

Mathematics

DESCRIPTION OF COURSE UNIT

Program Studi Sarjana (S1) Desain Produk

Bachelor of Industrial Design (BOLD)

2018-2023



Description of Course Unit
according to the ECTS User's Guide 2015

Course unit title	Mathematics
Course unit code	KM184101
Type of course unit	compulsory
Level of course unit	first cycle Bachelor
Year of study when the course unit is delivered	1 st year
Semester/trimester when the course unit is delivered	2 st Semester
Number of ECTS credits allocated	4,8 Credits
Name of lecturer	Dr. Tahiyatul Asfihani, S.Si., M.Si.
Learning outcomes of the course unit	<ol style="list-style-type: none"> 1. Able to interpret basic mathematical concepts and prepare proofs directly, indirectly, or by mathematical induction. 2. Able to identify simple problems, form mathematical models and solve them. 3. Master standard methods in mathematics. 4. Able to master fundamental mathematical theory which includes the concepts of matrices, determinants, complex numbers and equations or inequalities, as well as functions, derivatives, and integrals. 5. Able to identify and solve problems, form mathematical models and solve them.
Mode of delivery (face-to-face, distance learning)	face-to-face
Prerequisites and co-requisites	-
Course content	<ol style="list-style-type: none"> 1. Matrix and Determinants. 2. Equations, inequalities, graphs of functions of parabolas, circles or ellipses. 3. Complex numbers and their polar forms. 4. Continuity of Functions and their derivatives. 5. Integrals and Fundamental theorems of Calculus.
Recommended or required reading and other learning resources/tools	<ol style="list-style-type: none"> 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. 3. Kreyzig, E, Advanced Engineering Mathematics, 10-th edition, John Wiley & Sons, Singapore, 2011.

	<ol style="list-style-type: none"> 4. Purcell, J, E, Rigdon, S., E., Calculus, 9-th edition, Prentice-Hall, New Jersey, 2006. 5. James Stewart , Calculus, ed.7, Brooks/cole-Cengage Learning, Canada,2012. 6. Strogatz, Steven. 2013. The Joy Of X: A Guided Tour of Math, from One to Infinity. New York : Mariner Books. 7. Budhi,Wono Setya.2001.Kalkulus Peubah banyak dan Penggunaanya.Bandung:ITB. 8. Graham, Alexander. 2018. Kronecker Products and Matrix Calculus with Applications. Dover Publications. 9. Ayes,Frank dan Elliot Mendelson.2004.Kalkulus Lanjut Edisi Keempat.Jakarta:Erlangga. 1988.Calculus (2nd edition).New York:WB Saunders,
Planned learning activities and teaching methods	Lectures, Tutorial activities, exercises
Language of instruction	Indonesia and English
Assessment methods and criteria	Assignment, Group Project, Quiz, Midterm Exam and Final Exam

© FIBAA – December 2020



myITSacademics

EN

Dashboard

Curriculum

Learning Outcomes

Courses

SKPB

Assessment

MBKM

DASHBOARD

COURSES

DETAIL

Course Details

KM184151

Matematika 1

Mathematics 1

3 credits

Coordinator: Dr. Tahiyyatul Asfihani, S.Si., M.Si.

Course Form

Course Type

Minimum Passing Grade

:

:

:

Mata Kuliah Bersama

C

Course Description

Mata kuliah ini membekali mahasiswa konsep matrik, determinan dan sistem persamaan linier, konsep berpikir matematis dalam penyelesaian masalah-masalah rekayasa, pemodelan, dan lain-lain dalam keteknikan yang berkaitan dengan aplikasi diferensial. Materi perkuliahan lebih ditekankan pada teknik penyelesaian masalah-masalah riil yang dapat diformulasikan ke dalam fungsi satu variabel bebas. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai Eigen dan vektor Eigen, sistim bilangan riil (keterurutan bilangan riil), fungsi dan grafik, derivatif dan aplikasinya, integral dan aplikasinya pada perhitungan luas bidang datar dan volume benda putar, geometri.

In this course, students will be given matrix concept, determinant and linear equation system, Mathematicssal thinking conception in order to solve manipulated problems, modeling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems that can be formulated to one independent variable function. In this course, student will learn: matrix and determinant, linear equation system, Eigen value and Eigen vector, real number system (real number order), functions and graph, derivative and its application, integral and its application the area between curves and the volume of area revolution and geometry.

LO

CLO

Assessment & Evaluation Plan

Lesson Plan

Learning Outcomes Charged by the Course

Mohon untuk mengecek kurikulum yang lain juga pada pilihan di bawah ini (lalu klik **Tampilkan**). Kemudian mohon pastikan centang CPL telah sesuai dengan yang dibutuhkan oleh CPMK.

Curriculum:

Kurikulum 2018 S-1 Desain Produk

Show

No.	Description
<input type="checkbox"/> 1.	Mampu menyusun konsep desain dengan mengidentifikasi sumber masalah, menganalisis, dan mensintesis kebutuhan dengan mempertimbangkan aspek estetika, kenyamanan dan keselamatan pengguna pada suatu produk <i>Able to develop design concepts by identifying problem sources, analyzing, and synthesizing needs by considering aesthetic, comfort and user safety aspects of a product</i>
<input type="checkbox"/> 2.	Mampu merancang sistem produk dan benda produk berdasarkan penguasaan metoda desain, cara produksi dan sistem distribusi, untuk menghasilkan produk yang dapat dipertanggungjawabkan terhadap kaidah desain, dampak pada lingkungan hidup, dan isu-isu sosial budaya <i>Able to design product systems and product objects based on mastery of design methods, production methods and distribution systems, to produce products that can be accounted for by design principles, impacts on the environment, and socio-cultural issues</i>
<input type="checkbox"/> 3.	Mampu membuat model untuk menyelesaikan masalah desain yang kompleks secara kreatif berdasarkan prinsip-prinsip desain dan rekayasa, dengan mempertimbangkan faktor ekonomi, keamanan, keselamatan, dan kelestarian lingkungan <i>Able to create models to solve complex design problems creatively based on design and engineering principles, taking into account economic, security, safety, and environmental sustainability factors</i>
<input type="checkbox"/> 4.	Melakukan kolaborasi dalam bidang kerja yang multi disiplin dengan memanfaatkan pengetahuan dan kemampuan desainnya <i>Collaborating in multi-disciplinary work areas by utilizing design knowledge and skills</i>
<input type="checkbox"/> 5.	Memahami konsep teoretis desain: 1. fungsi, 2. estetika, 3. ekonomi, 4. sosial dan, 5. teknologi secara umum <i>Understand the theoretical concepts of design: 1. function, 2. aesthetics, 3. economy, 4. social and, 5. technology in general</i>
<input type="checkbox"/> 6.	Ketrampilan presentasi lisan, tulisan dan multimedia dan teknologi presentasi secara umum <i>Oral, written and multimedia presentation skills and general presentation technology</i>
<input type="checkbox"/> 7.	Ketrampilan rekabentuk dan visualisasi 2 dan 3 matra secara mendalam <i>Design skills, 2 and 3 dimension visualization in depth</i>
<input type="checkbox"/> 8.	Prinsip dan metodologi desain secara mendalam <i>Design principles and methodologies</i>
<input type="checkbox"/> 9.	Konsep user centered design secara mendalam <i>The concept of user centered design in depth</i>
<input type="checkbox"/> 10.	Sejarah dan perkembangan desain produk secara mendalam <i>The history and development of product design in depth</i>
<input type="checkbox"/> 11.	Wawasan budaya dan perkembangan tren secara mendalam <i>Insight into culture and trend developments in depth</i>
<input type="checkbox"/> 12.	Prinsip dan isu terkini dalam teknologi manufaktur secara umum <i>Current principles and issues in manufacturing technology in general</i>
<input type="checkbox"/> 13.	Bisnis dan pemasaran, kewirausahaan, kode etik dan HAKI (Hak atas Kekayaan Intelektual) secara umum <i>Business and marketing, entrepreneurship, code of ethics and IPR (Intellectual Property Rights) in general</i>
<input type="checkbox"/> 14.	Konsep dan prinsip pelestarian lingkungan secara umum <i>Environmental conservation concepts and principles in general</i>

Gedung Desain Produk ITS Jl. Despro No.1 Kampus ITS Sukolilo Surabaya. 60111

Hotline Call official : +62315931147 email : despro@its.ac.id

Dashboard

CURRICULUM

List of Curriculum

Learning Outcomes

Courses

SKPB

List of Curriculum

Courses

ASSESSMENT

Evaluation Entry

Scoring Recap

LO CLO Report

Scoring Revision

MBKM

Entri Nilai

DASHBOARD > COURSES > DETAIL

Course Details

KM184151

Matematika 1

Mathematics 1

3 credits

Coordinator: Dr. Tahiyatul Asfihani, S.Si., M.Si.

Course Form :
Course Type : Mata Kuliah Bersama
Minimum Passing Grade : C

Course Description

Mata kuliah ini membekali mahasiswa konsep matrik, determinan dan sistem persamaan linier, konsep berpikir matematis dalam penyelesaian masalah-masalah rekayasa, pemodelan, dan lain-lain dalam keteknikan yang berkaitan dengan aplikasi diferensial. Materi perkuliahan lebih ditekankan pada teknik penyelesaian masalah-masalah riil yang dapat diformulasikan ke dalam fungsi satu variabel bebas. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai Eigen dan vektor Eigen, sistim bilangan riil (keterurutan bilangan riil), fungsi dan grafik, derivatif dan aplikasinya, integral dan aplikasinya pada perhitungan luas bidang datar dan volume benda putar, geometri.

In this course, students will be given matrix concept, determinant and linear equation system, Mathematicssal thinking conception in order to solve manipulated problems, modeling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems that can be formulated to one independent variable function. In this course, student will learn: matrix and determinant, linear equation system, Eigen value and Eigen vector, real number system (real number order), functions and graph, derivative and its application, integral and its application the area between curves and the volume of area revolution and geometry.

LO CLO Assessment & Evaluation Plan Lesson Plan

Course Learning Outcomes

Mohon untuk mengecek kurikulum yang lain juga pada pilihan di bawah ini (lalu klik **Tampilkan**). Kemudian mohon pastikan centang CPL telah sesuai dengan yang dibutuhkan oleh CPMK.

Curriculum: Kurikulum 2018 S-1 Desain Produk

Show

Code	Description of CLO	Mapping of CLO to LO	Weight of CLO
CLO-1	Mampu memahami matriks dan determinan serta sifat-sifatnya dan mampu menyelesaikan sistem persamaan linier, menentukan nilai Eigen dan vektor Eigen. <i>Students are able to understand matrix and determinant with its characteristic and able to solve linear equation system.</i>		15%
CLO-2	Mampu memahami pengertian sistem bilangan riil, bentuk desimal bilangan riil, persamaan, dan pertidaksamaan. <i>Students are able to understand real number system, decimal form of real number, equality, and inequality.</i>		10%
CLO-3	Mampu memahami fungsi polinomial, fungsi transenden, dan mampu menggambar grafiknya dasar. <i>Students are able to understand polynomial functions, transcendent functions, and able to draw the basic graph.</i>		10%
CLO-4	Mampu mendefinisikan sinus, cosines, tangent, dan mengaplikasikan kesamaan trigonometri dalam menyederhanakan/menyelesaikan persamaan trigonometri. <i>Students are able to define sinus, cosinus, tangent, and apply trigonometric equation in simplifying /solving trigonometric equation.</i>		10%
CLO-5	Mampu menurunkan (mendiferensialkan) fungsi eksplisit, menerapkan aturan rantai, turunan fungsi implisit serta mampu menentukan nilai maks/min untuk fungsi polinomial. <i>Students are able to differentiate explicit functions, apply chain rule, derivative implicit functions, and able to determine maximum/minimum value of the polynomial function.</i>		15%
CLO-6	Mampu menyelesaikan integral menggunakan teorema fundamental kalkulus dan rumus rumus dasar integrasi. <i>Students are able to solve integral using fundamental calculus theorem and basic integration equation.</i>		15%
CLO-7	Mampu menghitung luas bidang datar dan volume benda putar. <i>Students are able to calculate the area between curves and the volume of area revolution.</i>		15%
CLO-8	Mampu memahami geometri. <i>Students are able to understand geometry.</i>		10%
Total Weight			100%

Dashboard

CURRICULUM

List of Curriculum

✓ Learning Outcomes >

Courses >

SKPB

List of Curriculum

Courses >

ASSESSMENT

Evaluation Entry

Scoring Recap

LO CLO Report

Scoring Revision >

MBKM

Entri Nilai

DASHBOARD > COURSES > DETAIL

Course Details

KM184151

Matematika 1

Mathematics 1

3 credits

Coordinator: Dr. Tahiyatul Asfihani, S.Si., M.Si.

Course Form

:

Course Type

: Mata Kuliah Bersama

Minimum Passing Grade

: C

Course Description

Mata kuliah ini membekali mahasiswa konsep matrik, determinan dan sistem persamaan linier, konsep berpikir matematis dalam penyelesaian masalah-masalah rekayasa, pemodelan, dan lain-lain dalam keteknikan yang berkaitan dengan aplikasi diferensial. Materi perkuliahan lebih ditekankan pada teknik penyelesaian masalah-masalah riil yang dapat diformulasikan ke dalam fungsi satu variabel bebas. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai Eigen dan vektor Eigen, sistem bilangan riil (keteraturan bilangan riil), fungsi dan grafik, derivatif dan aplikasinya, integral dan aplikasinya pada perhitungan luas bidang datar dan volume benda putar, geometri.

In this course, students will be given matrix concept, determinant and linear equation system, Mathematicssal thinking conception in order to solve manipulated problems, modeling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems that can be formulated to one independent variable function. In this course, student will learn: matrix and determinant, linear equation system, Eigen value and Eigen vector, real number system (real number order), functions and graph, derivative and its application, integral and its application the area between curves and the volume of area revolution and geometry.

LO CLO Assessment & Evaluation Plan Lesson Plan

Assessment & Evaluation Plan

No.	Evaluation Plan	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5	CLO-6	CLO-7	CLO-8	Total Weight
1	Tugas, keaktifan & dsb Task, Interaction & etc Kognitif - Tugas Cognitive - Assignment	5%	0%	0%	0%	0%	5%	10%	0%	20%
2	Quis 1 Quiz 1 Kognitif - Quiz Cognitive - Quiz	5%	5%	5%	0%	0%	0%	0%	0%	15%
3	Quis 2 Quiz 2 Kognitif - Quiz Cognitive - Quiz	0%	0%	0%	0%	5%	5%	0%	5%	15%
4	ETS MidExam Kognitif - UTS Cognitive - Midterm Exam	5%	5%	5%	10%	0%	0%	0%	0%	25%
5	UAS FinalExam Kognitif - UAS Cognitive - Final Exam	0%	0%	0%	0%	10%	5%	5%	5%	25%
TOTAL		15%	10%	10%	10%	15%	15%	15%	10%	100%
Target		15%	10%	10%	10%	15%	15%	15%	10%	100%

[Dashboard](#)

CURRICULUM

[List of Curriculum](#)[✓ Learning Outcomes](#) >[Courses](#) >

SKPB

[List of Curriculum](#)[Courses](#) >

ASSESSMENT

[Evaluation Entry](#)[Scoring Recap](#)[LO CLO Report](#)[Scoring Revision](#) >

MBKM

[Entri Nilai](#)[DASHBOARD](#) > [COURSES](#) > [DETAIL](#)

Course Details

KM184151

Matematika 1

Mathematics 1

3 credits

Coordinator: Dr. Tahiyyatul Asfihani, S.Si., M.Si.

Course Form :
Course Type : Mata Kuliah Bersama
Minimum Passing Grade : C

Course Description

Mata kuliah ini membekali mahasiswa konsep matrik, determinan dan sistem persamaan linier, konsep berpikir matematis dalam penyelesaian masalah-masalah rekayasa, pemodelan, dan lain-lain dalam keteknikan yang berkaitan dengan aplikasi diferensial. Materi perkuliahan lebih ditekankan pada teknik penyelesaian masalah-masalah riil yang dapat diformulasikan ke dalam fungsi satu variabel bebas. Materi perkuliahan meliputi: matrik dan determinan, penyelesaian sistem persamaan linier, nilai Eigen dan vektor Eigen, sistim bilangan riil (keterurutan bilangan riil), fungsi dan grafik, derivatif dan aplikasinya, integral dan aplikasinya pada perhitungan luas bidang datar dan volume benda putar, geometri.

In this course, students will be given matrix concept, determinant and linear equation system, Mathematicssal thinking conception in order to solve manipulated problems, modeling, etc. in technique that relate to differential application. The course will be focusing on the technique to solve real problems that can be formulated to one independent variable function. In this course, student will learn: matrix and determinant, linear equation system, Eigen value and Eigen vector, real number system (real number order), functions and graph, derivative and its application, integral and its application the area between curves and the volume of area revolution and geometry.

[LO](#) [CLO](#) [Assessment & Evaluation Plan](#) [Lesson Plan](#)

Lesson Plan

Weeknum	Course Material	Learning Method
1	Matriks dan Determinan & Penyelesaian Sistem Persamaan Linier. <i>Matrix and Determinant & Solving Linear Equation System</i>	Non SCL
2	Nilai Eigen dan Vektor Eigen. <i>Eigen Value and Eigen Vector.</i>	Metode SCL lainnya
3	Sistem Bilangan Real, logaritma, nilai mutlak & pertidaksamaan. <i>Real Number System, logarithms, absolute value & Inequalities.</i>	Non SCL
4	Koordinat bidang, garis, jarak dua titik, lingkaran & parabola. <i>The coordinates planes, lines, two points distance, circle & parabola.</i>	Case method
5	Fungsi dan operasi fungsi, fungsi polinomial & invers fungsi, <i>Property and operation functions, polynomial functions & inverse functions</i>	Non SCL
6	Fungsi transenden dan trigonometri & grafik fungsi. <i>Transcendent and trigonometry functions, graph functions.</i>	Metode SCL lainnya
7	Sinus, cosines, tangent, cotangent, secan, cosecan, persamaan trigonometri <i>Sinus, cosinus, tangent, cotangent, secan, cosecan, trigonometry equation.</i>	Non SCL
8	ETS <i>MIDTERM EXAM</i>	Non SCL
9	Limit fungsi & kontinuitas <i>Limit functions & continuity</i>	Non SCL
10	Turunan, aplikasi turunan. <i>The derivative, applications of derivatives.</i>	Case method
11	Integral tak tentu, integrasi dengan substitusi, integrasi parsial. <i>Improper integral, integration with substitution, partial</i>	Non SCL
12	Integrasi pecahan rasional, integrasi fungsi fungsi trigonometri, teknik integrasi yang lain. <i>Integration of rational functions, trigonometric functions integration, other integration technique.</i>	Metode SCL lainnya
13	Aplikasi integral tertentu: Luas antara dua kurva <i>Application of Integral: The area between curve</i>	Non SCL
14	Aplikasi integral tertentu: menghitung volume benda putar. <i>Application of integral: The volume of area revolution.</i>	Case method
15	Irisan kerucut, pencerminan, pergeseran dan proyeksi. <i>Cone slice, mirroring, shifting, projection.</i>	Non SCL
16	EAS <i>FINAL EXAM</i>	Non SCL