology: Exploring Life. John Wiley & Sons, Inc. New York, Chichester, Singapore. [2]. Campbel, N.A., L.G. Mitchell, J.B. Reece.2001. Biology: Concepts and Connections. The Benjamin/Cummings Publishing Co. California, Singapura. [3]. Kimball, J.W 1982. Biology. 5th. Ed. Addison Wesley Publishing. Co. Reading, Massachusset. [4]. Purves, W.K., G.H. Orians, and H.C. Heller. 1992. Life: The Science of Biology 3th Ed. W.H. Freemann and Co. Salt Lake City, Utah. [5]. Solomon, E.P., L.R. Berg, D.W. Martin. 1985. Biology. 5th Ed. Saunders College Publishing. New York

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	√	√	
CLO 2	√		√
CLO 3	√	√	
CLO 4	√	√	
CLO5	√	√	

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	2	4	10	5	21
CLO 2	2	4	**10**	**5**	21
CLO 3	2	4	5	5	16
CLO 4	2	4	5	10	21
CLO 5	2	4	5	10	21
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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Compilation Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Information Technology
Module level, if applicable	Bachelor
Code, if applicable	MPU-105
Subtitle, if applicable	-
Courses, if applicable	Introduction to Information Technology
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Computer Engineering Program
Lecturer(s)	Tedy Rismawan, Syamsul Bahri, Dwi Marisa, Irma Nirmala, Ilhamsyah, Renny P, Rahmi
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1st semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 91 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam (100 minutes) and final exam (100 minutes).
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students should be able and responsible for working individually and in a group to update their knowledge (sustainable learning) of current information technology. **CLO 2.** Students can explain in general the infrastructures (hardware, software, and service) on IT technology **CLO 3.** Students can explain the basic concept of advanced information technology.
Content	The material of the Introduction to Information Technology course is Introduction, Basic Concepts of information technology, computer development, computer systems, data and information, computer networks and the internet, computer security.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5

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		$50 \leq FS < 55$	D	1	
		$FS < 50$	E	0	
Media employed	Board, LCD Projector, Laptop/Computer				
Reading list	1. Supriyanto, Aji. Pengantar Teknologi Informasi. Jakarta: Salemba Infotek. 2005 2. Abdul Kadir, Terra Ch. Triwahyuni, Pengantar Teknologi Informasi EdisinRevisi (Soft Cover), Andi Plubiser, 2014 3. Janner Simarmata, News, Pengenalan Teknologi Komputer Dan Informasi, Edisi/Cetakan I, 5th Published				

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	√		
CLO 2		√	√
CLO 3		√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	2		18		20
CLO 2	4	10	17	9	40
CLO 3	4	10		26	40
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Modern Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MPM-1121
Subtitle, if applicable	-
Courses, if applicable	Introduction to Modern Mathematics
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group (Fransiskus Fran, M.Si.)
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si., Dr. Bayu Prihandono, M.Sc., Yudhi, M.Si., Nur'ainul Miftahul Huda, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (150 minutes) and final exam (150 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	No prerequisites
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students master the concepts, principles, and laws of mathematical logic and set theory. **CLO 2.** Students can apply proof methods to prove mathematical theorems and conclude from several statements. **CLO 3.** Students can form the ability to determine combinations of sets, power sets, ordered sets, and family sets. **CLO 4.** Students can use the laws of sets to prove properties in set algebra. **CLO 5.** Students can understand the concept of relations between sets, including types of relations (reflexive, symmetric, transitive), equivalence relations and forming partitions
Content	1. Basics of Logic 2. Compound Sentences and Statement Operations 3. Quantification 4. Proof Techniques in Mathematics 5. Inference Methods in Mathematics 6. Basics of Sets 7. Multisets 8. Set Families 9. Ordered Sets 10. Equivalence Relations
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and

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<table>
<tr><td></td><td>based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2.50</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2.00</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1.50</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Devlin, K., 1992. Sets, Function and Logic. 2nd ed. New York: Chapman and Hall.
2. Soehakso, R., 1993. Pengantar Matematika Modern. 1 st ed. Yogyakarta: Jurusan Matematika FMIPA</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 4
CLO 1		√
CLO 2		√
CLO 3	√	√
CLO 4		√
CLO 5		√

Assessment Strategies

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	2	8	15		25
2	2	3	20		25
3	2	6		17	25
4	2			8	10
5	2	3		10	15
Percentage (%)	**10**	**20**	**35**	**35**	

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Calculus
Module level, if applicable	Bachelor
Code, if applicable	MPM-1111
Subtitle, if applicable	-
Courses, if applicable	Calculus I
Semester(s) in which the module is taught	1st (first)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Dr. Evi Noviani. M.Si., Drs. Helmi, M.Si., Yudhi, M.Si., Mariatul Kiftiah, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (1st semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, the students should have: CLO 1. Understand the basic concepts of algebraic operations on real number systems CLO 2. understand the theoretical concepts of Number Systems, inequalities and absolute values, functions, limits and continuity CLO 3. apply number system properties in solving inequalities and absolute value problems. CLO 4. solve function operations, determine limits, and apply these concepts to comprehend the continuity and derivatives of functions. CLO 5. calculate derivatives of functions and solve optimizations problem
Content	The course will cover the system of real numbers, functions and their graph, the limit of a function, continuity, the derivatives, the geometric interpretation of the derivatives, higher-order derivatives, the Mean Value Theorem, L'Hopital's rule theorem, extreme value problem, applications of extreme problem, increasing and decreasing functions, concavity, inflection points, sketching the graph of functions, Taylor and Maclaurin series.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** Students are evaluated based on their performance class: Theory The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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	Percentage of Achievement / **Grade** / **Conversion Value** 80FS<100 / A / 4.00 75FS<80 / B+ / 3.50 70FS<75 / B / 3.00 65FS<70 / C+ / 2.50 60FS<65 / C / 2.00 55FS<60 / D+ / 1.50 50FS<55 / D / 1.00 FS<50 / E / 0.00
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Noviani, E, Kiftiah M., Helmi, Yudhi. 2021. Kalkulus 1. Pontianak:UNTAN Press 2. Purcell, E. J. & Varberg, D., 1994. Kalkulus dan Geometri Analitis. 4th ed. I Nyoman Susila, Bana Kartasasmita, Rawuh, penerjemah. Jakarta: Erlangga. 3. James Stewart, 2014, *Calculus: Early Transcendentals*, 8th edition, Cengage Learning. 4. Robert A. Adam and Christopher Essex, 2010, *Calculus, A Complete Course*, Pearson.

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CLO 1	v	V	v
CLO 2	V	V	v
CLO 3	v	V	v
CLO 4	v	V	v
CLO 5	v	V	v

Assessment Plan

CO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	2	3	3	6	2	16
2	1			9	2	12
3	1		2	6	2	11
4	2	3		3	5	13
5	**2**	**2**	**2**	**4**	**6**	16
6	**2**	**2**	**3**	**7**	**18**	32
Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Religion Education and Ethics (Buddhis)
Module level, if applicable	Bachelor
Code, if applicable	MKWU1
Subtitle, if applicable	-
Courses, if applicable	Religion Education and Ethics (Buddhis)
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Dra. Eny Enawaty, M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.
Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to understand the framework and contents of the Tipitaka/Tripitaka scriptures. **CLO 2.** Students are able to understand the meaning and purpose of human life that comes from the teachings of Buddha, and the role of Buddhist universal law in daily life.

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	CLO 3. Students are able to understand the meaning of Godhead in Buddhism. **CLO 4.** Students are able to understand moral values and norms (sila) as the basis and pattern of life, harmony of science and technology and art in life. **CLO 5.** Students are able to understand the concept of Buddhist society and the construction of attitudes of inter-religious harmony, the dynamics of Buddhist culture and politics in the context of Indonesian nationality. **CLO 6.** Students are able to understand about bhavana to form a clean mind of human character.
Content	The course Religion Education and Ethics would likely cover the following topics: 1. The Tipitaka/Tripitaka scriptures 2. The meaning and purpose of human life that comes from the teachings of Buddha 3. The role of Buddhist universal laws in daily life 4. The meaning of the Supreme Godhead in Buddhism, moral values and norms (sila) as the basis and pattern of life, harmony of science and technology and art in life, 5. The concept of Buddhist society and the construction of an attitude of inter-religious harmony 6. The dynamics of Buddhist culture and politics in the context of Indonesian nationality, and Bhavana to form a clean mind of human character.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and

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<table>
<tr><td></td><td>based on the following grade scale:
Percentage of Achievement & Grade & Conversion Value
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>[1]. Bodhi, Bhikkhu. In the Buddha's Words.Wisdom Publication. Boston. 2005.
[2]. Wowor, Cornelis. 1999. Hukum Kamma Buddhis. Jakarta: Rora Karya.
[3]. Dirjen Belmawa, Pendidikan Agama Buddha untuk Perguruan Tinggi, Jakarta. 2016.
[4]. Kusaladhamma, Ashin. Kronologi Hidup Buddha. Ehipassiko Foundation. Jakarta. 2015.
[5]. Mahathera, Narada. 1996. Sang Buddha dan AjaranajaranNya. Jakarta: Dhammadipa Arama</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	
CLO 3	√	
CLO 4	√	√
CLO 5	√	√
CLO 6	√	

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	4	10		16
CLO 2	2	2	10		16
CLO 3	2	4	15		21
CLO 4	1	4		10	15
CLO 5	1	2		10	13
CLO 6	2	4		15	21

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Percentage	**10**	**10**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Religion Education and Ethics (Catholic)
Module level, if applicable	Bachelor
Code, if applicable	MKWU1
Subtitle, if applicable	-
Courses, if applicable	Religion Education and Ethics (Catholic)
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Drs. Sugino, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.
Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to understand understand the concept of Catholic Religion and implementation. **CLO 2.** Students have logic, dicipline, communicative, confidence, and ethics

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	CLO 3. Students are able to apply the concept of the variety of ways strengthen the faith and piety and develop noble character and makes Catholic teaching as the foundation of thinking and behaving in the development of science and profession.
Content	The course Religion Education and Ethics would likely cover the following topics: The concept of the deity in the Catholic concept of faith, and Implementation in Modern Life, Faith in the Bible, the Sacraments and Liturgy, Catholic Spirituality, Social Doctrine of the Church as the implementation of faith, Dialogue and inter-religious harmony, Social Faith and Politics: Law, Human Rights, and Democracy, Faith and science and technology.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5

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	$50 \leq FS < 55$	D	1
	$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list	[1]. Lembaga Biblika Indonesia, Alkitab [2]. Konferensi Wali Gereja Indonesia, Iman Katolik, Kanisius, 1996. [3]. Pandin, Moses G, 2009, Pendidikan Agama Katolik, MKWU, Universitas Airlangga, Surabaya. [4]. Walker, DF., 2004, Konkordasi Alkitab, Jakarta: BPK Gunung Mulia. [5]. Cunningham, L.S. 2009. An Introduction to Catholicsm, Cambridge University Press, New York.		

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	√
CLO 3	√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	4	7	15	5	31
CLO 2	3	6	15	10	34
CLO 3	3	7	5	20	35
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Religion Education and Ethics (Christian)
Module level, if applicable	Bachelor
Code, if applicable	MKWU1
Subtitle, if applicable	-
Courses, if applicable	Religion Education and Ethics (Christian)
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Pdt. Syahdin Nyarong, S.Th,M.Pd
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in basic number theory, mathematical logic, relations, and functions.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.
Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to understand the knowledge of Christian values that come from understanding God and human nature and the sins that prevent humans from receiving God's blessings. **CLO 2.** Students are able to live according to Christian values in daily life in a critical, rational, ethical and dynamic way.

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	CLO 3. Students are able to apply an understanding of the principal teachings of the Christian faith in the mindset, attitude and behavior both vertically to God and horizontally in practical life of the nation, the state and society according to the science and profession of each.
Content	The course Religion Education and Ethics would likely cover the following topics: The identity and personal integrity, leadership, social ethics, and the Ethics of Scientific Profession, which is described in the sub-subject of a following: The introduction of personal character of its own and others, values of life Christian faith, Implementation life values of the Christian faith in the face of global culture, emotional intelligence, social and spiritual, leadership and effective communication, interpersonal relations ethics, family ethics, and Christian Ethics.
Examination forms	Oral presentation, Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2

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		$55 \leq FS < 60$	D+	1,5	
		$50 \leq FS < 55$	D	1	
		$FS < 50$	E	0	
Media employed	Board, LCD Projector, Laptop/Computer				
Reading list	[1]. LAI, 1990. Alkitab. Terjemahan Baru, Lembaga Alkitab Indonesia, Jakarta. [2]. Geisler, N.L., 2010, Etika Kristen: Pilihan & Isu Kontemporer, Edisi 2, Literatur SAAT, Malang. [3]. Verkuyl, J., 1997, Etika Kristen: Bagian Umum, Terjemahan oleh Soegiarto. [4]. Youth for Christ/USA (Ed.), 1987. Penerapan Praktis Pola Hidup Kristen. Tyndale Publisher, Wheaton, Illinois USA, Hak cipta terjemahan Indonesia: Yayasan Gandum Mas, Cetakan Kelima 2002.				

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	
CLO 3	√	√

Assessment Plan (1:20,3:30,4:50)

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	3	5	15	5	28
CLO 2	3	5	10	15	33
CLO 3	4	10	10	15	39
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Religion Education and Ethics (Hindu)
Module level, if applicable	Bachelor
Code, if applicable	MKWU1
Subtitle, if applicable	-
Courses, if applicable	Religion Education and Ethics (Hindu)
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	-
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.
Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to understand the concept of the Hindu religion and its implementation. **CLO 2**. Students have logic, dicipline, communicative, confidence, and ethics.

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	CLO 3. Students are able to understand and able to apply the concept of a variety of ways to strengthen faith and piety, develop noble character, and make the Hindu teachings the foundation of thinking and behaving in professional development.
Content	The course Religion Education and Ethics would likely cover the following topics: The conception of the Godhead (Brahma Widya), Catur Marga Yoga, The Nature of Human Hindu, Ethics and Morality, Science, Technology in Perspective Hindu, Harmony Life Religious, Community Work of Jagadhita, Cultural as experience of Hinduism, Political Perspective of Hindu, Hindu in the Uphold Justice Framework.
Examination forms	Oral presentation, Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5

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	$50 \leq FS < 55$	D	1
	$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list	[1]. Atmaja, I.B. Punya, 1974, Panca Sradha,Jakarta: PHDI Pusat. [2]. Tim Penyusun, 1998, Pendidikan Agama Hindu Untuk Perguruan Tinggi, Jakarta, Depag Binbaga Agama Hindu. [3]. Wiana, 1994, Bagaimana Hindu Menghayati Tuhan, Bali, Manikgeni		

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	√
CLO 3	√	√

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	3	5	15	5	28
CLO 2	3	5	10	15	33
CLO 3	4	10	10	15	39
Percentage	**10**	**20**	**35**	**35**	**100**

Compilation Date	:	**July 22nd, 2024**
Modified Date	:	**July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Religion Education and Ethics (Islam)
Module level, if applicable	Bachelor
Code, if applicable	MKWU1
Subtitle, if applicable	-
Courses, if applicable	Religion Education and Ethics (Islam)
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Ir. Riadi Budiman, ST, MT, MPd, IPM, ASEAN Eng.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.
Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students have faith and fear Allah SWT. **CLO 2.** Students have good morals (honest, trustworthy, hard work, responsibility, and discipline). **CLO 3**. Students are able to develop correct and critical thinking and

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	reasoning in understanding various actual problems from an Islamic perspective. **CLO 4**. Students are able to respect the rights of individuals and groups by providing freedom of expression with responsibility. **CLO 5**. Students are able to apply morality in everyday life, both on campus, family and in society. **CLO 6**. Students are able to build harmonious relationships and mutual respect in diversity
Content	The course Religion Education and Ethics would likely cover the following topics: 1. Introduction: The Urgency of Islam in Higher Education, Integration of Faith, Islam and Ihsan in Forming Whole Humanity. 2. Implementation of Islamic Aqeedah in Realizing Happiness in the World and the Hereafter. 3. Islam, The Role of Mosques in Building Human Civilization, Islamic Law in Indonesian Context, Morals and Modern Problems, Islam and the Challenge of Radicalism, The Qur'anic Paradigm in Facing the Development of Modern Science and Technology 4. Corruption and its Prevention from an Islamic Perspective, Islamic Economic and Administrative System, Politics and Love for the Homeland in an Islamic Perspective.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and

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<table>
<tr><td></td><td>based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>[1]. Al Qur’an Al Karim dan CD Al Qur’an: Holy Qur’an.
[2]. Al Hadist dan CD Al Hadist: Kutub Al Tis’ah, Penerbit Al Bayan.
[3]. Kemenristekdikti. 2016. Modul Pendidikan Agama Islam Untuk Perguruan Tinggi. Jakarta: Dirjen Belmawa Kemenristekdikti.
[4]. Rustam, R., & Haris, Z. A. 2018. Buku Ajar Pendidikan Agama Islam di Perguruan Tinggi. Deepublish.
[5]. Andariati, L. 2020. Hadis dan Sejarah Perkembangannya. Diroyah: Jurnal Studi Ilmu Hadis, 4(2), 153-66
[6]. Thohir Luth, dkk. Buku Ajar Pandidikan Agama Islam, PMPK UB, 2019
[7]. Direktorat Belmawa Dikti, Buku Ajar MKWU Pendidikan Agama Islam, Ditjen Belmawa, 2016.
[8]. Thohir Luth, dkk. Buku Daras Pendidikan Agama Islam, Malang, Universitas Brawijaya, 2012.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	
CLO 3	√	√
CLO 4	√	√
CLO5	√	
CLO6	√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	4	10		16
CLO 2	2	2	10		16

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CLO 3	2	4	15		21
CLO 4	1	4		10	15
CLO 5	1	2		10	13
CLO 6	2	4		15	21
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Indonesian Language
Module level, if applicable	Bachelor
Code, if applicable	MPKWU4
Subtitle, if applicable	-
Courses, if applicable	Physics
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Team of Indonesian Laboratory
Lecturer(s)	Drs. Ahmad Rabi'ul Muzammil,M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks , 120 minutes of structured activities per week, and 120 minutes of individual study per week including mid exam and final exam.
Credit points	2 (1) = 3.34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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<table>
<tr><td>Module objectives (CLO/CPMK)</td><td>After completing this course, the students should have the ability to
CLO 1. Students are able to explain the development, status, and functions of the Indonesian language.
CLO 2. Students are able to use spoken and written language varieties appropriate to the context and enhanced spelling system.
CLO 3. Students are able to select diction or word choices based on the topic of the composition.
CLO 4. Students are able to construct effective, logical, and grammatically correct sentences.
CLO 5. Students are able to develop academic paragraphs.
CLO 6. Students are able to draft an outline for a simple scientific work.
CLO 7. Students are able to prepare citations and compile a bibliography.</td></tr>
<tr><td>Content</td><td>1. The Development, Position and Function of the Indonesian language
2. Varieties of the Indonesian Language
3. Enhanced spelling system (Ejaan yang disempurnakan)
4. Word Structure and diction
5. Effective Sentences in the Indonesian Language
6. Reasoning in Writing
7. Topics of Scientific Writing
8. Manuscript Conventions and Editing
9. Outline of Scientific Work
10. Citation and Bibliography Writing</td></tr>
<tr><td>Examination forms</td><td>Quantitative Participation Tracking, Structured assignments, Written Test</td></tr>
<tr><td>Study and examination requirements</td><td>study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table></td></tr>
</table>

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<table>
<tr><td></td><td>Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer and E-Learning</td></tr>
<tr><td>Reading list</td><td>1. Arifin, E.Z. Cermat Berbahasa Indonesia untuk Perguruan Tinggi. Jakarta: Akademika Pressindo, 2008.
2. Dalman. Keterampilan Menulis. Jakarta: Raja Grafindo Persada, 2014.
3. Depdiknas. Ejaan Yang Disempurnakan. Jakarta: Gramedia, 2008.
4. Hs. Widjono. Bahasa Indonesia Mata Kuliah Pengembangan Kepribadian di Perguruan Tinggi. Jakarta: PT. Grasindo, 2008.
5. Suhertuti, dkk. Bahasa Indonesia sebagai Sarana Komunikasi Ilmiah. Bogor: Irham Publishing, 2011.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	√
CLO 2	√	√
CLO 3		√
CLO 4	√	√
CLO 5		√

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CLO 6	√	√
CLO 7		√

Assessment Plan

	Activity	Quiz	Task	Mid-Term Exam	Final Exam	Percentage (%)
CLO 1	1			8		
CLO 2	2	3		12		
CLO 3	1	1	2	15		
CLO 4	1				7	
CLO 5	2	3	4		11	
CLO 6	2	3	4		12	
CLO 7	1				5	
Percentage (%)	10	10	10	35	35	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Integral Calculus
Module level, if applicable	Bachelor
Code, if applicable	MPM-1211
Subtitle, if applicable	-
Courses, if applicable	Integral Calculus
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of the Mathematical Analysis and Analytical Geometry Subject Group (Berikan namanya)
Lecturer(s)	Dr. Bayu Prihandono, M.Sc., Yudhi, M.Si., Dr. Evi Noviani, M.Si., Meliana Pasaribu, M.Sc.,
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured assignment per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in pre calculus, differential calculus, and elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics.

Module objectives (CLO/CPMK)	After completing this course, CLO 1. Students are able to solve the definitions and theorems of integrals (antiderivatives) and master the fundamental concepts of integrals. CLO 2. Students are able to understand the linear properties of indefinite integrals, comprehend techniques for solving indefinite integrals, and solve indefinite integrals using reduction, rational functions, and transcendental functions (exponential, logarithmic, and inverse trigonometric functions). CLO 3. Students are able to solve partial integrals, compute definite integrals, and develop as well as modify integral techniques. CLO 4. Students are able to compute improper integrals. CLO 5. Students are able to apply integral methods to calculate areas of regions, volumes of solids of revolution, and surface areas of solids of revolution.
Content	In the course **Integral Calculus**, various integration techniques will be studied. Some of the integration methods covered in this course include: 1. **Substitution Method**: This technique involves substituting a new variable to simplify the integral. 2. **Partial Integration**: Also known as integration by parts, this method is useful for integrating products of functions. 3. **Partial Fraction Decomposition**: Used to break down rational functions into simpler fractions. 4. **Trigonometric Substitution**: A powerful tool for handling integrals involving trigonometric functions. 5. **Improper Integrals**: These are integrals with infinite limits or discontinuities. Additionally, we'll explore specific applications of definite integrals, such as calculating the area between curves, finding the volume of solid objects formed by rotation, and determining arc lengths. These applications will be discussed in both Cartesian and polar coordinate systems.
Examination forms	Essay

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<table>
<tr>
<td>Study and examination requirements</td>
<td>
Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table>
</td>
</tr>
<tr>
<td>Media employed</td>
<td>Board, LCD Projector, Laptop/Computer</td>
</tr>
</table>

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Reading list	[1]. Prihandono, Bayu.2023. *Kalkulus Integral (Konsep dan Aplikasinya)*. Pontianak: UNTAN Press [2]. Stewart, J. 2001. *Kalkulus. 4th ed*. I Nyoman Susila & Hendra Gunawan, penerjemah. Jakarta: Erlangga. [3]. Varberg, Purcell, E. Purcell & S. Rigdon.2006. *Calculus. 9th ed.* Boston: Prentice Hall [4]. Noviani, E., Helmi, Kiftiah, M., & Yudhi. 2021. *Kalkulus 1*. Pontianak: Untan Press.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1			√
CLO 2			
CLO 3		√	
CLO 4			
CLO 5	√		

Assessment Plan

	Activity	Quiz	Task	Mid Exam	Final Exam	Percentage
CLO 1	2		2	3		7
CLO 2	2	5	5	20		32
CLO 3	2			11		13
CLO 4	2				2	4
CLO 5	**2**	**5**	**3**	**1**	**33**	**44**
Percentage	**10**	**10**	**10**	**35**	**35**	**100**

Compilation Date : May 5th, 2024

Modified Date : May 5th, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Discrete Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MPM-1222
Subtitle, if applicable	-
Courses, if applicable	Discrete Mathematics
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si., Meliana Pasaribu, M.Si., Nur'ainul Miftahul Huda, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive, Collaborative Learning, Case-based Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in introduction to Modern Mathematics.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics..

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	ILO 6: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing..

Module objectives (CLO/CPMK)	After completing this course, CLO 1. Students are able to understand and master the basic concepts of integer systems, especially those related to divisibility and congruence. CLO2. Students are able to solve various problems in discrete mathematics using the principles of Mathematical Induction, Inclusion-Exclusion Principle, and Pigeonhole Principle. CLO3. Students are able to identify various combinatorial problems and find solutions using appropriate combinatorial principles. CLO4. Students are able to use and prove the equality of binomial coefficients and apply the Binomial Theorem and Newton's Binomial Theorem. CLO5. Students are able to apply the concept of generating functions to solve relevant combinatorial problems. CLO6. Students are able to identify suitable methods for solving recurrence relation problems.
Content	Based on the provided course objectives, Discrete Mathematics course would typically cover the following topics: 1. **Basic Concepts of Integer Systems**: This would include fundamental concepts related to integers such as divisibility, prime numbers, modular arithmetic, and congruence. 2. **Mathematical Induction**: Students would learn about the principle of mathematical induction and its application in proving statements and solving problems involving sequences, series, and recursive definitions. 3. **Combinatorial Principles**: The course would cover various combinatorial principles such as the Inclusion-Exclusion Principle and the Pigeonhole Principle. Students would learn how to apply these principles to count and solve problems related to combinations, permutations, and counting arguments. 4. **Binomial Coefficients and Binomial Theorem**: Students would study the properties of binomial coefficients and how to prove their equality. They would also learn about the Binomial Theorem and its applications in expanding binomial expressions and calculating probabilities. 5. **Generating Functions**: The concept of generating functions would be introduced, focusing on how they can be used to represent combinatorial sequences and solve combinatorial problems. 6. **Recurrence Relations**: Students would learn about recurrence relations and methods for solving them, including methods such as substitution and characteristic equations. They would also explore

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<table>
<tr><td></td><td>applications of recurrence relations in various mathematical contexts.
Overall, the course would provide students with a solid foundation in discrete mathematics, which is essential for understanding and analyzing algorithms, cryptography, combinatorial optimization, and various other areas of computer science and mathematics.</td></tr>
<tr><td>Examination forms</td><td>Essay</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
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<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
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Media employed	Board, LCD Projector, Laptop/Computer
Reading list	[1]. Liu, C.L., 1995, *Dasar-dasar Matematika Diskret,* edisi 2, PT Gramedia Pustaka Utama, Jakarta. [2]. Slamet, S., & Makaliwe, H. (1991). *Matematika Kombinatorik.* Jakarta: PT Elex Media Komputindo. [3]. Rosen, Kenneth H., 2001, *Discrete Mathematics and its Applications, 5th edition*, Mc Graw Hill, New York. [4]. Kusumastuti, N., 2021, Matematika Diskret: Metode-metode Pembuktian, *Bahan Ajar,* FMIPA UNTAN [5]. Kusumastuti, N., 2021, Matematika Diskret: Teori Kombinatorika, *Bahan Ajar,* FMIPA UNTAN

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√		√	√		
CLO 3	√		√			√
CLO 4	√			√		√
CLO5	√		√			√
CLO6	√			√		√

Assessment Plan

CLO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1	2	2	5		10
2	1		3	18		22
3	2	2	2	12		18
4	2				12	14
5	**2**	**3**	**3**		**13**	**21**
6	**2**	**3**			**10**	**15**
Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Elementary Linear Algebra
Module level, if applicable	Bachelor
Code, if applicable	MMM-1221
Subtitle, if applicable	-
Courses, if applicable	Elementary Linear Algebra
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group (Fransiskus Fran, M.Si.)
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si., Dr. Bayu Prihandono, M.Sc., Yudhi, M.Si., Nur'ainul Miftahul Huda, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in basic algebra such as arithmetic algebra, simple equations dan their solutions, monomials and polynomials, number theory.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students can analyze and find solutions to systems of linear equations using various methods. **CLO 2.** Students can calculate and analyze matrix operations, determinants, and matrix inverses. **CLO 3.** Students can discover the relationships between solutions of systems of linear equations, matrix inverses, and matrix determinants. **CLO 4.** Students can determine vector operations both geometrically and analytically and analyze the properties of vectors in Euclidean vector spaces. **CLO 5.** Students can determine vector projections and apply them to problems involving lines and planes in three-dimensional space.
Content	The course **Elementary Linear Algebra** would likely cover the following topics: 1. **Systems of Linear Equations**: This includes methods for solving systems of linear equations such as Gaussian elimination, matrix representation of systems, and methods for solving non-square systems. 2. **Matrix Operations**: Students would learn about basic operations on matrices including addition, subtraction, scalar multiplication, and matrix multiplication. They would also study properties of matrices under these operations. 3. **Determinants and Inverses**: The course would cover the concept of determinants and their calculation, including properties and applications. In addition, students would learn about matrix inverses, their existence, and how to find them. 4. **Relationships between Solutions of Systems, Matrix Inverses, and Determinants**: This aspect would focus on understanding the connections between solutions of systems of linear equations, matrix inverses, and determinants of matrices. This might involve discussing the conditions under which systems have unique solutions, no solutions, or infinitely many solutions. 5. **Vector Operations and Properties**: Students would learn about operations on vectors such as addition, scalar multiplication, and dot product. They would also study geometric and algebraic properties of vectors in Euclidean spaces. 6. **Vector Projections and Applications**: This part would involve understanding vector projections onto other vectors and their applications, particularly in problems involving lines and planes in three-dimensional space. Overall, the course would provide a foundation in basic linear algebra concepts and techniques, essential for understanding more advanced topics in mathematics and various applications in other fields.
Examination forms	Essay

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<table>
<tr>
<td>Study and examination requirements</td>
<td>
Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
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<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2.00</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1.50</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table>
</td>
</tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>[1]. Anton, H., & Rorres, C. (2004). Aljabar Linear Elementer versi Aplikasi, Edisi Kedelapan. Erlangga.
[2]. Lipschutz, S., & Lipson, M. (2001). Schaum's outline of theory and problems of linear algebra. Erlangga.
[3]. Kusumastuti, N., Yundari, Fran, F., Pasaribu, M. 2020. Aljabar Linear Elementer, Bahan Ajar. FMIPA UNTAN</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4
CLO 1			√	
CLO 2				√
CLO 3			√	

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CLO 4	√			√
CLO 5	√		√	

Assessment Strategies

CLO	Activity	Quiz	Task	Mid-term Examination	Final Examination	Percentage (%)
1	2	1	2	8		13
2	2	2	4	20		28
3	2			7		9
4	2	6	2		27	37
5	2	1	2		8	13
Percentage (%)	**10**	**10**	**10**	**35**	**35**	

Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Statistical Method
Module level, if applicable	Bachelor
Code, if applicable	MPM-1242
Subtitle, if applicable	-
Courses, if applicable	Statistical Method
Semester(s) in which the module is taught	2nd (second)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Nur'ainul Miftahul Huda, M.Si., Dr. Evy Sulistyaningsih, M.Sc., Dadan Kusnandar, Ph.D., Shantika Martha, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the first year (2nd semester) bachelor's degree
Teaching methods	Interactive Learning and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week, 50 minutes of practicum for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (100 minutes), final exam (100 minutes), and practicum exam (100 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	No prerequisites

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Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1**. Students can understand EDA techniques and use them in data screening, **CLO 2**. Students can understand the concept of probability and its applications, **CLO 3**. Students can understand the distribution of random variables and their properties in real cases, **CLO 4**. Students can use statistical analysis to carry out inferences including estimation and hypothesis testing as well as searching for and analyzing linear relationship models between two variables, **CLO 5**. Students can use relevant statistical analysis and are responsible for the results of the analysis carried out.
Content	1. Statistics, data, and probability 2. Sampling distribution, estimation, and hypothesis test 3. Laboratory work
Examination forms	Essay and presentation.

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Study and examination requirements

Study Requirement

Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations

Students are evaluated based on their performance class: Theory and Practicum.

The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

While the practicum's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Pre-test and Post-test	10
2	Experiments Reports	40
3	Practicum Examination	50

Practicum's Final Score (PFS) = Pre-test and Post-test (10%) + Experiments reports (40%) + Practicum Exam (50%)

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

FS = TFS (70%) + PFS (30%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

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Media employed	Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using R, SPSS, and Minitab
Reading list	1. Kusnandar, D., Debataraja, N.N., Mara, M.N., dan Satyahadewi, N. 2019. Metode Statistika serta Aplikasinya dengan Minitab, Excel dan R. Untan Press, Pontianak. 2. Weiss, N.A, 2012. Introductory Statistics. 9th Edition. Addison-Wesley, Boston, United States of America.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√	√	√	√	√	√
CLO 2	√		√	√		
CLO 3	√			√		
CLO 4	√	√	√	√	√	√
CLO 5	√	√	√	√	√	√

Assessment Strategies

CLO	Activity	Quiz	Task	Pre-test	Post-test	Experiment reports	Mid-term Examination	Practicum Examination	Final Examination	Percentage (%)
1	2.00	0.88	2.10	14.00		0.43	0.43	3.43	4.29	27.55
2	0.50			3.50		0.11	0.11	0.86	1.07	6.14
3	1.00			7.00		0.21	0.21	1.71	2.14	12.29
4	2.00	3.50	2.80		14.00	0.43	0.43	3.43	4.29	30.87
5	1.50	2.63	2.10		10.50	0.32	0.32	2.57	3.21	23.15
Percentage (%)	**7**	**7**	**7**	**1.5**	**1.5**	**12**	**24.5**	**15**	**24.5**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Geometry
Module level, if applicable	Bachelor
Code, if applicable	MPM-2112
Subtitle, if applicable	-
Courses, if applicable	Geometry
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Analysis and Geometry Subject Group Division
Lecturer(s)	Dr. Yundari, M.Sc., Neva Satyahadewi, M,Si., Dr. Bistari, M.Pd
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 180 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary algebra
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4 Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Students are able to explain the basic definitions and concepts of incidence geometry, plane analytical geometry and space analytical geometry. **CLO 2.** Students can calculate plane and space equations in the Cartesian coordinate system **CLO 3.** Students can systematically determine plane equations. **CLO 4.** Students can intuitively use properties of event geometry to show related equations. **CLO 5.** Students can construct a product containing all the elements of incidence and analytical geometry.
Content	This course discusses basic geometric concepts, including incidence geometry, plane analytical geometry and space analytical geometry.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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		Percentage of Achievement	**Grade**	**Conversion Value**
		$80 \leq FS \leq 100$	A	4
		$75 \leq FS < 80$	B+	3,5
		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	1. Win J. Purcell, Dale Varbeg, and Steven E. Rigdon, 2003, Calculus 8th Edition,Prentic hall: Addison Wesley 2. Edward C. Wallace and Stephen F. West, 2003, Roads to Geometry, 3rd Edition, Pearson. 3. Richard S. Millman and George D. Parker, 1991, Geometry: A Metric Approach with Models, Springer.			

CLO-ILO Mapping

	ILO 1	**ILO 2**	**ILO 3**	**ILO 4**
CLO 1	√		√	√
CLO 2	√		√	√
CLO 3	√			√
CLO 4	√	√		
CLO 5	√	√		

Assessment Strategies

CLO	**Activity**	**Quiz**	**Task**	**Mid-Term Examination**	**Final Examination**	**Percentage (%)**
CLO 1	2		4	10	5	21
CLO 2	2	5		10	5	22
CLO 3	2		3	5	5	15
CLO 4	2	5		5	10	22
CLO 5	2		3	5	10	20
Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Graph Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-2122
Subtitle, if applicable	-
Courses, if applicable	Graph Theory
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Fransiskus Fran, M.Si., Dr. Nilamsari Kusumastuti, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4 Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5** Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CO/CPMK)	After completing this course, the students should have: CO 1. ability to explain basic concepts in graphs such as neighbourhood, degree, distance, connectivity, subgraph and graph complement. CO 2. ability to explain the concepts of graph planarity, graph Eulerian and graph Hamiltonian CO 3. ability to solve problems related to the shortest path with Dijkstra's algorithm, minimum spanning tree with Kruskal's and Prim's algorithm and solve problems with graph colouring. CO 4. ability to coloring, labeling, and determine the domination number of a graph.
Content	This course discusses the introduction to graph theory and special topics in graph theory. The introduction to graph theory discusses basic terminology in graphs, subgraphs, operations on graphs, graph connectivity, graph representations, trees, and solutions of optimization cases with graphs (shortest path, TSP, minimum spanning tree). Special topics in graphs discuss some concepts of graph colouring, graph labeling, and domination in graphs.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35%

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4 Final Examination 35 %

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table>
</td>
</tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>
1. Fould, L.R., 1992, Graf Theory Applications, Springer, Varleg
2. Mahmudi, A., 2003, Teori Graf, FMIPA UNY.
3. Munir, R., 2001, Matematika Diskrit, Informatika Bandung, Bandung.
</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CO 1	√			√		
CO 2	√			√		
CO 3	√	√	√		√	
CO 4	√			√	√	√

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Assessment Strategies

CO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CO 1	2.5	5	20		27.5
CO 2	2.5	5	**15**		22.5
CO 3	2.5	5		15	22.5
CO 4	2.5	5		20	27.5
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Abstract Algebra
Module level, if applicable	Bachelor
Code, if applicable	MMM-2121
Subtitle, if applicable	-
Courses, if applicable	Introduction to Abstract Algebra
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 180 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in basic number theory, mathematical logic, relations, and functions.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to recognize and analyze the basic concepts and fundamental properties of group and ring structures and apply basic concepts, properties, proof techniques and methods related to group and ring structures. Familiar with various examples of groups, such as permutation and cyclic groups, and various types of rings, such as division ring, integral domain and field. **CLO 2.** Students know and understand the basic concepts of subgroups and subrings and their properties, know the concepts of normal subgroup and ideal, can show that subsets of a group/ring are subgroup/subring or normal subgroups/ideal, understand the concept of left and right cosets, and the construction of group factor /ring factor. **CLO 3.** Students are able to apply the concept of group homomorphism and ring, kernel and image homomorphism, as well as basic properties, including the fundamental homomorphism theorem and its uses. **CLO 4.** Students understand the concept of polynomial ring over field and the basic concepts of polynomials and their properties.
Content	1. Group and its properties: Set and a binary operation that satisfies certain properties. Group axioms, group operations, subgroup structure, and properties of groups. 2. Quotient Groups and Group Homomorphisms 3. Ring, Types, and Characteristics of Rings 4. Subring and Ideal 5. Quotient Rings and Ring Homomorphisms 6. Polynomial ring Overall, the course would provide students with a solid foundation in abstract algebra, equipping them with the necessary tools to understand, analyze, and apply algebraic structures in mathematics and related fields.
Examination forms	Oral presentation, Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 %

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	Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale: **Percentage of Achievement & Grade & Conversion Value**

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5
$50 \leq FS < 55$	D	1
$FS < 50$	E	0

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	[1]. Kusumastuti, N. Fran, F., 2023, *Pengantar Aljabar Abstrak: Teori Grup dan Ring,* Pontianak: UNTAN-Press. [2]. Malik, D.S., John N. Mordeson, M.K. Sen 2007, *Introduction to Abstract Algebra,* Nebraska: Creighton University. [3]. Fraleigh, J.B., 1994, *A First Course in Abstract Algebra,* Fifth Edition, New York: Addison-Wesley. [4]. Hungerford, T.W., 1974, *Algebra,* New York: Springer-Verlag.

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√			√		
CLO 3	√		√			
CLO 4	√			√		

Assessment Plan

CLO	Activity	Quiz	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	3		5	20	10	38
CLO 2	3	5		10	10	28
CLO 3	2	5		5	10	22

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CLO 4	2		5		5	12
Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Linear Programming
Module level, if applicable	Bachelor
Code, if applicable	MPM-2131
Subtitle, if applicable	-
Courses, if applicable	Linear Programming
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Applied Mathematic Subject Group
Lecturer(s)	Mariatul Kiftiah, M.Sc., Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive, Collaborative, and Case-based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 98 hours per semester, which consists of 50 minutes of lectures per week for 14 weeks, 60 minutes of structured activities per week, 60 minutes of individual study per week including activity in Learning Management System and 170 minutes of practical work, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 (1) = 3.34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1.** Students are capable of constructing models for linear programming problems based on formulated assumptions and applying them through problem simulations. **CLO 2.** Students are able to solve the linear programming and integer linear programming with or without software optimization. **CLO 3.** Students are able to prove the theory of linear programming and duality **CLO 4.** Students are able to apply the sensitivity in the Linear Programming. **CLO 5.** Students are able to solve Primal – Dual Problem. **CLO 6.** Students are able to adapt real problems from various fields such as industry, agriculture, engineering, biology, or other areas into linear programming.
Content	1. Introduction to Linear Programming: formulate of the Linear Programming model 2. Graphical of Linear Programming solution 3. The simplex Method 4. Infeasible solution, unbounded solutions, degeneracy, alternative solutions 5. Theory of linear programming. 6. Integer Programming: formulate of the Integer linear programming, branch and bound algorithm and cutting plane algorithm. 7. Duality: definition of the dual problem 8. Sensitivity analysis 9. Laboratory work
Examination forms	Written assignment, written exams, presentation, laboratory work

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Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Final Examination 35% 2 Mid-Term Examination 35% 3 Class Activities: Quiz, Homework,presentation etc. 20% 4 Laboratory work 10%
Media employed	Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using Geogebra, Qm-for windows, Lingo dan Excel
Reading list	1. Hillier, F. S., & Lieberman, G. J. (2001). *Introduction to Operations Research.* New York: McGraw Hill. 2. Pasaribu, M. & Kiftiah, M. 2024. *Pemrograman Linear: Seri Metode Grafik dan Metode Simpleks.* Pontianak: Untan Press. 3. Sharma, J. K. (2016). *Operations Research Tehory and Applications, Sixth Edition.* India: Trinity Press. 4. Taha, H. A. (2007). *Operations Research: An Intorduction, Eight Edition.* USA: Pearson Education, Inc. 5. Winston, W. L. (2003). *Operations Research Applications and Algorithms, Fourth Edition.* United States: Thompson Learning

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√	√		
CLO 2	√	√	√	√		
CLO 3	√		√	√		
CLO 4	√		√	√		
CLO 5	√		√	√		√
CLO 6	√	√		√	√	√

Assessment Plan

CLO	Activity	Quiz	Task	Pretest	Posttest	Experiment reports	Practicum Examination	Mid-term Examination	Final Examinatiom	Percentage (%)
1	2	2	2				2	4		17,5
2	1		2			3	2	5		25
3	1					2	2	2,5	2,5	14
4	1		3	0,5	0,5	3	3	7	10	28
5	1	3		0,5	0,5	2	3		5	15,5
6	1	2		0,5	0,5	2	3	6	7	
Percentage (%)	7	7	7	1,5	1,5	12	15	24,5	24,5	100

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Multivariable Calculus
Module level, if applicable	Bachelor
Code, if applicable	MPM-2111
Subtitle, if applicable	-
Courses, if applicable	Multivariable Calculus
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Lab. of Analysis
Lecturer(s)	Dr. Bayu Prihandono, M.Sc., Yudhi, M.Si., Drs. Helmi, M.Si., Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	4 SKS =6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CO/CPMK)	After completing this course, the students should have: CO 1. Students are able to understand and master the definitions and basic concepts of sequences and series, multivariable functions and derivatives, and multiple integrals. CO 2. Students are able to determine the types of series and their convergence. CO 3. Students are able to explain multivariable functions and represent them graphically.. CO 4. Students are able to demonstrate the concept of limits and continuity in more than one variable and find derivatives and their applications. CO 5. Students are able to find the derivative of a multivariable function. CO 6. Students are able to determine double integrals and their applications.
Content	1. Sequences and series 2. Multivariable functions and derivatives 3. Multiple integrals
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** Students are evaluated based on their performance class: Theory The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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	Percentage of Achievement / **Grade** / **Conversion Value** 80FS<100 / A / 4.00 75FS<80 / B+ / 3.50 70FS<75 / B / 3.00 65FS<70 / C+ / 2.50 60FS<65 / C / 2.00 55FS<60 / D+ / 1.50 50FS<55 / D / 1.00 FS<50 / E / 0.00
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	**1. Purcell, E. J. & Varberg, D., 1994. Kalkulus dan Geometri Analitis. 4th ed. I Nyoman Susila, Bana Kartasasmita, Rawuh, penerjemah. Jakarta: Erlangga.** **2.** James Stewart, 2014, *Calculus: Early Transcendentals*, 8th edition, Cengage Learning. **3.** Robert A. Adam and Christopher Essex, 2010, *Calculus, A Complete Course*, Pearson.

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CO 1	v			v		
CO 2	V		V	v		
CO 3	v		V	v		
CO 4	v		V	v		
CO 5	v		v	v		
CO 6	V		V	V		

Assessment Plan

CO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	**1**		**2**	**11**		14
2	**2**	**2**	**3**	9		16
3	**2**		**3**	**10**		15
4	2	**2**		**5**	**3**	12
5	**1**	**3**			**17**	**21**
6	**2**	**3**	**2**		**15**	**22**
Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

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Compilation Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Probability Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-2142
Subtitle, if applicable	-
Courses, if applicable	Probability Theory
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Dr. Yundari, M.Sc., Nur'ainul Miftahul Huda M.Si. Nurfitri Imro'ah, M.Si., Asri Rahmawati, M.Mat.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Case-based learning,
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (150 minutes) and final exam (150 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary statistics
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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	ILO 3: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Students can explain and master the definitions, theorems, and examples of basic knowledge of probability, such as sample space, events, and probability. **CLO 2.** Students can distinguish the definition of sample space, events, experiments and random variables. **CLO 3.** Students can provide real case examples of an experiment. **CLO 4.** Students can measure the probability of an experiment. **CLO 5.** Students can solve in building and compiling probability distributions
Content	The course will cover the random variable, Special Distribution of Random Variable, Multivariate of random variable, and function of random variable.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score

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<table>
<tr><td></td><td>(FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2.50</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2.00</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1.50</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Bain L Jee and Engekhardt Max, 1992, Introduction to Probability and Mathematical Statistics, second Edition, Duxbury Press:California.
2. E. Walpole, Ronald, H Maiers, Raymon, 1986, Ilmu Peluang dan Staistik untuk Insinyur dan Ilmuwan, second edition, ITB: Bandung.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2		√		√		
CLO 3		√		√	√	√
CLO 4			√		√	
CLO 5	√					√

Assessment plan

CLO	Activity	Quiz	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	2	16		21
2	1	2	2	4		9

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3	2	3	3	15	12	35
4	2	1	1		16	20
5	4	2	2		7	15
Percentage (%)	**10**	**10**	**10**	**35**	**35**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Regression Analysis
Module level, if applicable	Bachelor
Code, if applicable	MPM-2141
Subtitle, if applicable	-
Courses, if applicable	Regression Analysis
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Nur'ainul Miftahul Huda, M.Si. and Shantika Martha, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (3rd semester) bachelor's degree
Teaching methods	Collaborative Learning and Project Based learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam (150 minutes) and final exam (150 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Statistical Method

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Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1.** Students can calculate and estimate parameters in regression analysis (simple and multiple) and interpret them. **CLO 2.** Students can make inferences (draw conclusions) in regression analysis (simple and multiple) and apply and interpret them in real problems. **CLO 3.** Students can calculate correlation and determination coefficients and apply and interpret them in real problems. **CLO 4.** Students can determine the best regression model using forward selection, backward elimination, stepwise regression, and best subset regression methods. **CLO 5.** Students explain the principles of regression modelling with dummy variables and can interpret regression models with dummy variables that have been formed and apply them to real problems.
Content	1. Simple linear regression and correlation 2. Multiple linear regression (models and assumptions) 3. Least Squares Method 4. Selection of the best model (backward, forward, stepwise, and best subset) 5. Regression with dummy variables 6. Case studies using statistical software
Examination forms	Paper and Oral Presentation

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<table>
<tr>
<td>Study and examination requirements</td>
<td>
Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignment</td><td>20</td></tr>
<tr><td>3</td><td>Mid-term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (30%) + Final Examination (40%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
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<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table>
</td>
</tr>
<tr>
<td>Media employed</td>
<td>Board, LCD Projector, Laptop/Computer, E-Learning</td>
</tr>
<tr>
<td>Reading list</td>
<td>
1. Kusnandar, D., Debataraja, N.N., Mara, M.N., Satyahadewi, N., 2019, Metode Statistika serta Aplikasinya dengan Minitab, Excel, dan R, Untan Press, Pontianak.
2. Montgomery, D.C., Peck, E.A., 2006, Introduction to Linear Regression Analysis. John Wiley & Sons. New York.
</td>
</tr>
</table>

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CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2			√			
CLO 3			√			
CLO 4	√	√			√	√
CLO 5	√	√			√	√

Assessment Strategies

CLO	Activity	Paper	Oral Presentation (Mid-term Examination)	Oral Presentation (Final Examination)	Percentage (%)
1	3	7	10		20
2	3	7	10		20
3	2	3	15		20
4	1	2		16	19
5	1	1		19	21
Percentage (%)	**10**	**20**	**35**	**35**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Database
Module level, if applicable	Bachelor
Code, if applicable	MPM-2151
Subtitle, if applicable	-
Courses, if applicable	Database
Semester(s) in which the module is taught	3th (third)
Person responsible for the module	Chair of the computer science
Lecturer(s)	Dr. Bayu Prihandono, S.SI., M.Sc, dan Yudhi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5,01 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1:** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2:** Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, **either** independently or with the aid of technology.

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	ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalisation, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Students are able to understand the meaning of database and the use of database CLO 2. Students are able to understand the concept of a database system CLO 3. Students are able to analyse data modeling
Content	database basics, security, and data integrity.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value

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	80≤FS<100	A	4.00
	75≤FS<80	B+	3.50
	70≤FS<75	B	3.00
	65≤FS<70	C+	2.50
	60≤FS<65	C	2.00
	55≤FS<60	D+	1.50
	50≤FS<55	D	1.00
	2FS<50	E	0.00
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list	1. Elmasri, R., & Navathe, S.B., 2011. Fundamental of Database System, 6th ed.Addison-Wesley. 2. Klemens & Ben., 2009. Modelling with Data, Tools and Techniques for Scientific Computing. Princeton University Press.		

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4
CLO 1	√	√	√	√
CLO 2	√	√	√	√
CLO 3	√	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	2	6	10		18
2	4	7	25		36
3	4	7		35	46
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Number Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-2123
Subtitle, if applicable	-
Courses, if applicable	Number Theory
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., & Nur'ainul Miftahul Huda, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in mathematical logic.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to explain the basic concepts of the integer system, especially concepts related to divisibility and congruence. **CLO 2.** Students are able to explain the nature of order in the integer system as well as Peano's axioms in the positive integer system. **CLO 3.** Students are able to reason in building and compiling logical proof steps based on the algebraic properties of the integer system to prove the properties that apply to the concepts of divisibility and congruence and express the results of their reasoning in writing and systematically.
Content	In this course, students will study the following subjects: Division and division algorithms, division properties, the greatest common factor and the smallest multiplicity of alliances, Euclid's algorithm on the greatest common factor, Bezout's identity and its application, prime and relatively prime and the theorem Fermat, algebra modulo and inverse modulo, linear congruence relationships, Wilson's theorem, Diophantine Equations and Congressional Theorems.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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		Percentage of Achievement	**Grade**	**Conversion Value**
		$80 \leq FS \leq 100$	A	4
		$75 \leq FS < 80$	B+	3,5
		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Gioia, A.A., "Theory of Numbers" Dover Pub., Chicago, 2001 [2]. Apostol, TM, "Introduction to Analytic Number Theory", Toppan Company S.Pte. Ltd., Singapore, 1980 [3]. Stein, W; Elementary Number Theory; Harvard, UC San Diego; 2017			

CLO-ILO Mapping

	ILO 1	**ILO 2**	**ILO 4**	**ILO 6**
CO 1	√	√		
CO 2	√		√	√
CO 3	√		√	√

Assessment Strategies

CO	**Activity**	**Task**	**Mid-Term Examination**	**Final Examination**	**Percentage (%)**
CO 1	3	5	5	5	18
CO 2	3	5	10	10	28
CO 3	4	10	15	15	44
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Set Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-2125
Subtitle, if applicable	-
Courses, if applicable	Set Theory
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in mathematical logic and functions.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to explain the concept of infinite sets, denumerable and non-denumerable sets, countable and uncountable sets, Cantor sets, and set partitions. **CLO 2.** Students are able to prove the properties of infinite sets, the Bernstein-Schroder Theorem, Cantor's Theorem, and the properties of set partitions. **CLO 3.** Students are able to apply the concept of set theory both in mathematics and other relevant fields.
Content	This course discusses the concepts of infinite sets consisting of the equivalence of two sets, denumerable and non-denumerable sets, Cantor theorem and Schroder-Bernstein Theorem. This course also explore material related to the Cantor sets and set partitions.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3

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		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Devlin, K. (2004), Sets, Function and Logic: An Introduction to Abstract Mathematics, 3th. Ed., Chapman and Hall, London. [2]. Soehakso, RMJT, (1993), Pengantar Matematika Modern, Departemen Pendidikan dan Kebudayaan, Direktorat Jendral Pendidikan Tinggi, Proyek Pembinaan Tenaga Kependidikan Pendidikan Tinggi			

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CLO 1	√	√	
CLO 2	√		√
CLO 3	√	√	

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	3	5	15	10	33
CLO 2	4	10	15	15	44
CLO 3	3	5	5	10	23
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date	:	**July 22nd, 2024**
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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Fuzzy Logic
Module level, if applicable	Bachelor
Code, if applicable	MPM-2124
Subtitle, if applicable	-
Courses, if applicable	Fuzzy Logic
Semester(s) in which the module is taught	3rd (third)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Dr. Bayu Prihandono, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (3rd semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in mathematical logic and functions.
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4** Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5** Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various

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	problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to master the principles of fuzzy logic implications with classical logic as the basis. **CLO 2.** Students are able to adapt various real problems into fuzzy logic models. **CLO 3.** Students are able to reconstruct, modify, analyze/think logically about fuzzy modelling of a phenomenon and assess its accuracy.
Content	Fuzzy Logic course is an elective course which discusses the principles of fuzzy logic as a generalization of classical logic and its application to solving decision-making problems follow. 1. Fuzzy set 2. Fuzzy set membership function 3. Fuzzy implication function 4. Fuzzy inference system
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-

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	Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5
$50 \leq FS < 55$	D	1
$FS < 50$	E	0

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	[1]. Kusumadewi, S., Purnomo, H., 2010, Aplikasi Logika Fuzzy Untuk Pendukung Keputusan, Graha Ilmu, Yogyakarta. [2]. Setiadji, 2009, Himpunan & Logika Samar serta Aplikasinya, Ed ke-1, Graha Ilmu, Yogyakarta.

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√			√		
CLO 2	√		√		√	
CLO 3	√		√	√	√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	3	5	10		18
CLO 2	3	5	**25**	**10**	43
CLO 3	4	10		25	39
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Civics Education
Module level, if applicable	Bachelor
Code, if applicable	MKWU3
Subtitle, if applicable	-
Courses, if applicable	Civics Education
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Feira Budiarsyah Arief, M.P.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) of bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students will be able to explain and understand the function of Pancasila as the national ideology and basis of the Indonesian State and implement the principles of Pancasila in national and state life. **CLO 2.** Students can know and understand the concepts of state, citizen, foreigner and Indonesian citizen, the rights and obligations of citizens, human rights in the Indonesian context, and democratic life. **CLO 3.** Students will be able to analyze the concept and form of Indonesian national insight, national national identity, and identity as an Indonesian citizen **CLO 4.** Students can know and understand the characteristics of national politics and strategy and the implementation and enforcement of law in Indonesia (Rule of Law)
Content	This course discusses Pancasila as a study of the current history of the Indonesian nation, Pancasila as the Foundation and Ideology of the State, Pancasila as a philosophical system, Pancasila as an ethical system and Pancasila as the value of developing science.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4

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		$75 \leq FS < 80$	B+	3,5
		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Kemenristekdikti. 2016. Modul Pendidikan Pancasila Untuk Perguruan Tinggi. Jakarta: Dirjen Belmawa Kemenristekdikt. [2]. Ali, As'ad Said. 2009. Negara Pancasila Jalan Kemaslahatan Berbangsa. Jakarta: Pustaka LP3ES. [3]. Bakry, Noor Ms. 2010. Pendidikan Pancasila. Pustaka Pelajar:Yogyakarta. [4]. Kaelan. 2013. Negara Kebangsaan Pancasila: Kultural, Historis, Filosofis, Yuridis dan Aktualisasinya. Yogyakarta: Penerbit Paradigma. [5]. Kemenristekdikti. 2016. Modul Pendidikan Kewargnegaraan Untuk Perguruan Tinggi. Jakarta: Dirjen Belmawa. Kemenristekdikti [6]. Budimansyah, D (Ed). 2006. Pendidikan Nilai Moral dalam Dimensi Pendidikan Kewarganegaraan. Bandung. [7]. Pasha, MK. 2008. Pendidikan Kewarganegaraan (Civic Education). Yogyakarta. Citra Karsa Mandiri. [8]. Sunarso, dkk. 2006. Pendidikan Kewarganegaraan. Yogyakarta: UNY Press			

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	
CLO 3	√	√
CLO 4	√	√

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	5	15	5	27
CLO 2	2	5	10	5	22
CLO 3	3	5	5	10	23
CLO 4	3	5	5	15	28
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Civics Education
Module level, if applicable	Bachelor
Code, if applicable	MKWU3
Subtitle, if applicable	-
Courses, if applicable	Civics Education
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Team of Character Building Courses
Lecturer(s)	Feira Budiarsyah Arief, M.P.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) of bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	-
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students will be able to explain and understand the function of Pancasila as the national ideology and basis of the Indonesian State and implement the principles of Pancasila in national and state life. **CLO 2.** Students can know and understand the concepts of state, citizen, foreigner and Indonesian citizen, the rights and obligations of citizens, human rights in the Indonesian context, and democratic life. **CLO 3.** Students will be able to analyze the concept and form of Indonesian national insight, national national identity, and identity as an Indonesian citizen **CLO 4.** Students can know and understand the characteristics of national politics and strategy and the implementation and enforcement of law in Indonesia (Rule of Law)
Content	This course discusses Pancasila as a study of the current history of the Indonesian nation, Pancasila as the Foundation and Ideology of the State, Pancasila as a philosophical system, Pancasila as an ethical system and Pancasila as the value of developing science.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4

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		$75 \leq FS < 80$	B+	3,5
		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Kemenristekdikti. 2016. Modul Pendidikan Pancasila Untuk Perguruan Tinggi. Jakarta: Dirjen Belmawa Kemenristekdikt. [2]. Ali, As'ad Said. 2009. Negara Pancasila Jalan Kemaslahatan Berbangsa. Jakarta: Pustaka LP3ES. [3]. Bakry, Noor Ms. 2010. Pendidikan Pancasila. Pustaka Pelajar:Yogyakarta. [4]. Kaelan. 2013. Negara Kebangsaan Pancasila: Kultural, Historis, Filosofis, Yuridis dan Aktualisasinya. Yogyakarta: Penerbit Paradigma. [5]. Kemenristekdikti. 2016. Modul Pendidikan Kewargnegaraan Untuk Perguruan Tinggi. Jakarta: Dirjen Belmawa. Kemenristekdikti [6]. Budimansyah, D (Ed). 2006. Pendidikan Nilai Moral dalam Dimensi Pendidikan Kewarganegaraan. Bandung. [7]. Pasha, MK. 2008. Pendidikan Kewarganegaraan (Civic Education). Yogyakarta. Citra Karsa Mandiri. [8]. Sunarso, dkk. 2006. Pendidikan Kewarganegaraan. Yogyakarta: UNY Press			

CLO-ILO Mapping

	ILO 1	ILO 2
CLO 1	√	
CLO 2	√	
CLO 3	√	√
CLO 4	√	√

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	5	15	5	27
CLO 2	2	5	10	5	22
CLO 3	3	5	5	10	23
CLO 4	3	5	5	15	28
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Linear Algebra
Module level, if applicable	Bachelor
Code, if applicable	MPM-2221
Subtitle, if applicable	-
Courses, if applicable	Linear Algebra
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc,. Fransiskus Fran, M.Si., Yudhi, M.Si.,
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom, and problem solving.
Workload (incl. contact hours, self-study hours)	The total workload is 180 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	4 SKS =6,72 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary algebra and elementary linear algebra.
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4** Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics.

Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Ability to explain the definition of vector spaces and subspaces, along with some related properties. **CLO 2.** ability to explain the concepts of basis and dimension and prove the related properties. **CLO 3.** ability to determine eigenvalues, eigenvectors, and diagonalize matrices based on definition and explain the related properties. **CLO 4.** ability to explain the concept of linear transformation and its representation matrix and the related properties. **CLO 5.** ability to explain the definition and some properties related to inner product spaces.
Content	This Linear Algebra course is a compulsory course in Mathematics Study Program of FMIPA Untan which discuss the basics of vector space structure, linear transformations, and inner product spaces.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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<table>
<tr><td></td><td>Percentage of Achievement & Grade & Conversion Value
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>
1. Anton, H. & Rorres, C., 2004, Aljabar Linear Elementer Versi Aplikasi. Jakarta: Erlangga.
2. Fraleigh, J.B., 1994, A first Course in Abstract Algebra, Fifth Edition, Addison-Wesley, New York.
3. Hungerford, T.W., 1974, Algebra, Springer-Verlag, New York.
4. Sukirman dan Soebagio, S., 1994, Struktur Aljabar, FMIPA UNY, Yogyakarta
</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CLO 1	√		√
CLO 2	√	√	
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√

Assessment Plan

CLO	Activity	Quiz	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2			10		12
CLO 2	2	5	3	18		28
CLO 3	2		2	6		10
CLO 4	2	5			23	30
CLO 5	2		5		13	20
Percentage	**10**	**10**	**10**	**35**	**35**	**100**

Compilation Date : July 22nd, 2024

Modified Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Ordinary Differential Equation
Module level, if applicable	Bachelor
Code, if applicable	MPM-2211
Subtitle, if applicable	-
Courses, if applicable	Ordinary Differential Equation
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Mathematical Analysis and Analytical Geometry Subject Group
Lecturer(s)	Dr. Bayu Prihandono, M.Sc., Yudhi, M.Si., Dr. Evi Noviani, M.Si., Meliana Pasaribu, M.Sc., Drs; Helmi, M.Si., Mariatul Kiftiah, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom, and problem solving.
Workload (incl. contact hours, self-study hours)	The total workload is 180 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week, including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in calculus, differential calculus, and integral calculus.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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Module objectives (CO/CPMK)	After completing this course, students will have **CLO 1**. A good understanding and mastery of the definition of differential equations, classification, general solution, particular solution, singular solution, solving differential equations, and forming differential equations. **CLO 2**. Ability to solve first-degree to high-degree first-order ordinary differential equations. **CLO 3**. Ability to solve homogeneous linear equations and linear equations with constant coefficients. **CLO 4**. Ability to solve homogeneous linear equations and linear equations with variable coefficients. **CLO 5**. Ability to solve linear differential equations of degree-n by using Laplace Transformation.
Content	In the course **of Ordinary Differential Equation**, various techniques will be studied to solve the ODE problems. **Introduction to Differential Equations:** • Definition of differential equations • Classification: ordinary vs. partial, order, linearity, degree • General solution: definition and examples • Particular solution: definition and examples • Singular solution: explanation and examples • Methods for solving differential equations • Forming differential equations from given conditions or problems **First-Order Ordinary Differential Equations** • Introduction to first-order ODEs • Separable equations • Exact equations and integrating factors • Linear equations: integrating factor method • Bernoulli equations • Applications and modeling **Homogeneous Linear Equations with Constant Coefficients** • Homogeneous linear differential equations • Characteristic equation and roots • Solutions in terms of exponentials • Complex roots: Euler's formula • Systems of linear differential equations • Applications in physics and engineering **Homogeneous Linear Equations with Variable Coefficients** • Introduction to variable coefficients • Power series solutions • Frobenius method for equations with regular singular points • Bessel's equation and Bessel functions • Applications in mechanics, electromagnetism, and heat transfer **Linear Differential Equations of Degree-n and Laplace Transformation**

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	• Introduction to Laplace transformation • Laplace transforms of standard functions • Properties of Laplace transforms • Inverse Laplace transform • Solving linear differential equations using Laplace transforms • Application to circuit analysis, control systems, and signal processing These topics cover a comprehensive understanding of ordinary differential equations, ranging from basic concepts to advanced techniques, along with practical applications across various fields of science and engineering.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
80≤FS<100	A	4.00
75≤FS<80	B+	3.50
70≤FS<75	B	3.00

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	65≤FS<70	C+	2.50
	60≤FS<65	C	2.00
	55≤FS<60	D+	1.50
	50≤FS<55	D	1.00
	FS<50	E	0.00
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list	1. Ross L Shepley , 1984., Differential Equations., Third edition, Jhon Wiley & Son, Singapure. 2. Ayres Frank Jr, Ault J.C.,1992. "Teori Dan Soal Persamaan Diferensial " (terjemahan) Seri Schaum, Cetakan ketiga, Erlangga Jakarta 3. Finizio. N, G. Ladas., 1988, " Persamaan Diferensial Biasa Dengan Penerapan Modern". (Terjemahan). Edisi kedua, Erlangga . Jakarta. 4. Kreyzig Erwin, 1988 , "Advanced Engineering Mathematics"., Sixth Edition, John Wiley & Sons. New York Chcherster Bribane, Toronto Singapure.		

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	✓	✓	
CLO 2	✓	✓	
CLO 3	✓	✓	
CLO 4	✓	✓	✓
CLO 5	✓	✓	✓

Assessment Plan

	Activity	Quiz	Assignment	Mid Exam	Final Exam	Percentage
CLO 1	2	2		15		19
CLO 2	2	2	2	20		26
CLO 3	2	2	2		10	16
CLO 4	2	2	3		10	17
CLO 5	2	2	3		15	22
Percentage	**10**	**10**	**10**	**35**	**35**	**100**

Compilation Date : May 5th, 2024

Modified Date : May 5th, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Mathematical Statistics
Module level, if applicable	Bachelor
Code, if applicable	MPM-2241
Subtitle, if applicable	-
Courses, if applicable	Mathematical Statistics
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Dr. Yundari, M.Sc., Neva Satyahadewi, M.Sc., Dr. Evi Noviani, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Case-based learning,
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary statistics, measure, and probability theory.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics.

Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Students can explain and master the definition, theorems, and examples in basic knowledge of mathematical statistics, especially concepts related to probability, random variables including distribution, pdf, CDF, combined pdf, expected price, variance, mgf, random variable functions, convergence, point and interval estimation. **CLO 2.** Students can calculate probability and probability, use the definition of probability distribution to distinguish between random variables and continuous variables, use mgf to calculate expected price and variance and use mgf properties and transformation concepts to create random variable functions. **CLO 3.** Students can observe, recognize, formulate and solve problems related to random variables through a mathematical approach. **CLO 4.** Students can create random variable functions, such as CDF, transformation, and MGF techniques.
Content	The course will cover the random variable, Special Distribution of Random Variable, Multivariate of random variable, and function of random variable.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: **No** | **Assessment methods** | **Weight (%)** 1 | Class Activities | 10 2 | Assignments | 20 3 | Mid-Term Examination | 35 4 | Final Examination | 35 Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-

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	Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	**1.** Bain L Jee and Engekhardt Max, 1992, *Introduction to Probability and Mathematical Statistics,* second Edition, Duxbury Press:California. **2.** Robert V. Hogg, Joeseph Mckean, Allen T.Craig, 2014, *Introduction to Mathematical Statistics*, Seventh Edition, Pearson: USA **3.** E. Walpole, Ronald, H Maiers, Raymon, 1986, *Ilmu Peluang dan Statistik untuk Insinyur dan Ilmuwa*n, second edition, ITB: Bandung.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2			√	√		
CLO 3	√	√				
CLO 4				√		

Assessment Strategies

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	2.5	5	2.5		10
2	2.5	5	32.5		34
3	2.5	5		31.5	45
4	2.5	5		3.5	11
Percentage (%)	**10**	**20**	**35**	**35**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Research Methodology in Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MPM-2261
Subtitle, if applicable	-
Courses, if applicable	Research Methodology in Mathematics
Semester(s) in which the module is taught	4th (sixth)
Person responsible for the module	Final Project
Lecturer(s)	Dr. Bayu Prihandono, S.Si., M.Sc Dr. Yundari, S.Si., M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, for a total of 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

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<table>
<tr><td>Module objectives (CLO)</td><td>After completing this course, the students should have the ability to
CLO 1. Students can explain the basic concepts of research in mathematics.
CLO 2. Students can formulate problems and objectives of mathematics research.
CLO 3. Students can classify the anatomy and aspects that must be fulfilled in a scientific work
CLO 4. Students master the use of word processing applications and data processing applications in supporting the preparation of mathematical scientific papers
CLO 5. Students master the use of reference management applications in tracking and placing citations in mathematics scientific papers
CLO 6. Students master presentation applications and can communicate their research results</td></tr>
<tr><td>Content</td><td>Mathematics research guidelines and research methods projects</td></tr>
<tr><td>Examination forms</td><td>Essay</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and</td></tr>
</table>

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<table>
<tr><td></td><td>based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td></td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 6
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√
CLO 6	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	10		13
2	2	4	10		16
3	2	4	15		21
4	2	4		15	21
5	**2**	**4**		10	16
6	**1**	**2**		10	13
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Transformation Geometry
Module level, if applicable	Bachelor
Code, if applicable	MPM-2222
Subtitle, if applicable	-
Courses, if applicable	Transformation Geometry
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Yudhi, M.Si. & Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in basic number theory, mathematical logic, relations, and functions.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**. Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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	ILO 6. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to master the concept of geometric transformations in R^2 and R^n, which are related to isometry. **CLO 2.** Students are able to apply the theorems related to isometry in R^2 and R^n. **CLO 3.** Students are able to use the principles and concepts in isometry in R^2 to identify geometric patterns related to isometry based on the concepts of frieze groups and wallpaper groups. **CLO 4** Students are able to use the concept of isomerism in R^n to form a decomposition of a matrix in the form of QR decomposition and apply it to find consistent SPL solutions (based on the Householder transformation) and matrix eigenvalues (based on the Givens transformation).
Content	This course discusses material regarding geometric transformations, the composition of transformations and inverse transformations, isometry in R^2 (translation, rotation, reflection and glide), and symmetry groups, including frieze groups and wallpaper groups. Meanwhile, this course also discusses isometry in R^n, including orthogonal matrices, transformation matrices (for translation, reflection and rotation) and QR decomposition based on the Householder and Givens transformations.
Examination forms	Oral presentation, Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

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	Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5
$70 \leq FS < 75$	B	3
$65 \leq FS < 70$	C+	2,5
$60 \leq FS < 65$	C	2
$55 \leq FS < 60$	D+	1,5
$50 \leq FS < 55$	D	1
$FS < 50$	E	0

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	[1]. Susanta, B. 1990. *Geometri Transformasi.* FMIPA Universitas Gajah Mada: Yogyakarta. [2]. Rawuh. 1992. *Geometri Transformasi*. Dept. P dan K: Bandung. [3]. Eccles, F.M. 1971. *An Introduction to Tranformational Geometry*. Addison Wesley Publishing Company, Inc. [4]. Martin, G.E. 1982. *Transformasi Geometry an Introduction to Geometry.* Springer-Verlag: New York Inc.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√			√		
CLO 3	√		√			√
CLO 4	√	√				√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	5	5		12
CLO 2	2	5	**15**		22
CLO 3	3	5	15		23
CLO 4	3	5		35	43
Percentage	**10**	**20**	**35**	**35**	**100**

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Compilation Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Semigroup
Module level, if applicable	Bachelor
Code, if applicable	MPM-2223
Subtitle, if applicable	-
Courses, if applicable	Introduction to Semigroup
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in mathematical logic and elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students have the ability to identify the structure of semigroups in many areas of algebra. **CLO 2.** Students have the ability to prove the fundamental properties of homomorphisms **CLO 3.** Students have the ability to prove the elementary properties of Green's relations (Equivalence). **CLO 4.** Students have the ability to identify some kind of special semigroup. **CLO 5.** Students have the ability to explain the application of semigroup on algebraic systems and other fields.
Content	The course Introduction to Semigroup would likely cover the following topics: Basic definition of semigroup, monoid, subsemigroup, ideals, natural order, partially ordered semigroup, Green's equivalence, homomorphism of semigroups, regular element, idempotent element, inverse element, generalized inverse, quotient semigroup, regular semigroup, inverse semigroup, Orthodox semigroup.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale: **Percentage of Achievement** | **Grade** | **Conversion Value**

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		$80 \leq FS \leq 100$	A	4
		$75 \leq FS < 80$	B+	3,5
		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Kusumastuti, N. Fran, F., 2023, *Pengantar Aljabar Abstrak: Teori Grup dan Ring,* Pontianak: UNTAN-Press. [2]. Malik, D.S., John N. Mordeson, M.K. Sen 2007, *Introduction to Abstract Algebra,* Nebraska: Creighton University. [3]. Fraleigh, J.B., 1994, *A First Course in Abstract Algebra,* Fifth Edition, New York: Addison-Wesley. [4]. Hungerford, T.W., 1974, *Algebra,* New York: Springer-Verlag.			

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√			√		
CLO 3	√			√		
CLO 4	√		√			
CLO5	√			√		

Assessment Plan

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage
CLO 1	2	4	15		21
CLO 2	2	4	15		21
CLO 3	2	4	5	5	16
CLO 4	2	4		15	21
CLO 5	2	4		15	21
Percentage	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Finite Group Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-2224
Subtitle, if applicable	-
Courses, if applicable	Finite Group Theory
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Dr. Nilamsari Kusumastuti, M.Sc., Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in basic set theory, mathematical logic, functions, and elementary algebra.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to master theoretical concepts related to finite groups, such as Lagrange's theorem, normal subgroups and subgroups, normal series and direct products. **CLO 2.** Students can explain and apply theorems related to finite groups in the finite group class. **CLO 3.** Students can use principles and concepts in finite group theory to determine normal subgroups and normal series of a finite group based on the group order.
Content	This Finite Group Theory course discusses material regarding several classes of finite groups, such as permutation groups, alternating groups, dihedral groups, quaternion groups and Klein groups. Further discussion is also related to the Sylow Theorem, which includes Jordan Holder's Theorem (related to normal sequences), group action, Sylow subgroups, and direct product groups.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS \leq 100$	A	4
$75 \leq FS < 80$	B+	3,5

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		$70 \leq FS < 75$	B	3
		$65 \leq FS < 70$	C+	2,5
		$60 \leq FS < 65$	C	2
		$55 \leq FS < 60$	D+	1,5
		$50 \leq FS < 55$	D	1
		$FS < 50$	E	0
Media employed	Board, LCD Projector, Laptop/Computer			
Reading list	[1]. Kusumastuti, N. Fran, F., 2023, *Pengantar Aljabar Abstrak: Teori Grup dan Ring,* Pontianak: UNTAN-Press. [2]. Malik, D.S., John N. Mordeson, M.K. Sen 2007, *Introduction to Abstract Algebra,* Nebraska: Creighton University. [3]. Fraleigh, J.B., 1994, *A First Course in Abstract Algebra,* Fifth Edition, New York: Addison-Wesley. [4]. Hungerford, T.W., 1974, *Algebra,* New York: Springer-Verlag.			

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√			√		
CLO 3	√		√			

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	3	7	20	5	35
CLO 2	4	5	10	10	29
CLO 3	3	8	5	20	36
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Multivariate Analysis
Module level, if applicable	Bachelor
Code, if applicable	MPM-2243
Subtitle, if applicable	-
Courses, if applicable	Multivariate Analysis
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Hendra Perdana, M.Sc., and Dr. Yundari, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Collaborative Learning and Project Based learning.
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Regression Analysis
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

<table>
<tr><td></td><td>mathematical thinking in problem-solving, and communicates it in the language of mathematics.

ILO 5: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies.

ILO 6: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.</td></tr>
<tr><td>Module objectives (CLO/CPMK)</td><td>After completing this course,

CLO 1. Students can understand the terminology in data and its analysis and the concept of data screening

CLO 2. Students can master and explain the theoretical concepts of principal component analysis, factor analysis, cluster analysis, discriminant analysis and MANOVA

CLO 3. Students can use SPSS or R to conduct principal component analysis, factor analysis, cluster analysis, discriminant analysis and MANOVA

CLO 4. Students can analyze principal component analysis, factor analysis, cluster analysis, discriminant analysis and MANOVA

CLO 5. Students can apply the results of principal component analysis, factor analysis, cluster analysis, discriminant analysis and Canova to problems in the field.</td></tr>
<tr><td>Content</td><td>1. Data Screening
2. Principles of Component Analysis
3. Factor Analysis
4. Cluster Analysis
5. Canonical Correlation
6. Conjoint Analysis
7. Discriminant Analysis
8. Multidimensional Analysis
9. Correspondence Analysis
10. MANOVA</td></tr>
<tr><td>Examination forms</td><td>Essay</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement

Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations

The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
</table></td></tr>
</table>

	4 | Oral Presentation | 35 Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Oral Presentation (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Johnson, R. A. and Wichern, D. W. (2013). *Applied Multivariate Statistical Analysis* (sixth edition). Pearson Education 2. Latan, Hengky dan Temalagi, Selva. *Analisis Multivariate: Teknik dan Aplikasi Menggunakan Program IBM SPSS 20.0*. Bandung: Alfabeta 3. Hardle, W. and Simar, L. (2003). *Applied Multivariate Statistical Analysis*. Method and Data Technologies

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2				√		
CLO 3			√			
CLO 4					√	√
CLO 5	√	√			√	√

Assessment Strategies

CLO	Activity	Task	Writing Paper	Mid-term Examination	Oral Presentation	Percentage (%)
1	1			10		11
2	1			10		11
3	2	1		15	5	23
4	3	2	5		15	25
5	3	2	10		15	30
Percentage (%)	**10**	**5**	**15**	**35**	**35**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Sampling Methods
Module level, if applicable	Bachelor
Code, if applicable	MPM-2141
Subtitle, if applicable	-
Courses, if applicable	Sampling Methods
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Nur'ainul Miftahul Huda, M.Si. and Naomi Nessyana Debataraja, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Collaborative Learning and Project Based learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week, 50 minutes of practicum for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (100 minutes), final exam (100 minutes), and practicum exam (100 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Statistical Method
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1**. Students can understand the basic concepts of sampling, state the definition of samples, sampling frameworks and types of data, explain the sources of errors in sampling, and explain the sampling method **CLO 2.** Students can explain and provide examples of non-probability sampling methods and estimate population parameter estimates from these methods **CLO 3.** Students can explain the types of interviews and stages in a survey
Content	1. Sample 2. Simple Random Sampling 3. Systematic Random Sampling 4. Stratified Random Sampling 5. Cluster Sampling 6. Multistage Cluster Sampling 7. Surveys
Examination forms	Essay, Paper and Oral Presentation

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Study and examination requirements

Study Requirement

Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations

Students are evaluated based on their performance class: Theory and Practicum.

The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

While the practicum's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Pre-test and Post-test	10
2	Experiments Reports	40
3	Practicum Examination	50

Practicum's Final Score (PFS) = Pre-test and Post-test (10%) + Experiments reports (40%) + Practicum Exam (50%)

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

FS = TFS (70%) + PFS (30%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

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Media employed	Board, LCD Projector, Laptop/Computer, E-Learning
Reading list	1. Warwick, W.P. and Lininger, C.A., 1975, The Sample Survey : Theory and Practice, McGraw-Hill, Inc., New York. 2. Buckingham, A. and Saunders, P., 2004, The Survey Methods Workbook, 3. Scheaffer, R.L., Mendenhall, W., and Ott Lyman, 1990, Elementary Survey Sampling 4th Ed, PWS-Kent Publishing Company, Boston. 4. Fellegi, I.P., 2003, Survey Methods and Practices, National Library of Canada Cataloguing in Publication Data

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1		√		√		
CLO 2		√	√		√	
CLO 3	√					√

Assessment Strategies

CLO	Activity	Quiz	Task	Pre-test	Post-test	Experiment reports	Mid-term Examination	Practicum Examination	Final Examination	Percentage (%)
1	2	2				2	10	9		25
2	4	4	7	1	1	8.5	14.5	5		45
3	1	1		0.5	0.5	1.5		1	24.5	30
Percentage (%)	**7**	**7**	**7**	**1.5**	**1.5**	**12**	**24.5**	**15**	**24.5**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Non-parametric Statistics
Module level, if applicable	Bachelor
Code, if applicable	MPM-2244
Subtitle, if applicable	-
Courses, if applicable	Non-parametric Statistics
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Division of Statistics
Lecturer(s)	Drs. Helmi, M.Si. and Hendra Perdana, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the second year (4th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Case-based learning,
Workload (incl. contact hours, self-study hours)	The total workload is 91 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam (100 minutes) and final exam (100 minutes).
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in elementary statistics, measure, and probability theory.
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Students can distinguish between parametric statistics and non-parametric statistics and explain the advantages and disadvantages of non-parametric statistics **CLO 2.** Students can explain the use of several tests in non-parametric statistics **CLO 3.** Students can solve problems of descriptive hypothesis testing, comparative hypothesis testing for paired and independent samples, and associative hypothesis testing **CLO 4.** Students can use relevant statistical analysis and be responsible for the results of the analysis carried out.
Content	1. Descriptive hypothesis test (1 sample) 2. Comparative hypothesis test 2 paired samples 3. Comparative hypothesis test 2 independent samples 4. Comparative hypothesis test k paired samples 5. Comparative hypothesis test k independent samples 6. Associative hypothesis test
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignment	20
3	Mid-term Examination	35

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	4 | Final Examination | 35 Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term Examination (30%) + Final Examination (40%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Siegel Sidney. 1956. Nonparameteric Statistics for the Behavioral Sciences. New York: McGraw Hill 2. Djarwanto. 1997. Statistik Nonparametrik. Yogyakarta: BPFE. 3. Sugiyono. 2007. Statistik Nonparametris untuk Penelitian. Bandung: Alfabeta.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2					√	√
CLO 3		√	√			√
CLO 4	√				√	√

Assessment Strategies

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	2.5	5	12.5		20
2	2.5	5	12.5		20
3	2.5	5	10	14.5	32
4	2.5	5		20.5	28
Percentage (%)	**10**	**20**	**35**	**35**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Real Analysis I
Module level, if applicable	Bachelor
Code, if applicable	MPM-3111
Subtitle, if applicable	-
Courses, if applicable	Introduction to Real Analysis I
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Dr. Bayu Prihandono, M.Sc., Mariatul Kiftiah, M.Sc., and Dr. Nilamsari Kusumastuti.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Calculus (MPM-1111)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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<table>
<tr><td>Module objectives (CO/CPMK)</td><td>After completing this course, the students should have the ability to
CLO 1. Students are able to understand and master definitions, theorems, and examples of basic knowledge of real analysis, especially concepts related to real number systems, sequences, and series.
CLO 2. Students are able to use the properties of real numbers.
CLO 3. Students are able to study and investigate the convergence of real sequences and series.
CLO 4. Students are able to evaluate proof of existing theorems in the concept of real analysis.
CLO 5. Students are able to reason by building and compiling proofs of theorems in real analysis concepts and systematically expressing the results of their reasoning in writing.
CLO 6. Students are able to apply real analysis concepts both in the field of mathematics and in other relevant fields.</td></tr>
<tr><td>Content</td><td>This course explores in depth the concepts of the Real Number System, Sequences and Series, and their Convergence.</td></tr>
<tr><td>Examination forms</td><td>Essay</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignments</td><td>20</td></tr>
<tr><td>3</td><td>Mid-Term Examination</td><td>35</td></tr>
<tr><td>4</td><td>Final Examination</td><td>35</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and</td></tr>
</table>

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<table>
<tr><td></td><td>based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Bartle, R.G and Sherbert, D.R. 2011. Introduction to Real Analysis, 4th ed. United. States: John Wiley & Sons, Inc.
2. Trench, W.F. 2003. Introduction to Real Analysis. New Jersey: Pearson.
3. Darmawijaya, S. 2006. Pengantar Analisis Real. Yogyakarta: Jurusan Matematika FMIPA UGM.</td></tr>
</table>

CO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CO 1	√		√
CO 2	√		√
CO 3	√	√	√
CO 4	√	√	√
CO 5	√	√	√
CO 6	√	√	√

Assessment Plan

CO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1		5	5	11
2	2	3	2		7
3	2	3		10	15
4	2	4	10	5	21
5	**2**	**10**	**10**	**8**	**30**
6	**1**		**8**		**16**
Percentage (%)	**10**	**10**	**35**	**7**	**100**

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Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Partial Differential Equations
Module level, if applicable	Bachelor
Code, if applicable	MPM-3112
Subtitle, if applicable	-
Courses, if applicable	Partial Differential Equations
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Drs. Helmi, M.Si., Dr. Evi Noviani, S.Si., M.Si
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6,68 ECTS
Required and recommended prerequisites for joining the module	Integral Calculus (MPM-1211) Elementary Differential Equations (MPM-2211)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Able to master partial derivatives, partial derivatives of order n, total derivatives, necessary and sufficient conditions CLO 2. Able to explain the meaning of PDP CLO 3. Able to recognize the general form of partial differential equations of order one to order n CLO 4. Able to derive PDP by elimination of arbitrary constants and arbitrary functions CLO 5. Able to solve scientific problems through general PDP solution approach and partial PDP solution approach CLO 6. Able to recognize the form of non-linear first-order and second-order PDPs CLO 7. Able to solve partial PUPD and partial PD problems of first-order and second-order as well as non-linear PDPs CLO 8. Able to solve partial partial solution (PDP) problems CLO 9. Able to solve PDP with several accurate methods and be able to interpret CLO 10. Able to solve nth-order homogeneous PDP with constant coefficients and variable coefficients
Content	This course studies Partial Differential Equations of Order 1, Order 2, and Homogeneous and Non-Homogeneous PDEs, as well as problems with initial conditions and boundary conditions.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

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<table>
<tr><td></td><td>Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
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<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>2FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Raji, A.Wahid, Mohamad, M. Nor. 2008. Differential Equations for Engineering Students, Comtech Marketing Sdn. Bhd, Malaysia.
2. Ross, S.L. 1984. Differential Equations, Third Edition, John Wiley & Sons, Inc., New York.
3. Ayres Frank Jr, Ault J.C., 1992. Teori Dan Soal Persamaan Diferensial, Seri Schaum, Cetakan ketiga, Erlangga Jakarta.
4. Folland, G. B. 1996. Introduction to Partial Differential Equations, 2nd ed. Princeton, NJ: Princeton University Press.
5. Kevorkian, J. 2000. Partial Differential Equations: Analytical Solution Techniques, 2nd ed. New York: Springer-Verlag.
6. Morse, P. M. and Feshbach, H. "Standard Forms for Some of the Partial Differential
7. Polyanin, A., Zaitsev, V., and Moussiaux, A. 2001. Handbook of First-Order Partial Differential Equations. New York: Gordon and Breach.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√

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CLO 6	√	√	√
CLO 7	√	√	√
CLO 8	√	√	√
CLO 9	√	√	√
CLO 10	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1		5	5	11
2	1	3	2		7
3	2	3		10	15
4	1	4	10	5	21
5	**1**	**10**	**10**	**8**	**30**
6	**2**		**8**		**16**
7					
8					
9					
10					
Percentage (%)	**10**	**10**	**35**	**7**	**100**

Compilation Date : July 22nd, 2024

Modified Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Operation Research
Module level, if applicable	Bachelor
Code, if applicable	MPM-3131
Subtitle, if applicable	-
Courses, if applicable	Operation Research
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Applied Mathematic Subject Group
Lecturer(s)	Dr. Bayu Prihandono, M.Sc. and Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, structured activities (assignments, quizzes, team-project), problem solving and laboratory works.
Workload (incl. contact hours, self-study hours)	The total workload is 98 hours per semester, which consists of 50 minutes of lectures per week for 14 weeks, 60 minutes of structured activities per week, 60 minutes of individual study per week including activity in Learning Management System and 170 minutes of practical work, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 (1) = 3.34 ECTS
Required and recommended prerequisites for joining the module	Linear Programming (MPM-2131)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5 :** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to CO 1. Students are able to construct models for operation research problems based on formulated assumptions and applying them through problem simulations. CO 2. Students are able to solve the models by their algorithms or technique CO 3. Students are able to use optimization software to solve several models in operation research. CO 4. Students are able to adapt real problems from various fields such as industry, agriculture, engineering, biology, or other areas into operation research CO 5. Students are able to determine various post-optimality conclusions. CO 6. Students are able to solve network problems.
Content	1. Model, application, and algorithm for transportation, transshipment, assignment. 2. Network models : shortest path problem, minimum spanning tree, maximum flow, travelling salesman problem, and critical path method 3. Laboratory work
Examination forms	Written assignment, written exams, case based project, presentation, laboratory work
Study and examination requirements	

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Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exa

Study examinations
Students are evaluated based on their performance class: Theory and Practicum.

The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

While the practicum's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Pre-test and Post-test	10
2	Experiments Reports	40
3	Practicum Examination	50

Practicum's Final Score (PFS) = Pre-test and Post-test (10%) + Experiments reports (40%) Exam (50%)

Students are declared to have passed this course if the Final Score (FS) of Students with the below reaches a minimum score of 50 or D.

FS = TFS (70%) + PFS (30%)

Students are marked based on their Final Score (FS) obtained and based on the following g

Percentage of Achievement	Grade	Conversion Value
80FS<100	A	4.00
75FS<80	B+	3.50
70FS<75	B	3.00
65FS<70	C+	2.50

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	60FS<65 | C | 2.00 55FS<60 | D+ | 1.50 50FS<55 | D | 1.00 FS<50 | E | 0.00
Media employed	Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using Qm-for windows, Lingo dan Excel
Reading list	1. Hillier, F. S., & Lieberman, G. J. (2001). *Introduction to Operations Research.* New York: McGraw Hill. 2. Prihandono, B. & Pasaribu, M. *Modul Ajar Riset Operasi.* Pontianak: FMIPA UNTAN 3. Sharma, J. K. (2016). *Operations Research Tehory and Applications, Sixth Edition.* India: Trinity Press. 4. Taha, H. A. (2007). *Operations Research: An Intorduction, Eight Edition.* USA: Pearson Education, Inc. 5. Winston, W. L. (2003). *Operations Research Applications and Algorithms, Fourth Edition.* United States: Thompson Learning

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CO 1	√	√	√	√	√	√
CO 2	√	√	√	√		√
CO 3	√	√	√	√		√
CO 4	√	√	√	√		√
CO 5	√	√	√	√		√
CO 6	√	√	√	√	√	√

Asessmen Plan

	Theory (70%)				Percentage	Praktikum (30%)			Percentage
	Activity	Assignment	Mid Exam	Final Exam		Pre test Post test	Experiments report	Practicum Exam	
CO 1	2	4	3		9	2	2	4	9
CO 2	2		11		13	1	2	7	13

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CO 3	**2**	**9**	**17**		**28**	**1**	**8**	**10**	**28**
CO 4	**1**	**2**		**14**	**17**	**2**	**8**	**10**	**17**
CO 5	**1**	**2**		**3**	**6**	**1**	**10**	**9**	**6**
CO 6	**2**	**3**	**4**	**18**	**27**	**3**	**10**	**10**	**27**
Percentage	**10**	**20**	**35**	**35**	**100**	**10**	**40**	**50**	

Compilation Date : July 22nd, 2024

Modified Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Computational Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MPM-3151
Subtitle, if applicable	-
Courses, if applicable	Introduction to Computational Mathematics
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Computer Science Subject Group
Lecturer(s)	Dr. Evi Noviani, M.Si., CFrA and Yudhi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom, and problem solving.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week; in total is 16 weeks per semester, including mid-exam and final exams.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in Elementary Linear Algebra and Ordinary Differential Equations.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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Module objectives (CO/CPMK)	After completing this course, the students should have: CLO 1. Ability to master the concepts of calculus and linear algebra. CLO 2. Ability to use the Maple software program to represent algebraic expressions and operations from calculus and linear algebra problems. CLO 3. Ability to utilize the Maple software program to find solutions for calculus, linear algebra, and differential equation problems. CLO 4. Ability to adapt to and develop the use of the Maple software program in solving problems related to cases in calculus, linear algebra, and differential equations. CLO 5. Proficient in applying and enhancing computational skills in the workplace.
Content	1. Introduction to Maple 2. Solving Calculus Differential and It is Applications Using Maple 3. Solving Calculus Integral and Its Applications Using Maple 4. Solving Elementary Linear Algebra Using Maple 5. Solving Differential Equations Using Maple
Examination forms	Essay and Multiple Choice
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** Students are evaluated based on their performance class: Theory and Practicum. The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

While the practicum's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Pre-test and Post-test	10
2	Experiments Reports	40
3	Practicum Examination	50

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<table>
<tr><td></td><td>Practicum's Final Score (PFS) = Pre-test and Post-test (10%) + Experiments reports (40%) + Practicum Exam (50%)

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

FS = TFS (70%) + PFS (30%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
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<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2.50</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2.00</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1.50</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
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<tr><td>Reading list</td><td>1. Abel, M.L. dan Braselton, J.B. 2005. Maple by Example, 3rd edition, Elsevier Academic Press, USA.
2. Anton, H., and Rorres, C. 2014. Elementary Linear Algebra: Applications version Eleventh Edition. Wiley: USA.
3. Boyce, W. E., Diprima, R. C., and Meade, D. B. 2017. Elementary Differential Equations and Boundary Value Problems Eleventh Edition. Wiley: USA.
4. Strauss, W. A. 2008. Partial Differential Equations an Introduction Second Edition. John Wiley & Sons, Inc: USA.
5. Varberg, D., Purcell, E. J., and Rigdon, S.E. 2007. Calculus Ninth Edition. Pearson Education, Inc: USA.</td></tr>
</table>

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3
CO 1	✓	✓	
CO 2	✓	✓	
CO 3	✓	✓	
CO 4	✓	✓	
CO 5	✓		✓

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Assessment Strategies

CLO	Activity	Quiz	Assignment	Pre-test	Post-test	Experiment reports	Mid-term Examination	Practicum Examination	Final Examination	Percentage (%)
1	1					2	5	2		10
2	1	2	2	1	1	3	6	4		20
3	1	2	2	1	1	3		5	10	25
4	1	2	2	1	1	3		5	10	25
5	1	2	2	1	1	3		4	6	20
Percentage (%)	**5**	**8**	**8**	**4**	**4**	**14**	**11**	**20**	**26**	100

Compilation Date : May 2nd, 2024

Modified Date : May 2nd, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Algorithms and Programming
Module level, if applicable	Bachelor
Code, if applicable	MPM-3152
Subtitle, if applicable	-
Courses, if applicable	Algorithms and Programming
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the computer science
Lecturer(s)	Dr. Bayu Prihandono, S.SI., M.Sc, dan Yudhi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5,01 ECTS
Required and recommended prerequisites for joining the module	Introduction to Modern Mathematics (MPM-1121)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Demonstrates mastery in programming languages presenting algorithms using descriptive explanations, flowcharts, and pseudocode. CLO 2. Demonstrates the ability to apply programming languages and basic programming concepts to solve mathematical modeling problems. CLO 3. Understands programming skills' significance and application in the workplace and scientific disciplines. CLO 4. Applies algorithmic thinking and programming concepts to solve problems in basic science and mathematics.
Content	Programming basics: basic programming concepts and program structure, pseudocode, flowcharts, structures, data types, variables and constants, standard operators and functions. Programming languages: if, if-else, looping, procedures, and functions.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

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	Percentage of Achievement	**Grade**	**Conversion Value**
	80≤FS<100	A	4.00
	75≤FS<80	B+	3.50
	70≤FS<75	B	3.00
	65≤FS<70	C+	2.50
	60≤FS<65	C	2.00
	55≤FS<60	D+	1.50
	50≤FS<55	D	1.00
	3FS<50	E	0.00
Media employed	Board, LCD Projector, Laptop/Computer		
Reading list	8. Purcell, E. J. & Varberg, D., 1994. Calculus and Analytical Geometry. Edisi ke-4. Jakarta. 9. Hadiwidjojo, M., 1974, Field Analytical Measurement Science, Yogyakarta: FPMIPA-IKIP. 10. Neva Satyahadewi dan Yundari, 2023, Geometry teaching module, Pontianak: FMIPA-UNTAN.		

CLO-ILO Mapping

	ILO 1	**ILO 2**	**ILO 3**
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√

Assessment Plan

CLO	**Activity**	**Task**	**Mid-term Examination**	**Final Examination**	**Percentage (%)**
1	2	2	15		19
2	3	3	20		26
3	2	2		15	19
4	3	3		20	26
Percentage (%)	**10**	**10**	**35**	**35**	**100**

Compilation Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Actuarial Mathematic and Finance
Module level, if applicable	Bachelor
Code, if applicable	MPM-3132
Subtitle, if applicable	-
Courses, if applicable	Introduction to Actuarial Mathematic and Finance
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Dr. Evy Sulistyaningsih, M.Sc., Asri Rahmawati, M.Mat., and Neva Satyahadewi, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Collaborative Learning and Project Based learning.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam (150 minutes) and final exam (150 minutes).
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	No prerequisites
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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	ILO 3. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1.** Students can explain and master the definition of insurance and the terms used, as well as master the principles of survival functions, survival distribution laws, concepts of interest calculations, annuities and stochastic processes **CLO 2.** Students can explain and use life tables to calculate life expectancy using or without software **CLO 3.** Students can detect and recognize the relationship between the survival function and the survival distribution. **CLO 4.** Students can formulate, calculate and solve interest rate problems and stochastic processes. **CLO 5.** Students can modify and interpret annuity value calculations by simulating different interest rates and ages. **CLO 6.** Students can solve and apply the concepts of interest rates, survival functions, annuities, and stochastic processes in statistics, mathematics, actuarial, and other fields.
Content	1. Types of insurance 2. Life table 3. Survival function 4. Simple rate 5. Compound rate 6. Annuity 7. Portfolio 8. Introduction to stochastics process
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be

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eligible for the final exam.

Study examinations

The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignment	20
3	Mid-Term Examination	30
4	Final Examination	40

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Paperwork (20%) + Mid-Term exam (30%) + Oral Presentation (40%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer, E-Learning
Reading list	1. Bowers, Newton L, et al., 1997. Actuarial Mathematics. Second Edition. Schumburg, Illinois: The Society of Actuaries. 2. Futami, Takashi., 1993. Matematika Asuransi Jiwa. Jilid I. Gatot Herliyanto, penerjemah. Tokyo: OLICD Centre. 3. Sidi, Pramono dan Malau, R Alam, 2006. Matematika Finansial. Jakarta: Universitas Terbuka.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2			√			
CLO 3				√		
CLO 4		√	√			

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CLO 5			√			
CLO 6	√	√			√	√

Assessment Strategies

CLO	Activity	Paper	Mid-term Examination	Oral Presentation	Percentage (%)
1	1		2		3
2	1		9		10
3	1		3		4
4	1		9		10
5	1		7		8
6	5	20		40	65
Percentage (%)	**10**	**20**	**30**	**40**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Linear Algebra Applications
Module level, if applicable	Bachelor
Code, if applicable	MPM-3121
Subtitle, if applicable	-
Courses, if applicable	Linear Algebra Applications
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Algebra and Combinatorics Subject Group
Lecturer(s)	Yudhi, M.Si & Fransiskus Fran, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Students should be proficient in linear algebra
Intended Learning Outcome (ILO)	**ILO 1** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2** Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4** Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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	ILO 5 Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students are able to carry out matrix decomposition based on the concepts of matrix diagonalization, QR-decomposition and SVD. **CLO 2.** Students are able to analyze properties related to matrix decomposition based on the concepts of matrix diagonalization, QR-decomposition and SVD. **CLO 3.** Students can model cases in several science fields based on linear algebra concepts. **CLO 4.** Students are able to assess the accuracy and interpret several linear algebra concepts used in several fields of science.
Content	This course discusses matrix decomposition (matrix diagonalization, Jordan form, QR-decomposition and SVD) and its applications. Furthermore, it also discusses several applications of linear algebra in the fields of Geometry, Physics, Economics, Biology and Forestry.
Examination forms	Essay
Study and examination requirements	**Study Requirement** **Attendance**: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows: No Assessment methods Weight (percentage) 1 Class Activities 10% 2 Assignments 20% 3 Mid-Term Examination 35% 4 Final Examination 35 % Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. **Final Score (FS)** = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

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<table>
<tr><td></td><td>Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS \leq 100$</td><td>A</td><td>4</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3,5</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2,5</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1,5</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>[1]. Anton, H dan Rorres, C., 2004, Aljabar Linear Elementer Versi Aplikasi, Erlangga, Jakarta.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√		√			
CLO 2	√		√	√		
CLO 3	√	√			√	
CLO 4	√	√			√	√

Assessment Strategies

CLO	Activity	Task	Mid-Term Examination	Final Examination	Percentage (%)
CLO 1	2	5	15		22
CLO 2	3	5	**20**		28
CLO 3	2	4		15	31
CLO 4	3	6		20	29
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Dynamic Systems
Module level, if applicable	Bachelor
Code, if applicable	MPM-3133
Subtitle, if applicable	-
Courses, if applicable	Dynamic Systems
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Applied Mathematic Subject Group
Lecturer(s)	Dr. Evi Noviani, Yudhi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive, Collaborative and Case based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 = 5.01 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	ILO 1: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. ILO 2: Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. ILO 3: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. ILO 5 : Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies ILO 6: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to CLO 1. Students are able to understand systems of differential equations, system stability, and phase portraits. CLO 2. Students are able to comprehend the steps for solving differential equations, system stability, and illustrate phase portraits and direction fields of a system. CLO 3. Students are able to find solutions to systems of differential equations and determine stability, either with or without the use of software tools. CLO 4. Students are able to reconstruct, modify, and analyse/think systematically about systems of differential equations and their stability in relation to a given phenomenon. CLO 5. Students are able to interpret phase portraits and direction fields of systems of differential equations both orally and in written form accurately and clearly. CLO 6. Students are able to utilise various approaches to solving differential equations, whether analytically or numerically, either independently or in groups, for effective decision-making. CLO 7. Students are able to adapt real-world problems, such as those in physics, engineering, biology, or other fields, into dynamic systems.
Content	1. System of Differential Equation 2. System Stability 3. Phase Portrait
Examination forms	Written assignment, written exams, case based project, presentation,

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<table>
<tr><td>Study and examination requirements</td><td>

Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
Students are evaluated based on their performance class: Theory
The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
80FS<100	A	4.00
75FS<80	B+	3.50
70FS<75	B	3.00
65FS<70	C+	2.50
60FS<65	C	2.00
55FS<60	D+	1.50
50FS<55	D	1.00
FS<50	E	0.00

</td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using python</td></tr>
<tr><td>Reading list</td><td>

[1] L. Perko, *Differential Equations and Dynamical Systems*, Springer-Verlag, New York, 200
[2] F. Verhulst, *Nonlinear Differential and Dynamical Systems*, Springer-Verlag, Berlin, 1990.
[3] E. Süli, *Numerical Solution of Ordinary Differential Equations,* Mathematical Institute, Un
[4] L. Perko, *Differential Equations and Dynamical Systems*, Springer-Verlag, New York, 200

</td></tr>
</table>

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CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	√			√		
CLO 2	√		√	√		
CLO 3	√		√	√	√	√
CLO 4	√		√	√	√	√
CLO 5	√		√	√		√
CLO 6	√	√	√	√	√	√
CLO 7	√	√	√	√	√	√

Asessmen Plan

					Percentage
	Activity	Assignment	Mid Exam	Final Exam	
CLO 1	1		2		3
CLO 2	1		6		7
CLO 3	2	7	12		21
CLO 4	2		13		15
CLO 5	1	3		8	12
CLO 6	2	5		12	19
CLO 7	1	5	2	15	23
Percentage	10	20	35	35	100

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Experimental Design
Module level, if applicable	Bachelor
Code, if applicable	MPM-3141
Subtitle, if applicable	-
Courses, if applicable	Experimental Design
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of Statistics group (Dr. Yundari, M.Sc.)
Lecturer(s)	Drs. Helmi, M.Si. and Hendra Perdana, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Case-based learning,
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Statistical Method
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology.

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	ILO 4. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have: **CLO 1.** Students can explain the theoretical concept of experimental design and presentation of hypotheses **CLO 2.** Students can formulate research hypotheses, compile ANOVA tables, and draw conclusions **CLO 3.** Students can create programs for design, read output, and interpret it **CLO 4.** Students can determine an experimental design model that is appropriate to environmental conditions/available materials, analyze data, and conclude the results
Content	1. Completely randomized design 2. Randomized block design 3. Comparison of group means 4. Factorial design 5. Split plot
Examination forms	Essay, Paperwork, Oral Presentation
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignment	20
3	Mid-term Examination	35

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	4 | Final Examination | 35 Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D. Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Oral Presentation (35%) Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	Montgomery, D.C., (2005), Design and Analysis of Experiment, 2nd edition, John Wiley & Sons Inc.

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2		√		√		
CLO 3			√			
CLO 4	√				√	√

Assessment Strategies

CLO	Activity	Task	Paperwork	Mid-term Examination	Oral Presentation	Percentage (%)
1	2.5	2		10.5		15
2	2.5	3		14.5		20
3	2.5		1.5	10	6	20
4	2.5		13.5		29	45
Percentage (%)	**10**	**5**	**15**	**35**	**35**	

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Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Stochastic Process
Module level, if applicable	Bachelor
Code, if applicable	MPM-3142
Subtitle, if applicable	-
Courses, if applicable	Introduction to Stochastic Process
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Nur'ainul Miftahul Huda, M.Si. and Shantika Martha, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Project Based learning.
Workload (incl. contact hours, self-study hours)	The total workload is 91 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3.34 ECTS
Required and recommended prerequisites for joining the module	Probability Theory
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1**. Students can master the basic concepts of stochastic processes **CLO 2**. Students can master theoretical concepts related to stochastic processes, discrete parameter Markov chains, Poisson processes, continuous parameter Markov chains, and renewal processes **CLO 3**. Students can apply concepts in stochastic processes in the concepts of Markov chains, Poisson processes, Markov processes, and renewal processes **CL0 4**. Students can solve real problems related to the concepts of Markov chains, Poisson processes, Markov processes, and renewal processes
Content	1. Markov chain with discrete parameters 2. Poisson process 3. Markov chain with continuous parameters 4. Renewal process
Examination forms	Essay, Paper and Oral Presentation
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignment	20
3	Mid-term Examination	30
4	Final Examination	40

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of

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<table>
<tr><td></td><td>50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (30%) + Final Examination (40%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2.50</td></tr>
<tr><td>$60 \leq FS < 65$</td><td>C</td><td>2.00</td></tr>
<tr><td>$55 \leq FS < 60$</td><td>D+</td><td>1.50</td></tr>
<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer, E-Learning</td></tr>
<tr><td>Reading list</td><td>1. Ross, S M. 2007. Introduction to probability models ninth edtion. Elsevier: USA
2. Howard Taylor dan Samuel Karlin, 1998, An Introduction to Stochastic Modelling.
3. Karlin, S & H.M. Taylor, 1994. An Introduction to Stochastic Modelling. 3rd ed. Academic Press. New York.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2			√			
CLO 3				√	√	√
CLO 4	√	√			√	√

Assessment Strategies

CLO	Activity	Task	Paper	Mid-term Examination	Oral Presentation (Final Examination)	Percentage (%)
1	2	2		16		20
2	2		4	14		20
3	3		5		22	30
4	3	3	6		18	30
Percentage (%)	**10**	**5**	**15**	**30**	**40**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Time Series Methods
Module level, if applicable	Bachelor
Code, if applicable	MPM-3143
Subtitle, if applicable	-
Courses, if applicable	Time Series Methods
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of Statistics Group (Dr. Yundari, M.Sc.)
Lecturer(s)	Nur'ainul Miftahul Huda, M.Si., Dr. Yundari, M.Sc., Nurfitri Imro'ah, M.Si., and Shantika Martha, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective course in the third year (5th semester) bachelor's degree
Teaching methods	Interactive Learning, Collaborative Learning, and Project Based learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5.01 ECTS
Required and recommended prerequisites for joining the module	Regression Analysis
Intended Learning Outcome (ILO)	**ILO 1**. Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**. Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**. Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**. Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5.** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6**. Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.
Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to **CLO 1.** Students can explain the basic concepts in time series analysis, understand forecasting problems and the Exponential Smoothing method, and explain the general form of stationary, non-stationary, and seasonal models. **CLO 2.** Students can understand and apply time series methodology to produce the right model for forecasting. **CLO 3.** Students can determine the right time series model with the help of software and use Minitab, SPSS, and Eviews to analyse time series data. **CLO 4.** Students can formulate, process, and model time series data in a case study, read the output, and interpret the time series model that has been formed verbally or in writing. **CLO 5.** Students can determine the relevant time series model and be responsible for the results of the analysis.
Content	1. Decomposition 2. Exponential Smoothing Method 3. ARIMA Model 4. Time Series Data Modeling 5. Forecasting
Examination forms	Essay, Paper and Oral Presentation

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<table>
<tr>
<td>Study and examination requirements</td>
<td>
Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
The final mark will be weighted as follows:
<table>
<tr><th>No</th><th>Assessment methods</th><th>Weight (%)</th></tr>
<tr><td>1</td><td>Class Activities</td><td>10</td></tr>
<tr><td>2</td><td>Assignment</td><td>20</td></tr>
<tr><td>3</td><td>Mid-term Examination</td><td>30</td></tr>
<tr><td>4</td><td>Final Examination</td><td>40</td></tr>
</table>
Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (30%) + Final Examination (40%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>$80 \leq FS < 100$</td><td>A</td><td>4.00</td></tr>
<tr><td>$75 \leq FS < 80$</td><td>B+</td><td>3.50</td></tr>
<tr><td>$70 \leq FS < 75$</td><td>B</td><td>3.00</td></tr>
<tr><td>$65 \leq FS < 70$</td><td>C+</td><td>2.50</td></tr>
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<tr><td>$50 \leq FS < 55$</td><td>D</td><td>1.00</td></tr>
<tr><td>$FS < 50$</td><td>E</td><td>0.00</td></tr>
</table>
</td>
</tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer, E-Learning</td></tr>
<tr><td>Reading list</td><td>1. Cryer, J. D & Chan, k.-S., (2008) Time Series Analysis : with Application in R (2nd ed), Springer Science+Business Media, LLC, New York.Howard Taylor dan Samuel Karlin, 1998, An Introduction to Stochastic Modelling.
2. Huda, N.M & Imro'ah, N. (2023) Analisis Deret Waktu dengan R, Untan Press, Pontianak.</td></tr>
</table>

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CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1				√		
CLO 2		√			√	√
CLO 3			√	√		
CLO 4	√				√	√
CLO 5	√				√	√

Assessment Strategies

CLO	Activity	Task	Paper	Mid-term Examination	Oral Presentation (Final Examination)	Percentage (%)
1	2	2		6		10
2	1			24		25
3	2		5		13	20
4	2	3	5		12.5	22.5
5	3		5		14.5	22.5
Percentage (%)	**10**	**5**	**15**	**30**	**40**	

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Mathematics Rivalry
Module level, if applicable	Bachelor
Code, if applicable	MPM-3161
Subtitle, if applicable	-
Courses, if applicable	Linear Programming
Semester(s) in which the module is taught	5th (fifth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Mariatul Kiftiah, M.Sc., Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the second year (3rd semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, structured activities (assignments, quizzes, team-project), problem solving and laboratory works.
Workload (incl. contact hours, self-study hours)	The total workload is 91 hours per semester, which consists of 50 minutes of lectures per week for 14 weeks, 50 minutes of practicum for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week including activity in Learning Management System, in total, it is 16 weeks per semester, including mid-exam (50 minutes), final exam (minutes) and practicum exam (50 minutes).
Credit points	2 = 3.34 ECTS
Required and recommended prerequisites for joining the module	
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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	ILO 3: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5 :** Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing..

Module objectives (CO/CPMK)	After completing this course, CLO 1. Students are able to understand and apply the concepts of complex numbers and their functions in geometry and complex analysis, including complex integrals, series of complex numbers, residues, and poles. CLO 2. Students are able to apply the fundamental principles of combinatorics, such as binomial coefficients, the pigeonhole principle, inclusion-exclusion, and parity, as well as analyse Eulerian graphs, Hamiltonian graphs, and recurrence relations. CLO 3. Students are able to understand and utilise the basic concepts of linear algebra, including matrix operations, determinants, vector spaces, linear transformations, eigenvalues, eigenvectors, and inner product spaces. CLO 4. Students are able to analyse abstract algebraic structures, including groups, normal subgroups, quotient groups, group homomorphisms, Lagrange's theorem, rings, integral domains, fields, and structures such as polynomial rings and Euclidean domains. CLO 5. Students are able to master the concepts of real analysis, including real numbers, supremum, infimum, sequences, limits of functions, continuous functions, derivatives, Taylor's theorem, Riemann integrals, series of functions, and the topology of the real number system. CLO 6. Students are able to solve mathematical problems related to university-level competitions by integrating concepts from complex analysis, combinatorics, linear algebra, algebraic structures, and real analysis.

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	CLO 7. Students are able to think critically, logically, and systematically when constructing mathematical solutions for complex problems and presenting the results accurately and systematically.
Content	This course focuses on solving mathematical problems relevant to university-level competitions by integrating key concepts from complex analysis, combinatorics, linear algebra, algebraic structures, and real analysis. It begins with an in-depth exploration of complex numbers and their applications in geometry and complex analysis, covering topics such as complex integrals, complex series, residues, and poles. The course then introduces fundamental principles of combinatorics, including binomial coefficients, the pigeonhole principle, the inclusion-exclusion principle, parity, and the analysis of Eulerian and Hamiltonian graphs, as well as recursion techniques. In linear algebra, students will study matrix operations, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, and inner product spaces. The course also delves into abstract algebraic structures, covering groups, normal subgroups, quotient groups, group homomorphisms, Lagrange's theorem, rings, integral domains, fields, polynomial rings, and Euclidean domains. Finally, the course covers key concepts in real analysis, including real numbers, supremum and infimum, sequences, function limits, continuity, derivatives, Taylor's theorem, Riemann integration, function series, and the topology of the real number system.
Examination forms	Written assignment, written exams, presentation,
Study and examination requirements	study Requirement Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. Study examinations Students are evaluated based on their performance class: Theory and Practicum. The theory's score will be weighted as follows: The final mark will be weighted as follows:

No	Assessment methods	Weight (%)

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	1	Class Activities	10
	2	Assignments	20
	3	Mid-Term Examination	35
	4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Percentage of Achievement & Grade & Conversion Value

Percentage of Achievement	Grade	Conversion Value
80≤FS<100	A	4.00
75≤FS<80	B+	3.50
70≤FS<75	B	3.00
65≤FS<70	C+	2.50
60≤FS<65	C	2.00
55≤FS<60	D+	1.50
50≤FS<55	D	1.00
FS<50	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer, E-Learning,
Reading list	1. Hillier, F. S., & Lieberman, G. J. (2001). *Introduction to Operations Research.* New York: McGraw Hill. 2. Pasaribu, M. & Kiftiah, M. 2024. *Pemrograman Linear: Seri Metode Grafik dan Metode Simpleks.* Pontianak: Untan Press. 3. Sharma, J. K. (2016). *Operations Research Theory and Applications, Sixth Edition.* India: Trinity Press. 4. Taha, H. A. (2007). *Operations Research: An Introduction, Eight Edition.* USA: Pearson Education, Inc. 5. Winston, W. L. (2003). *Operations Research Applications and Algorithms, Fourth Edition.* United States: Thompson Learning

CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CO 1	√		√	√		√
CO 2	√				√	√
CO 3	√		√	√		√
CO 4	√		√		√	√
CO 5	√		√	√		√

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CO 6		√	√	√	√	√
CO 7			√	√		√

Assessment Plan

CO	Activity	Oral	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1	2	5		8
2	1	2	6		9
3	1	2		5	8
4	1	2		6	9
5	2	2		9	13
6	2	5	18	12	37
7	2	5	6	3	16
Percentage (%)	10	20	35	35	100

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Real Analysis II
Module level, if applicable	Bachelor
Code, if applicable	MPM-3211
Subtitle, if applicable	-
Courses, if applicable	Introduction to Real Analysis II
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Dr. Bayu Prihandono, M.Sc., Mariatul Kiftiah, M.Sc., and Yudhi, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning.
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Introduction to Real Analysis 1 (MPM-3111)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6 :**Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication,

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	presenting results accurately, clearly, and organized both orally and in writing..

Module objectives (CO/CPMK)	After completing this course, the students should have the ability to CO 1. understand and apply some fundamental concepts in real analysis, including those related to limits, continuity, derivatives, and integrals of real functions. CO 2. study and analyze limits, continuity, and integrals of real functions. CO 3. evaluate proofs of theorems in real analysis CO 4. reason and construct proofs of theorems using the formal definitions and basic properties, and to write the results of their reasoning systematically CO 5. Apply to real analysis concepts both in the field of mathematics and in other relevant disciplines.
Content	The course will study the theory of limit, continuous and differentiable functions of one real variable introduced in Calculus. It places the familiar techniques of differentiation, such as the Chain Rule, on a firm theoretical foundation and proves some of the key results of real analysis such as the Intermediate Value Theorem, the Mean Value Theorem and Taylor's Theorem. The basic theory of Riemann integration is also studied.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

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<table>
<tr><td></td><td>Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Bartle, R.G and Sherbert, D.R. 2011. Introduction to Real Analysis, 4th ed. United. States: John Wiley & Sons, Inc.
2. Trench, W.F. 2003. Introduction to Real Analysis. New Jersey: Pearson.
3. Darmawijaya, S. 2006. Pengantar Analisis Real. Yogyakarta: Jurusan Matematika FMIPA UGM.</td></tr>
</table>

CO-ILO Mapping

	ILO 1	ILO 4	ILO 6
CO 1	√		√
CO 2	√	√	
CO 3	√	√	
CO 4	√	√	

Assessment Plan

CO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	2		2	13,5		17,5
2	2	5	3	15		25
3	2			6,5	5,5	14
4	2	5	2		19	28
5	**2**		**3**		**10,5**	**15,5**

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Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Function of Complex Variables
Module level, if applicable	Bachelor
Code, if applicable	MPM-3212
Subtitle, if applicable	-
Courses, if applicable	Function of Complex Variables
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Dr. Yundari, M.Sc., Dr. Nilamsari Kusumastuti, M.Sc., and Mariatul Kiftiah, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Interactive dan collaborative learning
Workload (incl. contact hours, self-study hours)	The total workload is 182 hours per semester, which consists of 200 minutes of lectures per week for 14 weeks, 240 minutes of structured activities per week, and 240 minutes of individual study per week including activity in the Learning Management System, in total is 16 weeks per semester, including mid-exam (200 minutes) and final exam (200 minutes).
Credit points	4 SKS = 6.68 ECTS
Required and recommended prerequisites for joining the module	Introduction to Real Analysis 1 (MPM-3111)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in

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	writing.

Module objectives (CLO/CPMK)	After completing this course, the students should have the ability to CLO 1. explain the concepts and solve the fundamental problems of complex number system CLO 2. explain the concept of complex functions and use the basic complex transcendental functions CLO 3. determine whether a complex function is analytic CLO 4. calculate the integral complex functions using the appropriate properties and theorems CLO 5. evaluate series expansions of complex functions and identify the singularities of complex functions CLO 6. explain the residual theorem and use it to calculate the integral of a complex function.
Content	The course will cover the system of complex numbers, function, limit, and theorems on limit of complex function, analytic function, integral of complex function, series of a complex function and residue and pole.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment

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<table>
<tr><td></td><td>(20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Dedy, E. & Sumiaty, E. 2001. Fungsi Variabel Kompleks. Yogyakarta : Jurusan Pendidikan Matematika FMIPA UNY.
2. Zill, D. G. & Patrick D. S. 2003. A First Course in Complex Analysis With Application. United States. Jones and Bartlett Publishers, Inc.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 4	ILO 6
CLO 1	√	√	√
CLO 2	√	√	
CLO 3	√		√
CLO 4	√	√	√
CLO 5	√	√	
CLO 6	√	√	√

Assessment Plan

CLO	Activity	Quiz	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	3		6	8		17
2	2	6		25		33
3	1	2	1	2		6
4	1	1	2		7	11
5	**2**	**1**			**11**	14
6	**1**		**1**		**17**	19

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Percentage (%)	**10**	**10**	**10**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Differential Equation Modeling
Module level, if applicable	Bachelor
Code, if applicable	MPM-3231
Subtitle, if applicable	-
Courses, if applicable	Differential Equation Modeling
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Applied Mathematics
Lecturer(s)	Drs. Helmi, M.Si., Meliana Pasaribu, M.Sc., Dr. Evi Noviani, S.Si., M.Si, dan Mariatul Kiftiah, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 SKS = 5,01 ECTS
Required and recommended prerequisites for joining the module	Elementary Differential Equations (MPM-2211)
Intended Learning Outcome (ILO)	**ILO 1:** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 2:** Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4:** Has theoretical and procedural understanding, encompassing exploration, generalisation, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5:** Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies. **ILO 6:** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organised both orally and in writing.

Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Students are able to master the principles of modeling, especially modeling differential equations. CLO 2. Students can understand the initial steps in modeling such as making observations and making assumptions CLO 3. Students can build models based on the assumptions that have been made CLO 4. Students can find solutions to mathematical models, especially differential equation models that have been formed CLO 5. Students can reconstruct, modify, analyze/think structurally about differential equation modeling of a phenomenon and assess its accuracy. CLO 6. Students can interpret the model that has been formed and communicate orally and in writing appropriately and clearly. CLO 7. Students can utilize various alternatives to solve differential equation problems both analytically and numerically independently or in groups to make the right decisions in the fields of physics, biology, economics, ecology, and other relevant fields into mathematical models.
Content	
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10

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	2	Assignments	20
	3	Mid-Term Examination	35
	4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	**Grade**	**Conversion Value**
80≤FS<100	A	4.00
75≤FS<80	B+	3.50
70≤FS<75	B	3.00
65≤FS<70	C+	2.50
60≤FS<65	C	2.00
55≤FS<60	D+	1.50
50≤FS<55	D	1.00
FS<50	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer
Reading list	Ansorge, R. 2003. Mathematical Models of Fluid Dynamics: Modelling, Theory, Basic Numerical Facts-An Introduction. Wiley-VCH GmbH &Co. KGaA, Weinheim, Berlin.

CLO-ILO Mapping

	ILO 1	**ILO 2**	**ILO 3**	**ILO 4**	**ILO 5**	**ILO 6**
CLO 1	√	√	√	√	√	√
CLO 2	√	√	√	√	√	√
CLO 3	√	√	√	√	√	√
CLO 4	√	√	√	√	√	√
CLO 5	√	√	√	√	√	√
CLO 6	√	√	√	√	√	√
CLO 7	√	√	√	√	√	√

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Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	5		8
2	1	2	5		8
3	1	2	10		13
4	2	4	15		21
5	2	4		15	21
6	1	2		5	8
7	2	4		15	21
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Numerical Method
Module level, if applicable	Bachelor
Code, if applicable	MPM-3232
Subtitle, if applicable	-
Courses, if applicable	Numerical Method
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Applied Mathematic Subject Group
Lecturer(s)	Yudhi, M.Si. and Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Collaborative and Case based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 (1) =5.01 ECTS
Required and recommended prerequisites for joining the module	Calculus (MPM-1111), Ordinary Differential Equation (MPM-2211) and Algorithm and Programming (MPM-3152)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 3**: Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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	ILO 5 : Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies.

Module objectives (CO/CPMK)	After completing this course, the students should have the ability to CLO 1. Students are able to analyse the error and taylor polinomials CLO 2. Students are able to determine roots of nonlinear equation using closed and open method. CLO 3. Students are able to identify polynomial which interpolates the given data. CLO 4. Students are able to use appropriate numerical methods to approximate derivative values using finite difference and Richardson extrapolation methods. CLO 5. Students are able to use appropriate numerical methods to approximate integral values using trapezoidal rule and Simpson's rule. CLO 6. Students are able to use appropriate numerical methods to solve differential equations numerically using Euler's method and Runge-Kutta method. CLO 7. Students are able to solve real problems related to numerical computations. CLO 8. Students are able to apply the concepts of error truncation and numerical approximation approaches in the fields of mathematics, statistics and other areas
Content	1. Error: definitions, sources and examples 2. Taylor polynomial and the error in Taylor polynomial 3. Finding roots of nonlinear equation : bisection method, Newton's method, Secant method 4. Numerical Integration: Tapezoidal and Simpson rule 5. Numerical Differentiation: Forward difference, Backward difference, Central Difference and extrapolation Richardson 6. Numerical Methods for Initial Value Problems: Euler, Taylor and Runge Kutta Methods
Examination forms	Written assignment, written exams, case based project, presentation, laboratory work
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** Students are evaluated based on their performance class: Theory

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and Practicum.

The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

While the practicum's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Pre-test and Post-test	10
2	Experiments Reports	40
3	Practicum Examination	50

Practicum's Final Score (PFS) = Pre-test and Post-test (10%) + Experiments reports (40%) + Practicum Exam (50%)

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

FS = TFS (70%) + PFS (30%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
$80 \leq FS < 100$	A	4.00
$75 \leq FS < 80$	B+	3.50
$70 \leq FS < 75$	B	3.00
$65 \leq FS < 70$	C+	2.50
$60 \leq FS < 65$	C	2.00
$55 \leq FS < 60$	D+	1.50
$50 \leq FS < 55$	D	1.00
$FS < 50$	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using python

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Reading list	1. Munir, *Metode Numerik*, Edisi 3, Penerbit Informatika, Bandung, 2003… 2. S. C. Chapra, *Applied Numerical Methods with Matlab for Engineers and Scientists*, Edisi 3, McGraw-Hill, 2012. 3. Sahid. *Pengantar Komputasi Numeri dengan Matlab.* Penerbit Andi Yogyakarta, 2005. 4. Pasaribu, M dan Yudhi. Modul Metode Numerik 5. J. H. Mathews, *Numerical Methods for Mathematics Science and Engineering*, Second Edition, Prentice-Hall International,Inc, United States of America, 1992. 6. Kendal Atkinson. *Elementary Numerical Analysis.* John Wiley & Sons, 1993

CO-ILO Mapping

	ILO 1	ILO 3	ILO 4	ILO 5
CLO 1	√	√	√	
CLO 2	√	√		√
CLO 3	√	√	√	
CLO 4	√	√	√	√
CLO 5	√	√		√
CLO 6	√			
CLO 7	√			
CLO 8	√			

Asessmen Plan

	Theory (70%)					Praktikum (30%)			
	Activity	Assignment	Mid Exam	Final Exam	Percentage	Pre test Post test	Experiments report	Practicum Exam	Percentage
CO 1	2	2	4		8	2	2	4	8
CO 2	1		3		4	1	1	2	4
CO 3	2	5	11		18	1	7	10	18
CO 4	1	2	17		20	2	8	10	20
CO 5	1	4		9	14	1	8	5	14
CO 6	1	3		6	10	1	4	5	10
CO 7	1			7	8	1	3	4	8
CO 8	1	4		13	18	1	7	10	18
Percentage	10	20	35	35	100	10	40	50	

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Assistance I
Module level, if applicable	Bachelor
Code, if applicable	MPM-3261
Subtitle, if applicable	-
Courses, if applicable	Assistance I
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Comprehensive Mathematics
Lecturer(s)	Dr. Nilamsari Kusumastuti.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Project based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester.
Credit points	2
Required and recommended prerequisites for joining the module	The student has completed 75 credits.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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	ILO 6: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students can master the material in the field of mathematics theoretically, conceptually, and practically **CLO 2.** Students can create educational services that are to the needs and developments of society and global challenges. **CLO 3.** Students can develop teaching assistance programs that are accessible and useful for developing the capacity of target community groups. **CLO 4.** Students can develop mathematical concepts to analyse and resolve educational and social problems according to the situation. **CLO 5.** Students can consider various studies on mathematics education to provide solutions and decisions on problems in mathematics learning. **CLO 6.** Students can demonstrate ideas and information effectively through various forms of strategies and media to the mathematics community.
Content	Teaching Assistant Practice in Mathematics Program
Examination forms	Quantitative Participation Tracking, Structured assignments, Lab Work.
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Attendance 10% 2 Attitude and Activity Assessment 70% 3 Activity Report 20%
Media employed	Laptop/Computer
Reading list	-

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 4	ILO 6
CLO 1	√	√	√	√
CLO 2	√	√	√	√
CLO 3	√	√	√	√

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CLO 4	√	√	√	√
CLO 5	√	√	√	√
CLO 6	√	√	√	√

Assessment Plan

CLO	Attendance	Attitude and activity assesment	Activity Report	Percentage (%)
1	1	15	4	20
2	2	10	3	15
3	2	5	2	9
4	2	20	5	27
5	**2**	10	3	15
6	**1**	10	3	14
Percentage (%)	**10**	**70**	**20**	**100**

Compilation Date : May 5th, 2024

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Metric Spaces
Module level, if applicable	Bachelor
Code, if applicable	MPM-3214
Subtitle, if applicable	-
Courses, if applicable	Introduction to Metric Spaces
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Mariatul Kiftiah, M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, for a total of 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	Introduction to Real Analysis I (MPM-3111)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

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Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Apply structured reasoning and mathematical induction; understand key concepts such as metric spaces, completeness, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert spaces, along with their applications. CLO 2. Formulate and solve problems in metric spaces, completeness, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert spaces, with applications. CLO 3. Analyze the structure of mathematical problems in metric spaces, completeness, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert spaces, with applications. CLO 4. Various methods are used to prove mathematical statements in metric spaces, completeness, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert spaces. CLO 5. Generate and communicate mathematical ideas effectively, in writing or orally, based on scientific principles related to metric spaces, completeness, normed spaces, Banach spaces, linear operators, dual spaces, Prehilbert spaces, and Hilbert spaces, with applications.
Content	This course explores the concepts of metrics, the position of points relative to sets in metric spaces, the concept of sets in metric spaces, sequences, completeness, and compactness in metric spaces. Proof techniques and formal proof writing are essential parts of this course.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

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<table>
<tr><td></td><td>Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:
<table>
<tr><th>Percentage of Achievement</th><th>Grade</th><th>Conversion Value</th></tr>
<tr><td>80≤FS<100</td><td>A</td><td>4.00</td></tr>
<tr><td>75≤FS<80</td><td>B+</td><td>3.50</td></tr>
<tr><td>70≤FS<75</td><td>B</td><td>3.00</td></tr>
<tr><td>65≤FS<70</td><td>C+</td><td>2.50</td></tr>
<tr><td>60≤FS<65</td><td>C</td><td>2.00</td></tr>
<tr><td>55≤FS<60</td><td>D+</td><td>1.50</td></tr>
<tr><td>50≤FS<55</td><td>D</td><td>1.00</td></tr>
<tr><td>2FS<50</td><td>E</td><td>0.00</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Board, LCD Projector, Laptop/Computer</td></tr>
<tr><td>Reading list</td><td>1. Kreyszig, E. 1978. Introductory Functional Analysis with Applications. New York: John Wiley & Sons
2. Darmawijaya, S. 2007, Pengantar Analisis Abstrak, Yogyakarta: Universitas Gadjahmada.</td></tr>
</table>

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√
CLO 6	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	10		13
2	2	4	12,5		18,5

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3	2	4	12,5		18,5
4	1	2		10	13
5	2	4		12,5	18,5
6	2	4		12,5	18,5
Percentage (%)	**10**	**20**	**35**	**35**	**100**

Compilation Date : **July 22nd, 2024**

Modified Date : **July 22nd, 2024**

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MODULE HANDBOOK

Bachelor's in Mathematics

Module Name	Introduction to Topology
Module level, if applicable	Bachelor
Code, if applicable	MPM-3213
Subtitle, if applicable	-
Courses, if applicable	Introduction to Topology
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Mathematical Analysis and Geometry Subject Group
Lecturer(s)	Yudhi, M.Si dan Mariatul Kiftiah, M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, for a total of 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	Introduction to Real Analysis I (MPM-3111)
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to improve the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication,

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	presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO)	After completing this course, the students should have the ability to CLO 1. Able to use properties of open and closed sets to prove their advanced properties. CLO 2. Able to prove some characteristics of continuous functions. CLO 3. Able to prove some properties of compactness, connectedness, and Hausdorff space.
Content	This course discusses topological spaces, special topologies, sets in topological spaces, bases and subbases in topology, Euclidean topology in R (interior points and open sets, limit points and closed sets), limits in topological spaces, homomorphisms, and continuous mappings.
Examination forms	Essay
Study and examination requirements	**Study Requirement** Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam. **Study examinations** The final mark will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Students are declared to have passed this course if the Final Score (FS) of Students with the formula below reaches a minimum score of 50 or D.

Final Score (FS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and

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	based on the following grade scale: **Percentage of Achievement** / **Grade** / **Conversion Value** 80≤FS<100 / A / 4.00 75≤FS<80 / B+ / 3.50 70≤FS<75 / B / 3.00 65≤FS<70 / C+ / 2.50 60≤FS<65 / C / 2.00 55≤FS<60 / D+ / 1.50 50≤FS<55 / D / 1.00 3FS<50 / E / 0.00
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	3. Lipshutz, S. 1965. Schaum's Outline of Theory and Problems of General Topology. New York: McGraw-Hill Book Company. Inc. 4. Munkres, J.R. 2000. Topology, 2nd ed. London: Prentice Hall Inc. 5. Patty, C.W. 1993. Foundations of Topology. London: International Thomson Publishing.

CLO-ILO Mapping

	ILO 1	ILO 3	ILO 4
CLO 1	√	√	√
CLO 2	√	√	√
CLO 3	√	√	√
CLO 4	√	√	√
CLO 5	√	√	√
CLO 6	√	√	√

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examination	Percentage (%)
1	1	2	10		13
2	2	4	10		16
3	2	4	15		21
4	2	4		15	21
5	**2**	**4**		10	16
6	**1**	**2**		10	13
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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Compilation Date : July 22nd, 2024

Modified Date : July 22nd, 2024

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Introduction to optimization Theory
Module level, if applicable	Bachelor
Code, if applicable	MPM-3234
Subtitle, if applicable	-
Courses, if applicable	Introduction to optimization Theory
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Chair of the Applied Mathematic Subject Group
Lecturer(s)	Meliana Pasaribu, M.Sc. and Dr. Bayu Prihandono
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the third year (6th semester) bachelor's degree
Teaching methods	Lecture structured activities (assignments, quizzes, team-project), project and laboratory works.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, 120 minutes of individual study per week including activity in Learning Management System and 170 minutes laboratory work per week, in total, it is 16 weeks per semester, including mid-exam and final exam.
Credit points	3 (1)
Required and recommended prerequisites for joining the module	Numerical Methods
Intended Learning Outcome (ILO)	**ILO 1:** Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2:** Possess the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3:** Able to observe, identify, formulate, and resolve problems using mathematical methods, either independently or with the aid of technology. **ILO 4:** Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5 :** Possesses comprehensive knowledge in mathematical modeling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life, and can determine problem-solving strategies **ILO 6:** Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CO/CPMK)	After completing this course, the students should have the ability to CO 1. Students are able to explain the fundamental and advanced principles of the theories they understand, particularly those related to the formulation of optimisation design and its solution methods. CO 2. Students are able to solve optimisation problems numerically. CO 3. Students are able to develop MATLAB programmes to solve nonlinear optimisation problems. CO 4. Students are able to follow developments in mathematics and apply them, as well as communicate actively and accurately, both verbally and in writing. CO 6. Students are able to generalise optimisation problems from R^2, R^3 to R^n. CO 7. Students are able to explain intelligently and creatively the significant role of optimisation systems in related fields of knowledge or other areas.
Content	1. Euclidean Spaces 2. Convex Set 3. Convex Function 4. Quadratic Form 5. Extremes of a Function 6. Convex Nonlinear Programming
Examination forms	Written assignment, written exams, case based project, presentation, laboratory work
Study and examination requirements	

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Study Requirement
Attendance: Students must attend at least 75% of the lectures to be eligible for the final exam.

Study examinations
Students are evaluated based on their performance class: Theory
The theory's score will be weighted as follows:

No	Assessment methods	Weight (%)
1	Class Activities	10
2	Assignments	20
3	Mid-Term Examination	35
4	Final Examination	35

Theory's Final Score (TFS) = Class Activities (10%) + Assignment (20%) + Mid-Term exam (35%) + Final exam (35%)

Students are marked based on their Final Score (FS) obtained and based on the following grade scale:

Percentage of Achievement	Grade	Conversion Value
80FS<100	A	4.00
75FS<80	B+	3.50
70FS<75	B	3.00
65FS<70	C+	2.50
60FS<65	C	2.00
55FS<60	D+	1.50
50FS<55	D	1.00
FS<50	E	0.00

Media employed	Board, LCD Projector, Laptop/Computer, E-Learning, laboratory work using python
Reading list	[1]. Bazara, MS. HD, Sekrali dan C, M, Shetty, 1990, Learning Theory an [2]. Mital, K. V, Optimal Method in Operation Research and Analysis, W [3]. Winston, W. 1994. Operation and Research. Application and Algorit [4]. Taha, H.A. 1996. Riset Operasi. Suatu Pengantar, Jilid 2, Binarupa A

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CO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 1
CO 1	√		√	√		
CO 2	√		√	√		
CO 3	√	√	√	√		√
CO 4	√	√	√	√	√	√
CO 5	√		√	√		
CO 6	√	√	√	√	√	√
CO 7	√	√	√	√	√	√
CO 8	√	√	√	√	√	√
CO 9	√		√		√	
CO 10	√	√	√	√		√
CO 11	√	√	√	√		√
CO 12	√	√	√	√	√	√
CO 13	√	√	√	√	√	√
CO 14	√	√	√	√	√	√

Asessmen Plan

	Activity	Assignment	Mid Exam	Final Exam	Percentage
CO 1	0,25		1,75		2
CO 2	0,25	1	6,75		8
CO 3	0,25		7,75		8
CO 4	0,25		7,75		8
CO 5	0,50	**2**	**5,50**		8
CO 6	0,50	**2**	**4,50**		7
CO 7	**1**	**2**	**1**		4
CO 8	**1**	**1**		**2**	4
CO 9	**1**	**2**		**1**	4
CO 10	**1**	**2**		**1**	4
CO 11	**1**	**2**		**1**	4
CO 12	**1**	**2**		**8**	11
CO 13	**1**	**2**		**8**	11
CO 14	**1**	**2**		**14**	17
Percentage	**10**	**20**	**35**	**35**	**100**

Compilation Date : July 22nd, 2024

Modified Date : July 22nd, 2024

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Faculty of Mathematics and Natural Sciences
Department of Mathematics

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Assistance II
Module level, if applicable	Bachelor
Code, if applicable	MPM-4162
Subtitle, if applicable	-
Courses, if applicable	Assistance II
Semester(s) in which the module is taught	7th (sixth)
Person responsible for the module	Comprehensive Mathematics
Lecturer(s)	Dr. Nilamsari Kusumastuti.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Project based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester.
Credit points	2
Required and recommended prerequisites for joining the module	The student has completed Assistance I.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students can master the material in the field of mathematics theoretically, conceptually, and practically **CLO 2.** Students can create educational services that are to the needs and developments of society and global challenges. **CLO 3.** Students can develop teaching assistance programs that are accessible and useful for developing the capacity of target community groups. **CLO 4.** Students can develop mathematical concepts to analyse and resolve educational and social problems according to the situation. **CLO 5.** Students can consider various studies on mathematics education to provide solutions and decisions on problems in mathematics learning. **CLO 6.** Students can demonstrate ideas and information effectively through various forms of strategies and media to the mathematics community.
Content	Teaching Assistant Practice in Mathematics Program
Examination forms	Quantitative Participation Tracking, Structured assignments, Lab Work.
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 4 Attendance 10% 5 Attitude and Activity Assessment 70% 6 Activity Report 20%
Media employed	Laptop/Computer
Reading list	-

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 4	ILO 6

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CLO 1	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓

Assessment Plan

CLO	Attendance	Attitude and activity assesment	Activity Report	Percentage (%)
1	1	15	4	20
2	2	10	3	15
3	2	5	2	9
4	2	20	5	27
5	**2**	10	3	15
6	**1**	10	3	14
Percentage (%)	**10**	**70**	**20**	**100**

Compilation Date : May 5th, 2024

Modified Date : May 5th, 2024

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	West Kalimantan in Mathematics
Module level, if applicable	Bachelor
Code, if applicable	MPM-4161
Subtitle, if applicable	-
Courses, if applicable	West Kalimantan in Mathematics
Semester(s) in which the module is taught	7th (seventh)
Person responsible for the module	Comprehensive Mathematics
Lecturer(s)	Fransiskus Fran, M.Si., Yudhi, M.Si., Nur'ainul Miftahul Huda, M.Si., Meliana Pasaribu, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Lecture, classroom discussion, flipped classroom, and project.
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2
Required and recommended prerequisites for joining the module	Students have completed 75 credits of compulsory courses for their study program, excluding compulsory university courses.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines.

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	ILO 3: Capable of observing, identifying, formulating, and problems solving by using mathematical approaches, with or without the assistance of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Students can write, interpret, and apply definitions, theorems, and examples to the basic knowledge of mathematical modeling mathematical statistics, especially concepts related to transportation methods, sensitivity analysis, L-System methods, fractal generators, Julia sets, Fourier series, Fourier transforms, time and space-time series analysis using West Kalimantan data. **CLO 2.** Students can analyze, compare, and construct the process of model formation and solve solutions to problems in differential equations, graph theory, and linear programs both analytically and numerically. **CLO 3.** Students can apply definitions and theorems to solve various problems in modeling using data in West Kalimantan **CLO 4.** Students can analyze and formulate solutions for optimizing distribution costs from PT Pertamina in West Kalimantan using the transportation method and examine the sensitivity analysis. **CLO 5.** Students can apply the L-system technique in visualizing Songket Sambas motifs **CLO 6.** Students can construct models using the Fourier series approximation and apply them to air temperature data in Pontianak. **CLO 7.** Students can forecast COVID-19 data in West Kalimantan by constructing time series and space time forecasting models **CLO 8.** Students can use software to solve mathematical modeling problems with data in West Kalimantan
Content	Mathematics in West Kalimantan covers four themes, and for each theme, students will create projects and posters using data from West Kalimantan arranged according to each theme.

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Examination forms	Quantitative Participation Tracking, Structured assignments, Quiz, Discussion group, Oral Presentation, Lab Work, and Written Test
Study and examination requirements	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 1 — Class Activities — 10% 2 — Assignments — 20% 3 — Mid Term Examination — 35% 4 — Final Eximination — 35%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Agustine, C. V. PEMODELAN TITIK PANAS DI KALIMANTAN BARAT DENGAN METODE GENERALIZED SPACE TIME AUTOREGRESSIVE KALMAN FILTER. *BIMASTER: Buletin Ilmiah Matematika, Statistika dan Terapannya*, *12*(5). 2. Larita, A., Helmi, H., & Yudhi, Y. (2018). Optimasi Rata-Rata Produksi Padi Kalimantan Barat Menggunakan Pemrograman Kuadratik Metode Wolfe. *Buletin Ilmiah Math. Stat. dan Terapannya (Bimaster)*, *7*(3). 3. Fitri, F., Helmi, H., & Kiftiah, M. (2019). Perbandingan Metode Asm, Stepping Stone Dan Metode Modi Pada Biaya Angkut Transportasi (Kasus Studi: Data Pendistribusian Raskin Perum Bulog Divre Kalimantan Barat Tahun 2018 Pada Bulan Januari-September). *BIMASTER: Buletin Ilmiah Matematika, Statistika dan Terapannya*, *8*(3). 4. Maria, A. H., Helmi, H., & Huda, N. A. M. PEMODELAN PERTUMBUHAN PENDUDUK DI KOTA PONTIANAK DENGAN MENGGUNAKAN MODEL EKSPONENSIAL DAN MODEL LOGISTIK. *BIMASTER: Buletin Ilmiah Matematika, Statistika dan Terapannya*, *13*(6).

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓
CLO 8	✓	✓	✓	✓	✓	✓

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Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	2		5	5	12
2	2	3	2		7
3	3	3		10	16
4	3	4	10	5	22
5		**5**	**10**	**8**	**23**
6			**8**	**7**	**15**
7		**5**			**5**
8					
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Seminar
Module level, if applicable	Bachelor
Code, if applicable	MPM-4062
Subtitle, if applicable	-
Courses, if applicable	Seminar
Semester(s) in which the module is taught	7th (seventh)
Person responsible for the module	Head of the Mathematics Undergraduate Program.
Lecturer(s)	Thesis Supervisor
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Project based Learning
Workload (incl. contact hours, self-study hours)	Students present thesis material related to mathematics, with at least 80% of the results being based on their own research.
Credit points	4 SKS = 6,68 ECTS
Required and recommended prerequisites for joining the module	Pass all required courses with a minimum total of 120 credits earned from completed courses.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Capable of observing, identifying, formulating, and problems solving by using mathematical approaches, with or without the assistance of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Demonstrate the ability to conduct independent research in a specific area of mathematics, synthesizing existing knowledge and identifying research gaps. **CLO 2.** Present research findings clearly and effectively in both oral and written forms, using appropriate mathematical language, structures, and visual representations. **CLO 3.** Engage in critical discussions and debates, analyzing research in mathematics from diverse perspectives, while respecting academic integrity and contributing to the scholarly community. **CLO 4.** Develop skills in literature review and theoretical analysis, integrating multiple sources of information to strengthen the foundation of mathematical research. **CLO 5.** Apply research methods in mathematics, such as problem-solving, modeling, and experimentation, to formulate and test hypotheses or research questions.
Content	Project based Learning
Examination forms	Structured assignments, Oral Presentation
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 5 Seminar Draft 50% 6 Presentation 50%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Panduan Penulisan Skripsi Program Studi Matematika FMIPA UNTAN 2. Panduan Tugas Akhir FMIPA UNTAN

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CLO-ILO Mapping

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

Assessment Plan

CLO	Undergraduate Thesis Draft and article project	Presentation	Percentage (%)
1	5	20	25
2	15	10	25
3	10	5	15
4	5	10	15
5	15	5	20
Percentage (%)	**50**	**50**	**100**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Internship/Commubity Development Participation
Module level, if applicable	Bachelor
Code, if applicable	MPM-4061
Subtitle, if applicable	-
Courses, if applicable	Internship/Commubity Development Participation
Semester(s) in which the module is taught	7th (seventh)
Person responsible for the module	Head of the Mathematics Undergraduate Program.
Lecturer(s)	Field academic supervisor
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Project based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	Students have completed 90 credits.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Capable of observing, identifying, formulating, and problems solving by using mathematical approaches, with or without the assistance of technology.

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	ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Demonstrate professional ethics, integrity, and responsibility in the workplace or community by adhering to the standards and values of the host organization or community development project. **CLO 2.** Apply theoretical knowledge and skills from the mathematics program to real-world situations in a professional or community context, contributing to problem-solving and decision-making processes. **CLO 3.** Engage effectively in teamwork, communication, and collaboration with diverse groups, including colleagues, clients, and community members, to achieve common goals. **CLO 4.** Demonstrate self-management, time management, and project management skills by effectively planning, executing, and evaluating tasks and responsibilities within the internship or community project. **CLO 5.** Analyze and evaluate the impact of the internship or community development project on the community or organization, offering solutions and improvements based on experience and reflection. **CLO 6.** Reflect critically on the learning experiences gained during the internship or community participation, identifying strengths and areas for further personal and professional development. **CLO 7.** Contribute to the development of practical or sustainable solutions in community or organizational settings, demonstrating an understanding of the needs, challenges, and opportunities within these contexts.
Content	Project based Learning
Examination forms	Structured assignments, Oral Presentation

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Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 7 Class Activities 10% 8 Assignments 20% 9 Mid Term Examination 35% 10 Final Eximination 35%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	

CLO-ILO Mapping

	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
CLO 1	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	2		5	5	12
2	2	3	2		7
3	3	3		10	16
4	3	4	10	5	22
5		**5**	**10**	**8**	**23**
6			**8**	**7**	**15**
7		**5**			**5**
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Introduction to Functional Analysis
Module level, if applicable	Bachelor
Code, if applicable	MPM-4111
Subtitle, if applicable	-
Courses, if applicable	Introduction to Functional Analysis
Semester(s) in which the module is taught	7th (seventh)
Person responsible for the module	Chair of the Analysis Research Science Group
Lecturer(s)	Mariatul Kiftiah, M.Sc.
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Interactive and Collaborative Learning
Workload (incl. contact hours, self-study hours)	The total workload is 136 hours per semester, which consists of 150 minutes of lectures per week for 14 weeks, 180 minutes of structured activities per week, and 180 minutes of individual study per week, in total is 16 weeks per semester, including mid-exam and final exam.
Credit points	3
Required and recommended prerequisites for joining the module	Students should be proficient in Introduction to Real Analysis II
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics.

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	ILO 6: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Analyze finite and infinite-dimensional vector spaces, and pre-Hilbert spaces. **CLO 2.** Analyze the orthogonality of vectors, orthogonal systems, and orthonormal systems. **CLO 3.** Analyze subspaces, orthogonal complements, and direct sums. **CLO 4.** Analyze transformations and linear operators. **CLO 5.** Analyze the properties of linear operators, the spaces L(V,W) and B(V,W), and dual spaces. **CLO 6.** Analyze self-adjoint operators and projections.
Content	Introduction to Functional Analysis covers topics related to Banach spaces, Hilbert spaces, and continuous linear functions.
Examination forms	**E**ssay
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 11 Class Activities 10% 12 Assignments 20% 13 Mid Term Examination 35% 14 Final Eximination 35%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	1. Darmawijaya, S. 2006. Pengantar Analisis Abstrak. Yogyakarta: Jurusan Matematika FMIPA UGM. 2. Kreyszig, E. 1978. Introductory Functional Analysis withApplications. New York: John Wiley & Sons.

CO-ILO Mapping

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

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Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1		5	5	11
2	2	3	2		7
3	2	3		10	15
4	2	4	10	5	21
5	**2**	**10**	**10**	**8**	**30**
6	**1**		**8**		**16**
Percentage (%)	**10**	**20**	**35**	**35**	**100**

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Capita Selecta
Module level, if applicable	Bachelor
Code, if applicable	MPM-4163
Subtitle, if applicable	-
Courses, if applicable	Capita Selecta
Semester(s) in which the module is taught	7th (seventh)
Person responsible for the module	Comprehensive Mathematics
Lecturer(s)	Dr. Nilamsari Kusumastuti, Dr. Yundari
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (7th semester) bachelor's degree
Teaching methods	Collaborative and Project based Learning
Workload (incl. contact hours, self-study hours)	The total workload is 90 hours per semester, which consists of 100 minutes of lectures per week for 14 weeks, 120 minutes of structured activities per week, and 120 minutes of individual study per week, for a total of 16 weeks per semester, including mid-exam and final exam.
Credit points	2 SKS = 3,34 ECTS
Required and recommended prerequisites for joining the module	Students have completed 50 credits of compulsory courses for their study program, excluding compulsory university courses.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Capable of observing, identifying, formulating, and problems solving by using mathematical approaches, with or without the assistance of technology.

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	ILO 4: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Demonstrate a deep understanding of selected advanced topics in mathematics and their significance within the broader context of mathematical theory and applications. **CLO 2.** Analyse and synthesize concepts from the chosen topics to solve complex mathematical problems independently or collaboratively. **CLO 3.** Apply mathematical methods and tools, including technology, to investigate real-world or theoretical problems related to the selected topics. **CLO 4.** Communicate mathematical ideas, arguments, and solutions effectively in both oral and written forms using appropriate mathematical language and representations. **CLO 5.** Develop critical thinking and research skills to explore recent developments or unresolved questions in the selected mathematical topics. **CLO 6.** Demonstrate the ability to adapt and integrate knowledge from the selected mathematical topics into interdisciplinary fields or further research.
Content	Capita Selecta explores the latest advances in mathematics and its applications.
Examination forms	Structured assignments, Poster Presentation
Study and examination requirements	The final mark will be weighted as follows: No — Assessment methods (components, activities) — Weight (percentage) 15 — Class Activities — 10% 16 — Assignments — 20% 17 — Mid Term Examination — 35% 18 — Final Eximination — 35%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	5. Madina, F., & Rahadjeng, B. (2024). Pewarnaan Titik Ketakteraturan Lokal pada Beberapa Kelas Graf. MATHunesa: Jurnal Ilmiah Matematika, 12(2),

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CLO-ILO Mapping

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

Assessment Plan

CLO	Activity	Task	Mid-term Examination	Final Examinatiom	Percentage (%)
1	1		5	5	12
2	2	3	2		7
3	2	3		10	16
4	2	4	10	5	22
5	2	5	10	8	23
6	1		8	7	15
Percentage (%)	10	20	35	35	100

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MODULE HANDBOOK

Bachelor in Mathematics

Module Name	Thesis
Module level, if applicable	Bachelor
Code, if applicable	MPM-4063
Subtitle, if applicable	-
Courses, if applicable	Thesis
Semester(s) in which the module is taught	8th (seventh)
Person responsible for the module	Head of the Mathematics Undergraduate Program.
Lecturer(s)	Thesis Supervisor
Language	Bahasa Indonesia
Relation to curriculum	Compulsory course in the fourth year (8th semester) bachelor's degree
Teaching methods	Project based Learning
Workload (incl. contact hours, self-study hours)	Students present the results of their research on thesis material related to mathematics in scientific articles.
Credit points	6 SKS = 10,02 ECTS
Required and recommended prerequisites for joining the module	Pass all required courses with a minimum total of 136 credits earned from completed courses.
Intended Learning Outcome (ILO)	**ILO 1**: Demonstrates academic integrity by upholding belief in the one Almighty God, human values, morality, and ethics to contribute to improving the quality of life for the nation based on Pancasila. **ILO 2**: Possesses the ability to adapt, collaborate, and pursue self-development in mathematics while engaging with other disciplines. **ILO 3**: Capable of observing, identifying, formulating, and problems solving by using mathematical approaches, with or without the assistance of technology. **ILO 4**: Has theoretical and procedural understanding, encompassing exploration, generalization, abstraction, and the development of

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	mathematical thinking in problem-solving, and communicates it in the language of mathematics. **ILO 5**: Possesses comprehensive knowledge in mathematical modelling and can construct mathematical models for various problems, both in mathematics and other fields such as science or daily life and can determine problem-solving strategies. **ILO 6**: Demonstrates mathematical skills, including interpretation, reconstruction, analysis, and individual or team communication, presenting results accurately, clearly, and organized both orally and in writing.

Module objectives (CLO/CPMK)	After completing this course, **CLO 1.** Demonstrate the ability to conduct independent research in a specific area of mathematics, synthesizing existing knowledge and identifying research gaps. **CLO 2.** Present research findings clearly and effectively in both oral and written forms, using appropriate mathematical language, structures, and visual representations. **CLO 3.** Engage in critical discussions and debates, analyzing research in mathematics from diverse perspectives, while respecting academic integrity and contributing to the scholarly community. **CLO 4.** Develop skills in literature review and theoretical analysis, integrating multiple sources of information to strengthen the foundation of mathematical research. **CLO 5.** Apply research methods in mathematics, such as problem-solving, modeling, and experimentation, to formulate and test hypotheses or research questions.
Content	Project based Learning
Examination forms	Structured assignments, Oral Presentation
Study and examination requirements	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 19 Undergraduate Thesis Draft and article project 50% 20 Presentation 50%
Media employed	Board, LCD Projector, Laptop/Computer
Reading list	3. Panduan Penulisan Skripsi Program Studi Matematika FMIPA UNTAN 4. Panduan Tugas Akhir FMIPA UNTAN

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CLO-ILO Mapping

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

Assessment Plan

CLO	Undergraduate Thesis Draft and article project	Presentation	Percentage (%)
1	5	20	25
2	15	10	25
3	10	5	15
4	5	10	15
5	15	5	20
Percentage (%)	**50**	**50**	**100**

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