MODULE HANDBOOK
MATHEMATICS 1

Module name	**Mathematics 1**	
Module level	Undergradute	
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	Undergradute degree program, **mandatory**, 1st 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 ELECTRICAL 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)	**(Dimas Anton Asfani, ST., MT., Ph.D)**	**(Dedet Candra Riawan, ST., M.Eng., Ph.D.)**

Capaian Pembelajaran ***Learning Outcomes***	**CPL-PRODI yang dibebankan pada MK** ***PLO Program Charged to The Course***	
	CPL-01 *PLO-01*	Mampu **menginterpertasikan** 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) - If CLO as description capability of each Learning Stage in the course, then CLO = LLO***	
	CP MK 1 ***CLO 1***	Mahasiswa mampu Menerapkan konsep-konsep Dasar Matematika yang terkait matriks dan determinan. *Students are able to apply basic mathematical concepts related to matrices and determinants.*
	CP MK 2 ***CLO 2***	Mahasiswa mampu menerapkan persamaan atau petidakrsamaan serta grafik fungsi Parabola , lingkaran atau ellips. *Students are able to apply equations or inequalities and graphs of parabolic, circle or ellipse functions.*
	CP MK 3 ***CLO 3***	Mahasiswa mampu mengaplikasikannya bentuk peubah kompleks dalam bentuk polar serta menarik akar-akar persamaannya. *Students are able to apply complex variable forms in polar form and determine the roots of the equation.*
	CP MK 4 ***CLO 4***	Mahasiswa mampu menentukan kekontinuan fungsi dan turunanannya. *Students are able to determine the continuity of functions and its derivatives.*
	CP MK 5 ***CLO 5***	Mahasiswa mampu menerapkan integral melalui Theorema fundamental kalkulus. *Students are able to apply integrals through the fundamental theorem of calculus.*

Peta CPL – CP MK

Map of PLO - CLO

	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*					

	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. *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.*
Bahan Kajian: Materi pembelajaran ***Course Materials:***	1. Matrik dan Determinan / *Matrix and Determinant* 2. Persamaan , pertidaksamaan , grafik fungsi parabola , lingkaran atau Eliips / *Equations, inequalities, graphs of functions of a parabola, circle or Eliips* 3. Bilangan kompleks dan bentuk polarnya / *Complex numbers and their polar forms* 4. Kekontinuan Fungsi dan turunanya / *Continuity of Function and its derivation* 5. Integral dan theorema Fundamental Kalkulus / *Integral and Fundamental theorems of Calculus*
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) / *Final ability of each learning stage (LLO)*	**Indikator / *Indicator***	**Kriteria & Teknik / *Criteria & Techniques***	**[Estimasi Waktu] / *Form of Learning; Learning Method; Student Assignment; [Estimated Time]***		***Learning Material [Reference]***	***/Assess-ment Load* (%)**
(1)	**(2)**	**(3)**	**(4)**	**Tatap Muka / *In-class* (5)**	**Daring / *Online* (6)**	**(7)**	**(8)**
1	Pengantar Kuliah *Introduction to lecture*	**Menyampaikan RPS, Kontrak Kuliah, dan Perjanjian macam Evaluasi dan Prosentase masing masing evaluasi.** ***Delivering RPS, Study Contract, and Agreement on Evaluation and Percentage of each each evaluation.***					**2.5**
	Mampu menyelesaikan Sistem persamaan liner dalam bentuk matriks dan mengunakan OBE *Able to solve linear system of equations in the form of a matrix using OBE*	● 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 :*** *Problem solving task.*	● 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 menyelesakan sistem persaam linier dengan determinan serta menentukan nilai eigen dan vektor eigen. *Able to determine matrix inverse and solve linear equation system with determinants and determine eigenvalues and eigenvectors.*	• Ketepatan Memperoleh Invers matriks , menyelesaikan sistem persamaan linier dengan Determinan serta menemukan Nilai Eigen dan Vektor Eigen dari suatu matriks. • *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.*	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	• 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***	• Invers Matriks , Determinan dan nilai eigen atau vektor eigen **[1] hal: 21-49** • *Matrix inverse, Determinants and eigenvalues or eigenvectors* ***[1] page: 21-49***	**2.5**
	ASISTENSI KE-1 ***1st ASSISTANCE***						
3	**EVALUASI 1** ***1st EVALUATION***	**KUIS 1, bahan Bab 1** • ***1st QUIZ, material from Chapter 1***	**Ketajaman menyelesaikan soal - soal yang terkait dengan materi Bab 1.** ***Accuracy in solving questions related to the***	**TES TERTULIS** **Waktu : 60 menit** ***WRITTEN TEST*** • ***Time: 60 minutes***	**TES TERTULIS** **Waktu : 50 menit melalui MyITS Classroom** ***WRITTEN TEST*** ***Time: 50 minutes via MyITS Classroom*** •		**10**

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

	of complex variable equations.	*and their polarized forms and drawing the roots of complex variable equations.*		*[TM : 2 x 2 x 50”]*	*Lectures, practice and provide assignment questions through* ***Synchronus / asynchronous at MyITS***	*and their polarized forms and draw the roots of complex variable equations.* ***[1] page: 77-89***	
	ASISTENSI KE-2 ***2nd ASSISTANCE***						
5	Mampu menyelesaikan operasi pada fungsi dan mampu mensketsa grafik fungsi. *Able to complete operations on functions and sketch the function graphs.*	● 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 :*** *Problem solving task.*	● 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***	● 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.** ***Accuracy in solving questions related to the material in Chapter 2 and 3.***	**TES TERTULIS** **Waktu : 60 menit** ***WRITTEN TEST*** ● ***Time: 60 minutes***	**TES TERTULIS** **Waktu : 50 menit melalui MyITS Classroom** ***WRITTEN TEST*** ***Time: 50 minutes via MyITS Classroom*** ●		**10**
6	Mampu menyelesaikan Sifat-sifat grafik fungsi dan Fungsi Invers. *Able to solve the properties of the function graph and Inverse Functions.*	● Ketepatan menghitung Sifat-sifat grafik fungsi dan Fungsi Invers. ● *The accuracy of calculating the properties of the function graph and Inverse Functions.*	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	● 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***	● Sifat-sifat grafik fungsi dan Fungsi Invers. **[1] hal: 108-119** ● *The properties of the function graph and Inverse Functions* **[1] hal: 108-119**	**2.5**

	ASISTENSI KE-3 ***3rd ASSISTANCE***						
7	Mampu menghitung Limit fungsi dan mampu menghitung limit tak hingga dan kekontinuan fungsi. *Able to calculate function limit and able to calculate infinite limit and function continuity.*	• Ketepatan menghitung limit tak hingga dan kekontinuan fungsi. • Ketepatan menghitung limit tak hingga dan kekontinuan fungsi . • *The accuracy of calculating the infinite limit and the continuity of the function.* • *The accuracy of calculating the infinite limit and the continuity of the function.*	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	• 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***	• Limit fungsi **[1] hal: 123-134** • limit tak hingga dan kekontinuan fungsi . **[1] hal: 137-150** • *Function limit* ***[1] page: 123-134*** • *Infinite limit and continuity of function.* ***[1] page: 137-150***	**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.** ***Accuracy in solving problems related***	**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**

			to the trensendent function, the technique of integrating the area of plane and volume of rotating objects.		***Time : 90 minutes via MyITS Classroom***		
9	Mampu menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. *Able to determine tangents and rate of change and determine derivatives of functions.*	• Ketepatan menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. • *The accuracy of determining the tangent and rate of change and determines the derivative of the function.*	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	• 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***	• Garis singgung dan laju perubahan serta menentukan turunan fungsi. **[1] hal: 155-165** • *Tangents and rate of change and determine the derivative of the function.* ***[1] page: 155-165***	**2.5**
10	Mampu menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi. *Able to determine derivatives with implicit differentials and analyze graphs of functions.*	• Ketepatan menentukan turunan dengan diferensial implisit dan menganalisa grafik fungsi.	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	• 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* ***Synchronus / 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 :*** *Problem solving task.*	• 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 kecekunangan n ya dengan menggunakan uji turunan pertama dan kedua. **[1] hal: 195-218** • nilai maksimum/min i mum 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**

	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.*	● *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.* ● *The accuracy of calculating the maximum / minimum value of functions and sketch polynomial, rational and other graphical graphs of functions.*			**Sinkronus / asinkronus di MyITS Classroom** ● *Lectures, practice and provide assignment questions through* ***Synchr***	● *maximum / minimum value of a function and sketch polynomial, rational and other graphical functions.* ***[1] page: 220-234***	

					onus / asynchronous at MyITS		
12	**ASISTENSI KE-5** ***5th ASSISTANCE***						
	EVALUASI 4 **4th EVALUATION**	**KUIS KE-3, turunan Fungsi dan laju-laju yang terkait.** **3rd QUIZ, Function derivative and its associated rates.**	**Ketajaman menyelesaikan soal-soal yang terkait dengan turunan fungsi dan laju-laju yang terkait.** ***Accuracy in solving problems related to the derivative of the function and their associated rates.***	**TES TERTULIS** **Waktu : 60 menit** ***WRITTEN TEST*** ***Time: 60 minutes***	**TES TERTULIS** **Waktu : 50 menit melalui MyITS Classroom** ***WRITTEN TEST*** ***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. • *Able to explain problems related to maximum / minimum problem issues.* • *Able to determine the anti-derivative function and area as the sum limit.*	• Ketepatan menentukan masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum. • Ketepatan menentukan anti turunan fungsi dan luas sebagai limit jumlahan. • *The accuracy of explaining problems related to maximum / minimum problem issues.* • *The accuracy of determining the anti-derivative function and area as the sum limit.*	**Non-tes :** soal-soal latihan serta tugas. ***Non-test :*** *Problem solving task.*	• 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**	• Masalah yang berkaitan dengan persoalan-persoalan maksimum/minimum. **[1] hal: 235-258** • Anti turunan fungsi dan luas sebagai limit jumlahan. **[1] hal: 273-283** • *Problems related to maximum / minimum problem issues.* ***[1] page: 235-258*** • *Anti-derivative function and area as the sum limit.* ***[1] hal: 273-283***	**2.5**

					● *Lectures, practice and provide assignment questions through* ***Synchronus / 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**

	Able to determine the derivative using the fundamental theorem calculus I and II.	fundamental kalkulus I dan II . ● *The accuracy of determining the derivative using the fundamental theorem calculus I and II.*	*Problem solving task.*	[TM : 2 x 2 x 50"] ● *Lectures, practice and assignments* ● *[TM : 2 x 2 x 50"]*	- soal serta memberikan soal tugas melalui **Sinkronus / asinkronus di MyITS Classroom** ● *Lectures, practice and*	● *The fundamental theorem calculus I and II.* ***[1] page: 286-288***	

					provide assign ment t questions through ***Synchronus / asynchronous at MyITS***		
	ASISTENSI KE-6 ***6th ASSISTANCE***						
15-16	**EVALUASI 5** ***5th EVALUATION***	• **UJIAN AKHIR SEMESTER** • ***FINAL-SEMESTER EXAM***	**Ketajaman menyelesaikan soal-soal yang terkait dengan turunan dan anti turunan.** ***Accuracy in solving problems***	**TERJADWAL** **TES TERTULIS** • **Waktu : 100 menit** ***SCHEDULED WRITTEN TEST*** • ***Time : 100 minutes***	**TERJADWAL** **Daring asinkronus** **Waktu : 90 menit**	**KOMPREHENSIF** ***COMPREHENSIVE***	**20**

			related to derivatives and anti-derivatives.		**melalui MyITS Classroom** ***SCHEDULED Asynchronous online*** ***Time : 90 minutes via MyITS*** • ***Classroom***		

TM=Tatap Muka, **PT**=Penugasan Terstuktur, **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 ELECTRICAL 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 ***AUTHORIZATION***	**Penyusun RA & E** ***Compiler A&EP*** **Drs. I.G.Ngurah Rai Usada, M.Si**	**Koordinator RMK** ***Course Cluster Coordinator*** **Dimas Anton Asfani, ST., MT., Ph.D**	**Ka DEP** ***Head of DEP*** **Dedet Candra Riawan, ST., M.Eng., Ph.D.**

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 mengunakan OBE. • Introduction to lecture. • *Able to solve linear system of equations in the form of a matrix using OBE.*	**Non-tes :** soal-soal latihan serta tugas. **Non-test :** Problem solving task.	2.5
2	Mampu menentukan invers matriks dan menyelesakan sistem persaam linier dengan	**Non-tes :** soal-soal latihan serta tugas. **Non-test :**	2.5

	determinan serta menentukan nilai eigen dan vektor eigen. *Able to determine matrix inverse and solve linear equation system with determinants and determine eigenvalues and eigenvectors.*	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. *Able to solve an equation or inequality, Absolute Value and apply straight line equations.*	**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. *Able to solve a complex variable operation and its*	**Tes:** Ujian Tulis/Ujian Daring	2.5

	polar form and draw the roots of complex variable equations.		
	ASISTENSI KE-2 **2nd *ASSISTANCE***		
5	Mampu menyelesaikan operasi pada fungsi dan mampu mensketsa grafik fungsi. *Able to complete operations on functions and sketch the function graphs.*	**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. *Able to solve the properties of the function graph and Inverse Functions.*	**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. *Able to calculate function limit and able to calculate infinite limit and function continuity.*	**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:*** *Written exams / Online Exams*	
9	Mampu menentukan Garis singgung dan laju perubahan serta menentukan turunan fungsi. *Able to determine tangents and rate of change and determine derivatives of functions.*	**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. *Able to determine derivatives with implicit differentials and analyze graphs of functions.*	**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. • *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.*		
12	**ASISTENSI KE-5** ***5th ASSISTANCE***		
	EVALUASI 4 **4th *EVALUATION***	**Tes:** Ujian Tulis/Ujian Daring ***Test:*** *Written exams / Online Exams*	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. • *Able to explain problems related to maximum / minimum problem issues.* *Able to determine the anti-derivative function and area as the sum limit.*		
14	Mampu menentukan turunan dengan menggunakan Theorema fundamental kalkulus I dan II. *Able to determine the derivative using the fundamental theorem calculus I and II.*	**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:*** *Written exams / Online Exams*	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 / ***PLO charged to the course***	**CPMK** / ***Course Learning Outcome (CLO)***	**Minggu ke** / ***Week***	**Bentuk Asesmen** / ***Form of Assessment***	**Bobot** / ***Load* (%)**
CPL-01 / *PLO-01,* CPL-02 / *PLO-02,* CPL-04 / *PLO-04*	CPMK 1 / *CLO 1*	*Week- 1-2*	*Task 1*	2.5
			Task 2	2.5
CPL-02 / *PLO-2,* CPL-03 / *PLO-03,* CPL-04 / *PLO-04*	CPMK 2 / *CLO 2*	*Week- 3*	*Task 3*	2.5
			1st Evaluation	10
CPL-03 / *PLO-03,* CPL-04 / *PLO-04,* CPL-05 / *PLO-05*	CPMK 3 / *CLO 3*	*Week- 4-5*	*Task 4*	2.5
			Task 5	2.5
			2nd Evaluation	10
CPL-02 / *PLO-2,* CPL-03 / *PLO-03,* CPL-04 / *PLO-04*	CPMK 4 / *CLO 4*	*Week- 6-7*	*Task 6*	2.5
			Task 7	2.5
CPL-04 / *PLO-04,* CPL-05 / *PLO-05*	CPMK 5 / *CLO 5*	*Week- 9-14*	*Task 8*	2.5
			Task 9	2.5
			Task 10	2.5
			Task 11	2.5
			Task 12	2.5
			3rd Evaluation	10
		Week- 8	*Mid Exam*	**20**
		Week- 15-16	*Final exam*	**20**
				∑ = 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	*1st 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	*2nd 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	*3rd 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**