



MODULE HANDBOOK MATHEMATICS 1



**BACHELOR DEGREE PROGRAM
DEPARTMENT OF BIOMEDICAL ENGINEERING
FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS
TECHNOLOGY**

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE



MODULE HANDBOOK Mathematics 1

DEPARTMENT OF BIOMEDICAL ENGINEERING

INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Number : B/21382/IT2.IX.5.1.2/PP.03.00.00/2020

Proses Process	Penanggung Jawab Person in Charge			Tanggal Date
	Nama Name	Jabatan Position	Tandatangan Signature	
Perumus Preparation	Drs. I.G.Ngurah Rai Usada, M.Si	Dosen Lecturer	TTD	November 23, 2019
Pemeriksa dan Pengendalian Review and Control	Dr. Didik Khusnul Arif, S.Si, M.Si	Tim kurikulum Curriculum team	TTD	February 10, 2020
Persetujuan Approval		Koordinator RMK Course Cluster Coordinator	TTD	March 02, 2020
Penetapan Determination	Dr. Achmad Arifin, S.T., M.Eng.	Kepala Departemen Head of Department		March 09, 2020

MODULE HANDBOOK

MATHEMATICS 1

Module name	Mathematics 1	
Module level	Undergraduate	
Code	KM184101	
Course (if applicable)	Mathematics 1	
Semester	First Semester (Gasal)	
Person responsible for the module	Drs. I.G.Ngurah Rai Usada, M.Si	
Lecturer		
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, mandatory , 1 st semester.	
Type of teaching, contact hours	Lectures, <60 students	
Workload	1. Lectures : 3 x 50 = 150 minutes per week. 2. Exercises and Assignments : 3 x 50 = 150 minutes per week. 3. Private learning : 3 x 50 = 150 minutes per week.	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	Course Learning Outcome (CLO) after completing this module, CLO 1: Students are able to apply basic mathematical concepts related to matrices and determinants. CLO 2: Students are able to apply equations or inequalities and graphs of parabolic, circle or ellipse functions. CLO 3: Students are able to apply complex variable forms in polar form and determine the roots of the equation. CLO 4: Students are able to determine the continuity of functions and its derivatives.	PLO-01, PLO-02, PLO-04 PLO-02, PLO-03, PLO-04 PLO-03, PLO-04, PLO-05

	CLO 5: Students are able to apply integrals through the fundamental theorem of calculus.	PLO-02, PLO-03, PLO-04 PLO-04, PLO-05, PLO-04
Content	This course studies matrices and their determinants, equations, inequalities, graphs of parabolic functions, circles or ellipses, complex numbers and their polar forms, continuity of functions and its derivatives, integrals and fundamental theorems of calculus.	
Study and examination requirements and forms of examination	● In-class exercises ● Assignment 1, 2, 3 ● Mid-term examination ● Final examination	
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.	
Reading list	Main : 1. Tim Dosen Jurusan Matematika ITS, Buku Ajar Kalkulus 1 , Edisi ke-4 Jurusan Matematika ITS, 2018. 2. Anton, H. dkk, Calculus, 10-th edition, John Wiley & Sons, New York, 2012. Supporting : 1. Kreyzig, E, Advanced EngineeringMathematics, 10-th edition, John Wiley & Sons, Singapore, 2011. 2. Purcell, J, E, Rigdon, S., E., Calculus, 9-th edition, Prentice-Hall, New Jersey, 2006. 3. James Stewart , Calculus, ed.7, Brooks/cole-Cengage Learning, Canada,2012.	

I. Rencana Pembelajaran Semester / Semester Learning Plan

	INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS) FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY DEPARTMENT OF BIOMEDICAL ENGINEERING					Document Code
SEMESTER LEARNING PLAN						
MATA KULIAH (MK) COURSE	KODE CODE	Rumpun MK Course Cluster	BOBOT (sks) Credits		SEMESTER	Tgl Penyusunan Compilation Date
Mathematics 1 Mathematics 1	KM184101	Ilmu Dasar Teknik Basic Engineering	T=3	P=0	I	Feb 27, 2020
OTORISASI / PENGESAHAN AUTHORIZATION / ENDORSEMENT	Dosen Pengembang RPS Developer Lecturer of Semester Learning Plan		Koordinator RMK Course Cluster Coordinator		Ka DEPARTEMEN Head of Department	
	(Drs. I.G.Ngurah Rai Usada, M.Si)		(M. Hilman Fatoni, S.T., M.T.)		(Dr. Achmad Arifin, S.T., M.Eng.)	
Capaian Pembelajaran	CPL-PRODI yang dibebankan pada MK PLO Program Charged to The Course					
Learning Outcomes	CPL-01 PLO-01	Mampu menginterpretasikan konsep dasar matematika dan menyusun pembuktian secara langsung, tidak langsung, maupun dengan induksi matematika. Able to interpret the basic concepts of mathematics and construct proofs directly, indirectly, or by mathematical induction.				
	CPL-02 PLO-02	Mampu melakukan identifikasi permasalahan sederhana, membentuk model matematika dan menyelesaikannya. Able to identify simple problems, form mathematical models and solve them.				
	CPL-03 PLO-03	Menguasai metode-metode standar dalam bidang matematika. Mastering standard methods in mathematics.				
	CPL-04 PLO-04	Mampu menguasai teori fundamental matematika yang meliputi konsep Matriks , determinan , bilangan kompleks dan persamaan atau pertidaksamaan , serta fungsi , turunan dan integralnya. Able to master fundamental mathematical theory which includes the concept of matrices, determinants, complex numbers and equations or inequalities, as well as its functions, derivatives and integrals.				
	CPL-05	Mampu melakukan identifikasi permasalahan, membentuk model matematika dan menyelesaikannya.				

	PLO-05	Able to identify and solve problems, and form mathematical models.																																		
	Capaian Pembelajaran Mata Kuliah (CPMK) Course Learning Outcome (CLO) - <i>If CLO as description capability of each Learning Stage in the course, then CLO = LLO</i>																																			
	CP MK 1 CLO 1	Mahasiswa mampu Menerapkan konsep-konsep Dasar Matematika yang terkait matriks dan determinan. <i>Students are able to apply basic mathematical concepts related to matrices and determinants.</i>																																		
	CP MK 2 CLO 2	Mahasiswa mampu menerapkan persamaan atau petidaksamaan serta grafik fungsi Parabola , lingkaran atau ellips. <i>Students are able to apply equations or inequalities and graphs of parabolic, circle or ellipse functions.</i>																																		
	CP MK 3 CLO 3	Mahasiswa mampu mengaplikasikannya bentuk peubah kompleks dalam bentuk polar serta menarik akar-akar persamaannya. <i>Students are able to apply complex variable forms in polar form and determine the roots of the equation.</i>																																		
	CP MK 4 CLO 4	Mahasiswa mampu menentukan kekontinuan fungsi dan turunanannya. <i>Students are able to determine the continuity of functions and its derivatives.</i>																																		
	CP MK 5 CLO 5	Mahasiswa mampu menerapkan integral melalui Theorema fundamental kalkulus. <i>Students are able to apply integrals through the fundamental theorem of calculus.</i>																																		
Peta CPL – CP MK Map of PLO - CLO	<table><tr><td></td><td>CPL-01</td><td>CPL-02</td><td>CPL-03</td><td>CPL-04</td><td>CPL-05</td></tr><tr><td>CPMK 1 / SUB CPMK 1 CLO 1 / LLO 1</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CPMK 2 / SUB CPMK 2 CLO 2 / LLO 2</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CPMK 3 / SUB CPMK 3 CLO 3 / LLO 3</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CPMK 4 / SUB CPMK 4 CLO 4 / LLO 4</td><td></td><td></td><td></td><td></td><td></td></tr></table>							CPL-01	CPL-02	CPL-03	CPL-04	CPL-05	CPMK 1 / SUB CPMK 1 CLO 1 / LLO 1						CPMK 2 / SUB CPMK 2 CLO 2 / LLO 2						CPMK 3 / SUB CPMK 3 CLO 3 / LLO 3						CPMK 4 / SUB CPMK 4 CLO 4 / LLO 4					
	CPL-01	CPL-02	CPL-03	CPL-04	CPL-05																															
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CPMK 3 / SUB CPMK 3 CLO 3 / LLO 3																																				
CPMK 4 / SUB CPMK 4 CLO 4 / LLO 4																																				

	CPMK 5 / SUB CPMK 5 CLO 5 / LLO 5					
Diskripsi Singkat MK Short Description of Course	Mata kuliah ini mempelajari tentang matrik dan determinan, persamaan, pertidaksamaan , grafik fungsi parabola , lingkaran atau elips, bilangan kompleks dan bentuk polarnya, kekontinuan fungsi dan turunanya, integral dan theorema fundamental kalkulus. <i>This course studies matrices and their determinants, equations, inequalities, graphs of parabolic functions, circles or ellipses, complex numbers and their polar forms, continuity of functions and its derivatives, integrals and fundamental theorems of calculus.</i>					
Bahan Kajian: Materi pembelajaran Course Materials:	1. Matrik dan Determinan / <i>Matrix and Determinant</i> 2. Persamaan , pertidaksamaan , grafik fungsi parabola , lingkaran atau Eliips / <i>Equations, inequalities, graphs of functions of a parabola, circle or Eliips</i> 3. Bilangan kompleks dan bentuk polarnya / <i>Complex numbers and their polar forms</i> 4. Kekontinuan Fungsi dan turunanya / <i>Continuity of Function and its derivation</i> 5. Integral dan theorema Fundamental Kalkulus / <i>Integral and Fundamental theorems of Calculus</i>					
Pustaka References	Utama / Main:					
	1. Tim Dosen Jurusan Matematika ITS, Buku Ajar Kalkulus 1 , Edisi ke-4 Jurusan Matematika ITS, 2018. 2. Anton, H. dkk, Calculus, 10-th edition, John Wiley & Sons, New York, 2012.					
	Pendukung / Supporting:					
	1. Kreyzig, E, Advanced EngineeringMathematics, 10-th edition, John Wiley & Sons, Singapore, 2011 2. Purcell, J, E, Rigdon, S., E., Calculus, 9-th edition, Prentice-Hall, New Jersey, 2006. 3. James Stewart , Calculus, ed.7, Brooks/cole-Cengage Learning, Canada,2012.					
Dosen Pengampu Lecturers						
Matakuliah syarat Prerequisite		-				
Mg ke/ Week		Penilaian / Assessment		Bantuk Pembelajaran; Metode Pembelajaran; Penugasan Mahasiswa;		Materi Pembelajaran [Pustaka] /
						Bobot Penilaian

	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) / <i>Final ability of each learning stage (LLO)</i>	Indikator / <i>Indicator</i>	Kriteria & Teknik / <i>Criteria & Techniques</i>	[Estimasi Waktu] / <i>Form of Learning; Learning Method; Student Assignment; [Estimated Time]</i>		Learning Material <i>[Reference]</i>	/Assessment Load (%)
(1)	(2)	(3)	(4)	Tatap Muka / <i>In-class (5)</i>	Daring / <i>Online (6)</i>	(7)	(8)
1	Pengantar Kuliah <i>Introduction to lecture</i>	Menyampaikan RPS, Kontrak Kuliah, dan Perjanjian macam Evaluasi dan Prosentase masing masing evaluasi. <i>Delivering RPS, Study Contract, and Agreement on Evaluation and Percentage of each each evaluation.</i>					2.5
	Mampu menyelesaikan Sistem persamaan liner dalam bentuk matriks dan menggunakan OBE <i>Able to solve linear system of equations in the form of a matrix using OBE</i>	- Ketepatan menyatakan Sitem persamaan liner dalam bentuk matriks dan menyelesaikanya dengan OBE. - The accuracy of expressing a system of linear equations in matrix form and solve it by OBE.	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	- Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2 x 2 x 50"] - Lectures, practice and assignments [TM: 2 x 2 x 50"]	- Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus/asinkronus di MyITS Classroom - Lectures, practice and provide assignment questions through Synchronus / asynchronous at MyITS Classroom	- Ihtisar Matriks , dan persamaan [1] hal: 1-20 - Overview of the matrix, and equation [1] page: 1-20	

2	Mampu menentukan invers matriks dan menyelesaikan sistem persaaam linier dengan determinan serta menentukan nilai eigen dan vektor eigen. <i>Able to determine matrix inverse and solve linear equation system with determinants and determine eigenvalues and eigenvectors.</i>	● Ketepatan Memperoleh Invers matriks , menyelesaikan sistem persamaan linier dengan Determinan serta menemukan Nilai Eigen dan Vektor Eigen dari suatu matriks. ● <i>The accuracy of Obtaining the inverse of the matrix, solving the system of linear equations with the determinants and finding the Eigenvalues and Eigenvectors of a matrix.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	● Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2 x 2 x 50"] ● <i>Lectures, practice and assignments [TM: 2 x 2 x 50"]</i>	● Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus/asinkronus di MyITS Classroom ● <i>Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS Classroom</i>	● Invers Matriks , Determinan dan nilai eigen atau vektor eigen [1] hal: 21-49 ● <i>Matrix inverse, Determinants and eigenvalues or eigenvectors [1] page: 21-49</i>	2.5
	ASISTENSI KE-1 1 st ASSISTANCE						
3	EVALUASI 1 <i>1st EVALUATION</i>	KUIS 1, bahan Bab 1 ● <i>1st QUIZ, material from Chapter 1</i>	Ketajaman menyelesaikan soal - soal yang terkait dengan materi Bab 1. <i>Accuracy in solving questions related to the</i>	TES TERTULIS Waktu : 60 menit WRITTEN TEST ● <i>Time: 60 minutes</i>	TES TERTULIS Waktu : 50 menit melalui MyITS Classroom WRITTEN TEST <i>Time: 50 minutes via MyITS Classroom</i> ●		10

			material in Chapter 1.				
	Mampu menyelesaikan suatu persamaan atau pertidaksamaan, Nilai Mutlak dan mengaplikasikan persamaan garis lurus. <i>Able to solve an equation or inequality, Absolute Value and apply straight line equations.</i>	• Ketepatan menyelesaikan persamaan atau pertidaksamaan dan mensketsa persamaan garis lurus • <i>The accuracy of solving equations or inequalities and sketch out straight line equations.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	• Kuliah, latihan soal-soal serta memberikan soal tugas [TM : 2 x 2 x 50"] • <i>Lectures, practice and assignments [TM : 2 x 2 x 50"]</i>	• Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus/asinkronus di MyITS Classroom • <i>Lectures, practice and provide assignment questions through Synchronus / asynchronous at MyITS Classroom</i>	• Persamaan atau pertidaksamaan, Nilai mutlak dan mengaplikasikan persamaan garis lurus. [1] hal: 53-72 • <i>Equations or inequalities, Absolute values and applying straight line equations. [1] page: 53-72</i>	2.5
4	Mampu menyelesaikan suatu operasi peubah kompleks dan bentuk polarnya serta menarik akar-akar persamaan peubah kompleks. <i>Able to solve a complex variable operation and its polar form and draw the roots</i>	• Ketepatan menyelesaikan operasi peubah kompleks dan bentuk polarnya serta menarik akar-akar persamaan peubah kompleks. • <i>The accuracy of solving the operation of complex variables</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	• Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] • <i>Lectures, practice and assignments</i>	• Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di MyITS Classroom	• Operasi peubah kompleks dan bentuk polarnya serta menarik akar-akar persamaan peubah kompleks. [1] hal: 77-89 • <i>Operations of complex variables</i>	2.5

	<i>of complex variable equations.</i>	<i>and their polarized forms and drawing the roots of complex variable equations.</i>		<i>[TM : 2 x 2 x 50"]</i>	<i>Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS</i>	<i>and their polarized forms and draw the roots of complex variable equations. [1] page: 77-89</i>	
ASISTENSI KE-2 2nd ASSISTANCE							
5	Mampu menyelesaikan operasi pada fungsi dan mampu mensketsa grafik fungsi. <i>Able to complete operations on functions and sketch the function graphs.</i>	• Ketepatan menghitung operasi pada fungsi dan mampu mensketsa grafik fungsi • The accuracy of calculating operations on functions and sketching the function graphs.	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	• Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] • Lectures, practice and assignments [TM : 2 x 2 x 50"]	• Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di MyITS Classroom • Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS	• Operasi pada fungsi dan mampu mensketsa grafik fungsi [1] hal: 91-103 • Operations on functions and sketch the function graphs. [1] page: 91-103	2.5

	EVALUASI 2 2nd EVALUATION	KUIS 2, bahan Bab 2 dan 3 2nd QUIZ, material from Chapters 2 and 3	Ketajaman menyelesaikan soal - soal yang terkait dengan materi Bab 2 dan 3. <i>Accuracy in solving questions related to the material in Chapter 2 and 3.</i>	TES TERTULIS Waktu : 60 menit WRITTEN TEST <i>Time: 60 minutes</i>	TES TERTULIS Waktu : 50 menit melalui MyITS Classroom WRITTEN TEST <i>Time: 50 minutes via MyITS Classroom</i> 		10
6	Mampu menyelesaikan Sifat-sifat grafik fungsi dan Fungsi Invers. <i>Able to solve the properties of the function graph and Inverse Functions.</i>	- Ketepatan menghitung Sifat-sifat grafik fungsi dan Fungsi Invers. <i>The accuracy of calculating the properties of the function graph and Inverse Functions.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	- Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] <i>Lectures, practice and assignments [TM : 2 x 2 x 50"]</i>	- Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di MyITS Classroom <i>Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS</i>	- Sifat-sifat grafik fungsi dan Fungsi Invers. [1] hal: 108-119 <i>The properties of the function graph and Inverse Functions [1] hal: 108-119</i>	2.5

ASISTENSI KE-3 3 rd ASSISTANCE							
7	Mampu menghitung Limit fungsi dan mampu menghitung limit tak hingga dan kekontinuan fungsi. <i>Able to calculate function limit and able to calculate infinite limit and function continuity.</i>	• Ketepatan menghitung limit tak hingga dan kekontinuan fungsi. • Ketepatan menghitung limit tak hingga dan kekontinuan fungsi . • <i>The accuracy of calculating the infinite limit and the continuity of the function.</i> • <i>The accuracy of calculating the infinite limit and the continuity of the function.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	• Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] • <i>Lectures, practice and assignments [TM : 2 x 2 x 50"]</i>	• Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di MyITS Classroom • <i>Lectures, practice and provide assignment questions through Synchronus / asynchronous at MyITS</i>	• Limit fungsi [1] hal: 123-134 • limit tak hingga dan kekontinuan fungsi . [1] hal: 137-150 • <i>Function limit [1] page: 123-134</i> • <i>Infinite limit and continuity of function. [1] page: 137-150</i>	2.5
8	EVALUASI 3 3rd EVALUATION	UJIAN TENGAH SEMESTER MID EXAM	Ketajaman menyelesaikan soal-soal yang terkait dengan fungsi trensenden, teknik integrasi luas bidang dan volume benda putar. <i>Accuracy in solving problems related</i>	TERJADWAL TES TERTULIS • Waktu : 100 menit SCHEDULED WRITTEN TEST • Time : 100 minutes	TERJADWAL Daring asinkronus Waktu : 90 menit melalui MyITS Classroom SCHEDULED Asynchronous online	KOMPREHENSIF COMPREHENSIVE	20

			<i>to the transcendental function, the technique of integrating the area of plane and volume of rotating objects.</i>		<i>Time : 90 minutes via MyITS Classroom</i>		
9	Mampu menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. <i>Able to determine tangents and rate of change and determine derivatives of functions.</i>	- Ketepatan menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. <i>The accuracy of determining the tangent and rate of change and determines the derivative of the function.</i>	Non-test : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	- Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] <i>Lectures, practice and assignments [TM : 2 x 2 x 50"]</i>	- Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di MyITS Classroom <i>Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS</i>	- Garis singgung dan laju perubahan serta menentukan turunan fungsi. [1] hal: 155-165 <i>Tangents and rate of change and determine the derivative of the function. [1] page: 155-165</i>	2.5
10	Mampu menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi. <i>Able to determine derivatives with implicit differentials and analyze graphs of functions.</i>	Ketepatan menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi.	Non-test : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"]	Kuliah, latihan soal-soal serta memberikan soal tugas melalui Sinkronus / asinkronus di	menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi. [1] hal: 168-190	2.5

		The accuracy of determining derivatives with implicit differentials and analyzing graphs of functions.		Lectures, practice and assignments [TM : 2 x 2 x 50"]	MyITS Classroom Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS	Determine derivatives with implicit differentials and analyze graphs of functions. [1] page: 168-190	
ASISTENSI KE-4 4th ASSISTANCE							
11	- Mampun menyelesaikan laju- laju yang berkaitan dan menentukan selang naik / turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua. - Mampu Menentukan nilai maksimum / minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya. - Able to solve the corresponding rates and determines the increase /	- Ketepatan menghitung laju-laju yang berkaitan dan menentukan selang naik / turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua. - Ketepatan menghitung nilai maksimum / minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya.	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	- Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] - Lectures, practice and assignments [TM : 2 x 2 x 50"]	Kuliah, latihan soal - soal serta memberikan soal tugas melalui	- Laju-laju yang berkaitan dan menentukan selang naik/turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua. [1] hal: 195-218 - nilai maksimum/minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya . [1] hal: 220-234 - Corresponding rates and determines the increase / decrease interval of the function and its concavity using the first and second derivative tests. [1] page: 195-218	2.5

	<i>decrease interval of the function and its concavity using the first and second derivative tests.</i> • <i>Able to determine the maximum / minimum value of a function and sketch polynomial, rational and other graphical functions.</i>	• <i>The accuracy of calculating the corresponding rates and determines the increase / decrease interval of the function and its concavity using the first and second derivative tests.</i> • <i>The accuracy of calculating the maximum / minimum value of functions and sketch polynomial, rational and other graphical graphs of functions.</i>			Sin kro nus / asi nkr onu s di Myl TS Clas sro om • <i>Lect ures , prac tice and pro vide assi gn men t que stio ns thro ugh Syn chr</i>	• <i>maximum / minimum value of a function and sketch polynomial, rational and other graphical functions.</i> [1] page: 220-234	
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					onus / asynchronous at MyITS		
12	ASISTENSI KE-5 5 th ASSISTANCE						
	EVALUASI 4 4 th EVALUATION	KUIS KE-3, turunan Fungsi dan laju-laju yang terkait. 3 rd QUIZ, Function derivative and its associated rates.	Ketajaman menyelesaikan soal-soal yang terkait dengan turunan fungsi dan laju-laju yang terkait. <i>Accuracy in solving problems related to the derivative of the function and their associated rates.</i>	TES TERTULIS Waktu : 60 menit <i>WRITTEN TEST</i> Time: 60 minutes	TES TERTULIS Waktu : 50 menit melalui MyITS Classroom <i>WRITTEN TEST</i> Time: 50 minutes via MyITS Classroom		10

13	• Mampu menjelaskan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum. • Mampu menentukan anti turunan fungsi dan luas sebagai limit jumlahan. • <i>Able to explain problems related to maximum / minimum problem issues.</i> • <i>Able to determine the anti-derivative function and area as the sum limit.</i>	• Ketepatan menentukan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum. • Ketepatan menentukan anti turunan fungsi dan luas sebagai limit jumlahan. • <i>The accuracy of explaining problems related to maximum / minimum problem issues.</i> • <i>The accuracy of determining the anti-derivative function and area as the sum limit.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : <i>Problem solving task.</i>	• Kuliah, latihan soal soal serta memberikan soal tugas [TM : 2 x 2 x 50"] • <i>Lectures, practice and assignments</i> • <i>[TM : 2 x 2 x 50"]</i>	• Kuli ah, latih an soal - soal sert a me mb erik an soal tuga s mel alui Sin kro nus / asi nkr onu s di Myl TS Clas sro om	• Masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum. [1] hal: 235-258 • Anti turunan fungsi dan luas sebagai limit jumlahan. [1] hal: 273-283 • <i>Problems related to maximum / minimum problem issues. [1] page: 235-258</i> • <i>Anti-derivative function and area as the sum limit. [1] hal: 273-283</i>	2.5

					Lectures, practice and provide assignment questions through Synchronous / asynchronous at MyITS		
14	Mampu menentukan turunan dengan menggunakan Theorema fundamental kalkulus I dan II.	Ketepatan menentukan turunan dengan menggunakan Theorema	Non-tes : soal-soal latihan serta tugas. Non-test :	Kuliah, latihan soal soal serta memberikan soal tugas	Kuliah, latihan soal	Theorema fundamental kalkulus I dan II [1] hal: 286-288	2.5

	<i>Able to determine the derivative using the fundamental theorem calculus I and II.</i>	fundamental kalkulus I dan II . • <i>The accuracy of determining the derivative using the fundamental theorem calculus I and II.</i>	<i>Problem solving task.</i>	[TM : 2 x 2 x 50"] • <i>Lectures, practice and assignments</i> • [TM : 2 x 2 x 50"]	- soal sert a me mb erik an soal tuga s mel alui Sin kro nus / asi nkr onu s di Myl TS Clas sro om • <i>Lect ures , prac tice and</i>	• <i>The fundamental theorem calculus I and II.</i> [1] page: 286-288	
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					provide assignment questions through Synchronus / asynchronous at MyITS		
	ASISTENSI KE-6 6 th ASSISTANCE						
15-16	EVALUASI 5 5 th EVALUATION	• UJIAN AKHIR SEMESTER • FINAL-SEMESTER EXAM	Ketajaman menyelesaikan soal-soal yang terkait dengan turunan dan anti turunan. <i>Accuracy in solving problems</i>	TERJADWAL TES TERTULIS • Waktu : 100 menit SCHEDULED WRITTEN TEST • Time : 100 minutes	TERJADWAL Daring asinkronus Waktu : 90 menit	KOMPREHENSIF COMPREHENSIVE	20

			<i>related to derivatives and anti-derivatives.</i>		melalui MyITS Classroom SCHEDULED Asynchronous online <i>Time : 90 minutes via MyITS</i> • Classroom		
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TM=Tatap Muka, **PT**=Penugasan Terstruktur, **BM**=Belajar Mandiri.
FF = Face to Face, **SA** = Structured Assignment, **SS** = Self Study.

II. Rencana Asesmen & Evaluasi (RAE) / *Assessment & Evaluation Plan*

	ASSESSMENT & EVALUATION PLAN BACHELOR DEGREE PROGRAM OF BIOMEDICAL ENGINEERING - FTEIC ITS Course : Mathematics 1		RA&E
			Write Doc Code
Kode/code: KM184101	Bobot sks/credits (T/P): 3/0	Rumpun MK: Ilmu Dasar Teknik Course Cluster: Basic Engineering	Smt: I
OTORISASI <i>AUTHORIZATION</i>	Penyusun RA & E <i>Compiler A&EP</i> Drs. I.G.Ngurah Rai Usada, M.Si	Koordinator RMK <i>Course Cluster Coordinator</i> Muhammad Hilman Fatoni, S.T., M.T.	Ka DEP <i>Head of DEP</i> Dr. Achmad Arifin, S.T., M.Eng.

Mg ke/Week (1)	Sub CP-MK / Lesson Learning Outcomes (LLO) (2)	Bentuk Asesmen (Penilaian) Form of Assessment (3)	Bobot / Load (%) (4)
1	- Pengantar Kuliah. - Mampu menyelesaikan sistem persamaan linier dalam bentuk matriks dan menggunakan OBE. - Introduction to lecture. <i>Able to solve linear system of equations in the form of a matrix using OBE.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
2	Mampu menentukan invers matriks dan menyelesaikan sistem persamaan linier dengan	Non-tes : soal-soal latihan serta tugas. Non-test :	2.5

	determinan serta menentukan nilai eigen dan vektor eigen. <i>Able to determine matrix inverse and solve linear equation system with determinants and determine eigenvalues and eigenvectors.</i>	Problem solving task.	
	ASISTENSI KE-1 1st ASSISTANCE		
3	EVALUASI 1 1st EVALUATION	Tes: Ujian Tulis/Ujian Daring	10
	Mampu menyelesaikan suatu persamaan atau pertidaksamaan, Nilai Mutlak dan mengaplikasikan persamaan garis lurus. <i>Able to solve an equation or inequality, Absolute Value and apply straight line equations.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
4	Mampu menyelesaikan suatu operasi peubah kompleks dan bentuk polarnya serta menarik akar-akar persamaan peubah kompleks. <i>Able to solve a complex variable operation and its</i>	Tes: Ujian Tulis/Ujian Daring	2.5

	<i>polar form and draw the roots of complex variable equations.</i>		
	ASISTENSI KE-2 2nd ASSISTANCE		
5	Mampu menyelesaikan operasi pada fungsi dan mampu mensketsa grafik fungsi. <i>Able to complete operations on functions and sketch the function graphs.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
	EVALUASI 2 2nd EVALUATION	Tes: Ujian Tulis/Ujian Daring	10
6	Mampu menyelesaikan Sifat-sifat grafik fungsi dan Fungsi Invers. <i>Able to solve the properties of the function graph and Inverse Functions.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
	ASISTENSI KE-3 3rd ASSISTANCE		
7	Mampu menghitung Limit fungsi dan mampu menghitung limit tak hingga dan kekontinuan fungsi. <i>Able to calculate function limit and able to calculate infinite limit and function continuity.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
8	EVALUASI 3	Tes:	20

	Evaluasi Tengah Semester 3rd EVALUATION Mid Term Test	Ujian Tulis/Ujian Daring Test: <i>Written exams / Online Exams</i>	
9	Mampu menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. <i>Able to determine tangents and rate of change and determine derivatives of functions.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
10	Mampu menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi. <i>Able to determine derivatives with implicit differentials and analyze graphs of functions.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
	ASISTENSI KE-4 4th ASSISTANCE		
11	Mampun menyelesaikan laju- laju yang berkaitan dan menentukan selang naik / turunnya fungsi dan kecekungannya dengan menggunakan uji turunan pertama dan kedua.	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5

	• Mampu Menentukan nilai maksimum / minimum fungsi serta mampu mensketsa grafik fungsi polinomial, rasional dan grafik yang lainnya. • <i>Able to solve the corresponding rates and determines the increase / decrease interval of the function and its concavity using the first and second derivative tests. Able to determine the maximum / minimum value of a function and sketch polynomial, rational and other graphical functions.</i>		
12	ASISTENSI KE-5 5th ASSISTANCE		
	EVALUASI 4 4th EVALUATION	Tes: Ujian Tulis/Ujian Daring Test: <i>Written exams / Online Exams</i>	10
13	• Mampu menjelaskan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum.	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5

	• Mampu menentukan anti turunan fungsi dan luas sebagai limit jumlahan. • <i>Able to explain problems related to maximum / minimum problem issues. Able to determine the anti-derivative function and area as the sum limit.</i>		
14	Mampu menentukan turunan dengan menggunakan Theorema fundamental kalkulus I dan II. <i>Able to determine the derivative using the fundamental theorem calculus I and II.</i>	Non-tes : soal-soal latihan serta tugas. Non-test : Problem solving task.	2.5
	ASISTENSI KE-6 6th ASSISTANCE		
15-16	EVALUASI 5 Evaluasi Akhir 5th EVALUATION Final Exam	Tes: Ujian Tulis/Ujian Daring Test: <i>Written exams / Online Exams</i>	20
Total bobot penilaian Total assessment load			100%

● **Indikator Pencapaian CPL Pada MK / *Indicator of PLO achievement charged to the course***

CPL yang dibebankan pada MK / <i>PLO charged to the course</i>	CPMK / <i>Course Learning Outcome (CLO)</i>	Minggu ke / <i>Week</i>	Bentuk Asesmen / <i>Form of Assessment</i>	Bobot / <i>Load (%)</i>
CPL-01 / <i>PLO-01</i> , CPL-02 / <i>PLO-02</i> , CPL-04 / <i>PLO-04</i>	CPMK 1 / <i>CLO 1</i>	Week- 1-2	Task 1	2.5
			Task 2	2.5
CPL-02 / <i>PLO-2</i> , CPL-03 / <i>PLO-03</i> , CPL-04 / <i>PLO-04</i>	CPMK 2 / <i>CLO 2</i>	Week- 3	Task 3	2.5
			1 st Evaluation	10
CPL-03 / <i>PLO-03</i> , CPL-04 / <i>PLO-04</i> , CPL-05 / <i>PLO-05</i>	CPMK 3 / <i>CLO 3</i>	Week- 4-5	Task 4	2.5
			Task 5	2.5
			2 nd Evaluation	10
CPL-02 / <i>PLO-2</i> , CPL-03 / <i>PLO-03</i> , CPL-04 / <i>PLO-04</i>	CPMK 4 / <i>CLO 4</i>	Week- 6-7	Task 6	2.5
			Task 7	2.5
CPL-04 / <i>PLO-04</i> , CPL-05 / <i>PLO-05</i>	CPMK 5 / <i>CLO 5</i>	Week- 9-14	Task 8	2.5
			Task 9	2.5
			Task 10	2.5
			Task 11	2.5
			Task 12	2.5
			3 rd Evaluation	10
		Week- 8	Mid Exam	20
		Week- 15-16	Final exam	20
				Σ = 100%

No	Form of Assessment	PLO-01	PLO-02	PLO-03	PLO-04	PLO-05	PLO-06	PLO-07	PLO-08	PLO-09	PLO-10	PLO-11	PLO-12	Total
1	Task 1	0.01	0.01		0.005									0.025
2	Task 2	0.01	0.005		0.01									0.025

3	Task 3		0.005	0.01	0.01									0.025
4	1 st Evaluation		0.03	0.03	0.04									0.1
5	Task 4			0.01	0.01	0.005								0.025
6	Task 5			0.01	0.01	0.005								0.025
7	2 nd Evaluation			0.03	0.03	0.04								0.1
8	Task 6		0.01	0.005	0.01									0.025
9	Task 7		0.01	0.005	0.01									0.025
10	Task 8				0.0125	0.0125								0.025
11	Task 9				0.0125	0.0125								0.025
12	Task 10				0.0125	0.0125								0.025
13	Task 11				0.0125	0.0125								0.025
14	Task 12				0.0125	0.0125								0.025
15	3 rd Evaluation				0.05	0.05								0.1
16	Mid Exam	0.04	0.04	0.04	0.04	0.04								0.2
17	Final exam	0.04	0.04	0.04	0.04	0.04								0.2
	Total	0.1	0.15	0.18	0.3275	0.2425								1