MODULE HANDBOOK

MATHEMATICS IV

BACHELOR DEGREE PROGRAM
DEPARTEMENT OF STATISTICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

ENDORSEMENT PAGE

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MATHEMATICS IV
DEPARTMENT OF STATISTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses ***Process***	**Penanggung Jawab** ***Person in Charge***			**Tanggal** ***Date***
	Nama ***Name***	**Jabatan** ***Position***	**Tandatangan** ***Signature***	
Perumus *Preparation*	Dra. Wiwiek Setya Winahju, M.S.	Dosen *Lecturer*		**March 28, 2019**
Pemeriksa dan Pengendalian *Review and Control*	Dra. Wiwiek Setya Winahju, M.S. ; Erma Oktania Permatasari, S.Si., M.Si. ; Wibawati, S.Si, M.Si	Tim kurikulum *Curriculum team*		**April 15, 2019**
Persetujuan *Approval*	Dr. Santi Wulan Purnami, M.Si	Koordinator RMK *Course Cluster Coordinator*		**July 17, 2019**
Penetapan *Determination*	Dr. Kartika Fithriasari, M.Si	Kepala Departemen *Head of Department*		**July 30, 2019**

MODULE HANDBOOK

MATHEMATICS IV

Module name	**MATHEMATICS IV**	
Module level	Undergraduate	
Code	KS184409	
Course (if applicable)	MATHEMATICS IV	
Semester	Fourth Semester (Genapl)	
Person responsible for the module	Dra. Wiwiek Setya Winahju, M.S.	
Lecturer	Dra. Wiwiek Setya Winahju, M.S. ; Erma Oktania Permatasari, S.Si., M.Si. ; Wibawati, S.Si, M.Si	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, **mandatory**, 4th semester.	
Type of teaching, contact hours	Lectures, <50 students	
Workload	1. Lectures : 3 x 50 = 150 minutes per week. 2. Exercises and Assignments : 3 x 60 = 180 minutes (3 hours) per week. 3. Private learning : 3 x 60 = 180 minutes (3 hours) per week.	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	Mathematics III	
Learning outcomes and their corresponding PLOs	*CLO. 1 Mastering the PD concept with operator D, Simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and their application* *CLO. 2 Can formulate PD problems with operator D, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and their application* *CLO. 3 Can solve problems related to PD with operator D, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and the application*	PLO-01

	CLO. 4 Can choose the method in solving PD, row value problems, difference equations *CLO. 5 Can adapt to problems in PD with D operators, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, Partial PD and the problem of boundary values and different equations* *CLO. 7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams* *CLO. 8 Have responsibility and professional ethics* *CLO. 9 Able to motivate oneself to think creatively and learn lifelong*	PLO-04
Content	*Mathematics IV is one of the basic courses that are part of the field of study in mathematics. The purpose of studying Mathematics IV is to master the concept of PD with Operator D, Simultaneous PD, PD Solution with Series, Gamma and Beta Functions, Fourier Series, Laplace Transformation, and Difference Equations and applications in the statistical method so that students will have the experience of learning to think in ways. critical and able to make informed decisions about the use of the concept. The learning strategy used is discussion and exercises and assignments*	
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	1. Erwin Kreys Zigh, “Advanced Engineering Mathematics”, 7th edition. 1983 2. Richardson, CH, “An Introduction to the Calculus of Finite Difference”1981. 3. Anton, H.,Calculus,with analitic Geomery., 6ed, Jhon Wiley & Sons, Inc., Singapore. 1999 4. Salas SL, and Hille E, “Calculus of One and Several Variables”, 4th edition, Jhon Wiley, New York, 1982	

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Bahan Kajian *Study Materials*	Dasar Sains, Teori Statistika, Komputasi dan Data Processing, dan Pemodelan *Basic of Science, Statistical Theory, Computing and Data Processing, and Modeling*
CPL yang dibebankan MK *PLO*	CPL-1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi CPL-4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan *PLO-1 Able to apply knowledge of statistical theory, mathematics, and computation* *PLO-4 Able to identify, formulate, and solve statistical problems in various applied fields*
CP-MK *CLO*	CPMK.1 Menguasai konsep PD dengan operator D, PD simultan, Penyelesaian PD dengan deret, fungsi gamma dan beta, Deret Forier, Tansformasi Laplace, PD parsial dan masalah nilai batas serta persamaan beda hingga dan aplikasinya CPMK.2 Dapat memformulasikan permasalahan PD dengan operator D, PD simultan, Penyelesaian PD denagn deret, fungsi gamma dan beta, Deret Forier, Tansformasi Laplace, PD parsial dan masalah nilai batas serta persamaan beda hingga dan aplikasinya CPMK.3 Dapat menyelesaikan permasalahan yang berkaitan dengan PD dengan operator D, PD simultan, Penyelesaian PD denagn deret, fungsi gamma dan beta, Deret Forier, Tansformasi Laplace, PD parsial dan masalah nilai batas serta persamaan beda hingga dan aplikasinya CPMK.4 Dapat memilih metode dalam penyelesaian PD, masalah nilai baris, persamaan beda hingga CPMK.5 Dapat beradaptasi terhadap masalah dalam PD dengan operator D, PD simultan, Penyelesaian PD denagn deret, fungsi gamma dan beta, Deret Forier, Tansformasi Laplace, PD parsial dan masalah nilai batas serta persamaan beda hingga CPMK.7 Mampu berkomunikasi secara efektif dan bekerjasama dalam tim yang interdisiplin dan multidisiplin CPMK.8 Memiliki tanggung jawab dan etika profesi CPMK.9 Mampu memotivasi diri untuk berpikir kreatif dan belajar sepanjang hayat *CLO. 1 Mastering the PD concept with operator D, Simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and their application* *CLO. 2 Can formulate PD problems with operator D, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and their application* *CLO. 3 Can solve problems related to PD with operator D, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, partial PD and boundary value problems and finite difference equations and the application* *CLO. 4 Can choose the method in solving PD, row value problems, difference equations* *CLO. 5 Can adapt to problems in PD with D operators, simultaneous PD, PD solution with series, gamma and beta functions, Forier series, Laplace transformation, Partial PD and the problem of boundary values and different equations*

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	CLO. 7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams *CLO. 8 Have responsibility and professional ethics* *CLO. 9 Able to motivate oneself to think creatively and learn lifelong*

Perte-muan *Meeting*	**Kemampuan Akhir Sub CP-MK** *Final Ability*	**Keluasan (materi pembelajaran)** *Extent (learning material)*	**Metode Pembelajaran** *Learning methods*	**Estimasi Waktu** *Duration*	**Bentuk Evaluasi** *Evaluation Type*	**Kriteria dan Indikator Penilaian** *Assessment Criteria and Indicators*	**Bobot Penilaian** *Scoring*
1-2	1. Mampu menentukan solusi PD dengan operator D, PD simultan, dan aplikasi dalam statistika	PD dengan operator D, PD simultan	Ceramah, diskusi dan latihan soal	300 menit	Tugas 1 Test tulis Observasi di kelas	1.1. Dapat menjelaskan tentang PD dengan operator D 1.2. Dapat menjelaskan tentang, PD simultan,. 1.3. Dapat menentukan solusi PD dengan operator D, dan aplikasi dalam statistika. 1.4. Dapat menentukan solusi PD simultan, dan aplikasi dalam statistika.	10%/10%
1-2	*1. Able to determine PD solutions with operator D, simultaneous PD, and application in statistics.*	*PD with operator D, simultaneous PD*	*Lecture, discussion and practice questions*	*300 minutes*	*Task 1* *Writing test* *Observations in class*	*1.1. Can explain about PD with operator D* *1.2. Can explain about, simultaneous PD ,.* *1.3. Can definesolutions PDwith operator D, and applications in statistics.* *1.4. Can definesolutions simultaneous PD, and applications in statistics.*	*10% / 10%*

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3-4	2. Mampu menentukan solusi PD dengan deret (PDB)	Penyelesaian PD dengan deret	Ceramah, diskusi dan latihan soal	200 menit	Tugas 2 Test tulis Observasi di kelas	2.1. Dapat menerangkan konsep Penyelesaian PD dengan deret 2.2. Dapat menentukan Penyelesaian PD dengan deret.	15%/25%
3-4	*2. Able to determine PD solution with series (PDB)*	*PD solution by series*	*Lectures, discussions and exercises*	*200 minutes*	*Task 2 Test written Observations in class*	*2.1. Can explain the concept PD solutionin a row 2.2. Can determine the completion of the PD with a series.*	*15% / 25%*
4-5	3. Mampu menentukan integral Fungsi gamma dan beta serta aplikasi dalam statistika	Fungsi gamma dan beta	Ceramah, diskusi dan latihan soal	250 menit	Test tulis Tugas 3 Observasi di kelas	3.1. Dapat menjelaskan tentang definisi Fungsi gamma dan beta 3.2. Dapat menentukan integral Fungsi gamma dan beta serta aplikasi dalam statistika	10%/35%
4-5	*3. Able to determine integral gamma and beta functions as well as applications in statistics*	*Gamma and beta functions*	*Lectures, discussions and practice questions*	*250 minutes*	*Written test Task 3 Observations in class*	*3.1. Can explain about the definition of functions gamma and beta 3.2. Can determine integrals of gamma and beta functions as well as applications in statistics*	*10% / 35%*
6-7	4. Mampu menentukan solusi PD dengan Deret Forier serta aplikasi dalam statiska	Deret Forier	Ceramah, diskusi dan latihan soal	300 menit	Test tulis Tugas 4 Observasi di kelas	4.1. Dapat menerangkan konsep Deret Forier 4.2 . Dapat menentukan Deret Forier dari suatu fungsi.	15%/50%

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6-7	*4. Able to determine PD solutions with Forier Series and applications in statistics*	*Forier Series statistics*	*Lectures, discussions and exercises*	*300 minutes.*	*Written test Task 4 Observations in class*	4.3. Dapat menentukan solusi PD dengan Deret Forier. *4.1. Can explain the concept of Forier Series* *4.2. Can determine the Forier Series of a function.* *4.3. Can determine PD solutions with the Forier Series.*	*15% / 50%*
8	**ETS/***MID TERM EXAMINATION*						
9-11	5. Dapat menentukan Penyelesaian PD dengan Tansformasi Laplace dan aplikasi dalam statistika	Tansformasi Laplace	Ceramah, diskusi dan latihan soal	350 menit	Tes tulis Tugas 5 Observasi di kelas	5.1. Dapat menerangkan konsep Penyelesaian PD dengan Tansformasi Laplace 5.2. Dapat menentukan Penyelesaian PD dengan Tansformasi Laplace	10%/60%
9-11	*5. Can determine PD solution with Laplace Transformation and application in statistics*	*Laplace Transformation*	*Lectures, discussions and practice questions*	*350 minutes*	*Written test Task 5 Observation in class*	*5.1. Can explain the concept of PD solution with Laplace Transformation* *5.2. Can determine PD solution with Laplace Transformation*	*10% / 60%*
11-13	6. Dapat menentukan Penyelesaian PD parsial dan masalah nilai batas serta	PD parsial dan masalah nilai batas	Ceramah, diskusi dan latihan soal	400 menit	Test tulis Tugas 6 Observasi di kelas	6.1. Dapat menerangkan konsep Penyelesaian PD parsial dan masalah nilai batas	15%/75%

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	aplikasi dalam statistika					6.2. Dapat menentukan Penyelesaian PD parsial dan masalah nilai batas	
11-13	*6. Can determine partial PD solution and limit value problems and applications in statistics*	*partial PD and limit value problems*	*Lectures, discussions and practice questions*	*400 minutes*	*Written test Task 6 Observations in class*	*6.1 . Can explain the concept of partial PD solution and limit value problems 6.2. Can determine partial PD solution and limit value problems of*	*15% / 75%*
14-15	7. Mampu Dapat menentukan Penyelesaian Persamaan beda hingga serta aplikasi dalam statistika	Persamaan beda hingga	Ceramah, diskusi dan latihan soal	300 menit	Tes tulis Tugas 7 Observasi di kelas	7.1. Dapat menerangkan konsep beda hingga 7.2. Dapat menentukan Penyelesaian Persamaan beda hingga	25%/100%
14-15	*8. Able to determine finite difference solution and application in statistics*	*Different equations to*	*Lecture, discussion and practice questions*	*300 minutes*	*Written test Task 7 Observation in class*	*7.1. Can explainconcepts differentup to 7.2. Can determine Equation Solutions up to*	*25% / 100% difference.*
16	**EAS/***final exam*						

PUSTAKA/*REFERENCES* **:**

1. Erwin Kreys Zigh, “Advanced Engineering Mathematics”, 7th edition. 1983

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