MODULE HANDBOOK

APPLIED MULTIVARIATE ANALYSIS

STATISTICS UNDERGRADUATE PROGRAM
DEPARTMENT OF STATISTICS
FACULTY OF SCIENCE AND DATA ANALYTICS
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
SURABAYA

ENDORSEMENT PAGE

	MODULE HANDBOOK **APPLIED MULTIVARIATE ANALYSIS** **STATISTICS UNDERGRADUATE PROGRAM** **DEPARTMENT OF STATISTICS** **INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

Proses *Process*	Penanggung Jawab *Person in Charge*			Tanggal *Date*
	Nama *Name*	Jabatan *Position*	Tanda tangan *Signature*	
Perumus *Preparation*	Prof. Dr. Bambang Widjanarko Otok, M.Si.	Dosen Lecturer		
Pemeriksa dan Pengendalian *Review and Control*	Prof. Dr. Bambang Widjanarko Otok, M.Si. Santi Puteri Rahayu, M.Si., Ph.D; Santi Wulan P, M.Si, Ph.D	Tim kurikulum Curriculum team		
Persetujuan *Approval*	Prof. Dr. Bambang Widjanarko Otok, M.Si.	Koordinator RMK Course Cluster Coordinator		
Penetapan *Determination*	Dr. Kartika Fithriasari, M.Si	Kepala Departemen Head of Department		

MODULE HANDBOOK
APPLIED MULTIVARIATE ANALYSIS

Module name	APPLIED MULTIVARIATE ANALYSIS	
Module level	Undergraduate	
Code	SS234419	
Course (if applicable)	APPLIED MULTIVARIATE ANALYSIS	
Semester	4	
Person responsible for the module	Prof. Dr. Bambang Widjanarko Otok, M.Si.	
Lecturer	Prof. Dr. Bambang Widjanarko Otok, M.Si. Santi Puteri Rahayu, M.Si., Ph.D; Santi Wulan P, M.Si, Ph.D	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, mandatory, 4th semester.	
Type of teaching, contact hours	Other SCL Methods (31,25%); Non SCL (68,75%)	
Workload	1. Lectures [L]: 3 x 50 = 150 minutes per week. 2. Practicum [P]: 3x 45 = 135 minutes per week. 3. Exercises, Assignments [EA]: 3x60 minutes per week. 4. Independent Learning [IL]: 3 x 60 minutes per week.	
Credit points	3 credit points (SKS) Equivalent to 4.8 ECTS	
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to sit in the exams.	
Mandatory prerequisites	Matrices, Mathematical Statistics	
Learning outcomes and their corresponding PLOs	CLO.1 Able to apply knowledge of statistical, mathematical, and computational theories related to the concept of multivariate analysis CLO.3 Able to analyze data with appropriate multivariate methods and interpret them CLO.4 Able to identify, formulate, and solve multivariate problems in various applied fields	PLO-4 PLO-5 PLO-7 PLO-9
Content	Multivariate Analysis is one of the expertise courses that is part of the field of study in the Statistical modeling course family. The purpose of studying Multivariate Analysis is to master the theoretical concepts of multivariate analysis in order to understand multivariate methods, both in their development and application. Through this course, it is hoped that students will have a learning experience to think in a ethical manner and be able to give the right decisions about multivariate methods on a problem and its solution. The learning strategies used are discussions and exercises and tasks.	

Assessment and its weight	Assigment & Test I – 20% Midterm Exam – 30% Assigment & Test II – 20% Final Exam– 30%
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom
Reading list	1. Dillon, W.K. and Matthew, G., 1984. Multivariate Analysis, Methods and Application. New York : John Wiley dan Sons. 2. Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C., 2006. Multivariate Data Analysis. 6th edition. UK: Prentice Hall International. 3. Johnson, R. A. and Dean W. Wichern, D., 2007. Applied Multivariate Statistical Analysis, 6th edition. Englewood Cliffs, N.J: Prentice-Hall. 4. Rencher, A.C., 2002. Method of Multivariate Analysis. Canada: John Wiley dan Sons. 5. Sharma, S., 1996. Applied Multivariate Techniques. New York : John Wiley dan Sons, Inc. 6. Timm, N.H., 2002. Applied Multivariate Analysis. New York : Springer-Verlag.

	INSTITUT TEKNOLOGI SEPULUH NOPEMBER **FAKULTAS SAINS DAN ANALITIKA DATA** **PROGRAM STUDI SARJANA STATISTIKA** **DEPARTEMEN STATISTIKA**	**Kode Dokumen**

RENCANA PEMBELAJARAN SEMESTER/
SEMESTER LEARNING PLAN

MATA KULIAH (MK)/ ***Course***	**KODE/** ***Code***	**Rumpun MK/** ***Course Group***	**BOBOT (sks)/** ***Weight (credit)***		**SEMESTER/** ***Semester***	**Tgl Penyusunan/** ***Drafting Date***
ANALISIS MULTIVARIAT TERAPAN / ***APPLIED MULTIVARIATE ANALYSIS***	SS234419	LINGKES	**T=3**	**P=0**	IV	17 Desember 2022

OTORISASI/ ***AUTHORIZATION***	**Pengembang RPS/** ***RPS Developer***	**Koordinator RMK/** ***Course Group Coordinator***	**Ketua PRODI/** ***Head of Department***
	Prof. Dr. Bambang Widjanarko Otok, M.Si.	Prof. Dr. Bambang Widjanarko Otok, M.Si.	Dr. Kartika Fithriasari, M.Si

Capaian Pembelajaran (CP)/ ***Learning Achievement***	**CPL-PRODI yang dibebankan pada MK/** ***PLO***	
	CPL-4	*Mampu menerapkan Sains dan Matematika untuk mendukung pemahaman metode statistika*
	CPL-5	*Mampu menerapkan teori statistika pada metode statistika*
	CPL-7	*Mampu menggunakan perangkat komputasi modern untuk menyelesaikan permasalahan statistik*
	CPL-9	*Mampu menerapkan metode statistika dengan tepat serta mengevaluasinya untuk menganalisis permasalahan teoritis dan riil*
	PLO-4	*Able to apply science and mathematics to support the understanding of statistical methods*
	PLO-5	*Able to apply statistical theory to statistical methods*
	PLO-7	*Able to use modern computing devices to solve statistical problems*
	PLO-9	*Able to apply statistical methods to analyze theoretical and real problems*
	Capaian Pembelajaran Mata Kuliah (CPMK)/ ***CLO***	

<table>
<tr><td></td><td>CPMK.1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi terkait konsep analisis multivariat
CPMK.3 Mampu menganalisis data dengan metode multivariat yang tepat dan mengintepretasikannya
CPMK.4 Mampu mengindentifikasi,memformulasi, dan menyelesaikan masalah multivariat di berbagai bidang terapan

CLO.1 Able to apply knowledge of statistical, mathematical, and computational theories related to the concept of multivariate analysis
CLO.3 Able to analyze data with appropriate multivariate methods and interpret them
CLO.4 Able to identify, formulate, and solve multivariate problems in various applied fields</td></tr>
<tr><td></td><td>Matrik CPL – CPMK
PLO-CLO Matrix

<table><tr><td>CPMK</td><td>CPL-1</td><td>…</td><td></td><td></td></tr><tr><td>CPMK-1</td><td></td><td>V</td><td>V</td><td></td></tr><tr><td>…</td><td>V</td><td></td><td></td><td></td></tr><tr><td></td><td>V</td><td>V</td><td></td><td></td></tr><tr><td>…</td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Deskripsi Singkat MK/
Course Description</td><td>Analisis Multivariat merupakan salah satu mata kuliah keahlian yang merupakan bagian dari bidang kajian dalam rumpun mata kuliah Pemodelan statistik. Tujuan mempelajari Analisis Multivariat adalah untuk menguasai konsep teori dari analisis multivariat untuk memahami metode multivariat, baik dalam pengembangan dan penerapannya. Melalui mata kuliah ini diharapkan mahasiswa akan memiliki pengalaman belajar untuk berfikir secara kristis dan mampu memberikan keputusan yang tepat tentang metode multivariat pada suatu permasalahan dan penyelesaiannya. Strategi pembelajaran yang digunakan adalah diskusi dan latihan serta tugas.

Multivariate Analysis is one of the expertise courses that is part of the field of study in the Statistical modeling course family. The purpose of
studying Multivariate Analysis is to master the theoretical concepts of multivariate analysis in order to understand multivariate methods, both in their development and application. Through this course, it is hoped that students will have a learning experience to think in a ethical manner and be able to give the right decisions about multivariate methods on a problem and its solution. The learning strategies used are discussions and exercises and tasks.</td></tr>
<tr><td>Bahan Kajian:</td><td>Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Pemodelan,</td></tr>
</table>

Materi Pembelajaran/ ***Course Material***	Industri dan Bisnis, Pemerintahan dan Kependudukan, Ekonomi dan Manajemen, Kesehatan dan Lingkungan, dan Sosial Humaniora *Basic Science, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, Modeling, Industry and Business, Government and Population, Economics and Management, Health and Environment, and Social Humanities*
Pustaka/ ***References***	**Utama/*Primary*:** 7. Dillon, W.K. and Matthew, G., 1984. Multivariate Analysis, Methods and Application. New York : John Wiley dan Sons. **Pendukung/*Secondary*:** 1. Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C., 2006. Multivariate Data Analysis. 6th edition. UK: Prentice Hall International. 2. Johnson, R. A. and Dean W. Wichern, D., 2007. Applied Multivariate Statistical Analysis, 6th edition. Englewood Cliffs, N.J: Prentice-Hall. 3. Rencher, A.C., 2002. Method of Multivariate Analysis. Canada: John Wiley dan Sons. 4. Sharma, S., 1996. Applied Multivariate Techniques. New York : John Wiley dan Sons, Inc. 5. Timm, N.H., 2002. Applied Multivariate Analysis. New York : Springer-Verlag.
Dosen Pengampu/ ***Lecturers***	Prof. Dr. Bambang Widjanarko Otok, M.Si. Santi Puteri Rahayu, M.Si., Ph.D Santi Wulan P, M.Si, Ph.D
Matakuliah syarat/ ***Pre-requisite Course***	Matriks, Statistika Matematika *Matrices, Mathematical Statistics*

Mg Ke- ***Week***	**Kemampuan akhir tiap tahapan belajar (Sub-CPMK)** ***Final capability for each learning step***	**Penilaian** ***Evaluation***		**Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]** ***Learning Format Learning Methods Assignment for Student [Estimated Time]***		**Materi Pembelajaran [Pustaka]** ***Learning Material [References]***	**Bobot Penilaian (%)** ***Evaluation Weight (%)***
		Indikator	**Kriteria &**	**Luring**	**Daring**		

		Indicator	**Bentuk** *Criteria and Format*	*Offline*	*Online*		
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1	Dapat menjelaskan konsep dan tujuan analisis multivariat *Can explain the concept and purpose of multivariate analysis*	1. Mengetahui penerapan metode multivariat di permasalahan riil. 2. Dapat membedakan antara data univariat dan data multivariat. 3. Mengetahui pengelompokan metode univariat dan metode multivariat 4. Mampu menghitung konsep matriks yang sering digunakan dalam analisis multivariat *1. Knowing the application of multivariate methods in real problems.* *2. Can distinguish between univariate data and multivariate data.* *3. Knowing the grouping of univariate methods and multivariate methods* *4. Able to calculate matrix concepts that are often used in multivariate analysis*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif, Diskusi, Latihan Soal, Seminar *Interactive Lecture, Discussion, Exercise, Seminar* **TM: 3x50"** **LT: 3x60"** **BM: 3x60"**		Konsep dasar analisis multivariat, Aplikasi dan Pengelompokan metode multivariate, Aljabar matriks dan vektor random *Basic concepts of multivariate analysis, Application and Grouping of multivariate methods, Algebra of matrices and random vectors*	10%
2	Dapat menjelaskan konsep pengujian hipotesis vector rata-	1. Dapat melakukan uji asumsi *normality dan homoscedacity* *1. Can test assumptions of*	Tugas, Kuis *Assignment,*	Ceramah Interaktif Diskusi Praktikum		1. Pemeriksaan asumsi normal multivariat 2. Pemeriksaan asumsi	25%

	rata untuk satu dan dua populasi (metode dasar pada awal perkembangan analisis multivariate dengan asumsi distribusi normal multivariat) serta dapat menerapkan dalam problem riil *Can explain the concept of testing the average vector hypothesis for one and two populations (the basic method at the beginning of the development of multivariate analysis assuming a multivariate normal distribution) and can apply in real problems*	*normality and homoscedacity*	*Quiz*	Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 4x3x50"** **LT: 4x3x60"** **BM: 4x3x60"**		homoskedastisitas 1. *Examination of the assumptions of multivariate normal* 2. *Examination of homoskedasticity assumptions*	
3	Dapat menjelaskan konsep pengujian hipotesis vector rata-rata untuk satu dan dua populasi (metode dasar pada awal perkembangan analisis multivariate dengan asumsi distribusi normal multivariat) serta dapat menerapkan dalam problem riil *Can explain the concept of testing the average vector hypothesis for one and two populations (the basic method at the beginning of the development of*	1. Dapat melakukan Pra Prosesing Data 2. Dapat mendeteksi *missingvalue* dan data *outlier* 1. *Can pre -process data* 2. *Can detect missingvalue and outlier data*	Tugas, Kuis *Assignment, Quiz*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 4x3x50"** **LT: 4x3x60"** **BM: 4x3x60"**		1. Untuk Pra Prosesing Data 2. Untuk deteksi missingvalue 3. Untuk deteksi outlier 1. *For Pre Processing Data* 2. *For missingvalue detection* 3. *For outlier detection*	25%

	multivariate analysis assuming a multivariate normal distribution) and can apply in real problems						
4	Dapat menjelaskan konsep pengujian hipotesis vector rata-rata untuk satu dan dua populasi (metode dasar pada awal perkembangan analisis multivariate dengan asumsi distribusi normal multivariat) serta dapat menerapkan dalam problem riil *Can explain the concept of testing the average vector hypothesis for one and two populations (the basic method at the beginning of the development of multivariate analysis assuming a multivariate normal distribution) and can apply in real problems*	1. Dapat menentukan, menghitung uji hipotesis vektor rata-rata satu populasi normal multivariat 2. Dapat melakukan uji hipotesis vektor rata-rata satu populasi normal multivariat menggunakan piranti lunak serta menginterpretasikannya *1. Can determine, calculate the hypothesis test of the average vector of one multivariate normal population* *2. Can test the average vector hypothesis of one multivariate normal population using software and interpret it*	Tugas, Kuis *Assignment, Quiz*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 4x3x50"** **LT: 4x3x60"** **BM: 4x3x60"**		Untuk rata-rata satu populasi normal multivariat *For an average of one multivariate normal populations*	25%
5	Dapat menjelaskan konsep pengujian hipotesis vector rata-rata untuk satu dan dua populasi (metode dasar pada awal perkembangan analisis multivariate dengan asumsi distribusi normal multivariat) serta dapat menerapkan dalam	1. Dapat menentukan, menghitung uji hipotesis vektor rata-rata dua populasi normal multivariat 2. Dapat melakukan uji hipotesis vektor rata-rata dua populasi normal multivariat menggunakan piranti lunak serta menginterpretasikannya	Tugas, Kuis *Assignment, Quiz*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise,*		Untuk rata-rata dua populasi normal multivariat *For an average of two multivariate normal populations*	25%

	problem riil *Can explain the concept of testing the average vector hypothesis for one and two populations (the basic method at the beginning of the development of multivariate analysis assuming a multivariate normal distribution) and can apply in real problems*	*1. Can determine, calculate the hypothesis test of the average vector of two multivariate normal populations* *2. Can test the average vector hypothesis of two multivariate normal populations using software and interpret them*		*Observation* **TM: 4x3x50"** **LT: 4x3x60"** **BM: 4x3x60"**			
6	Dapat menjelaskan konsep MANOVA dan dapat menerapkan dalam problem riil *Can explain the concept of MANOVA and can apply it in real problems*	1. Dapat melakukan pemeriksaan asumsi dalam MANOVA, TWO-WAY MANOVA serta cara mengatasi 2. Dapat melakukan analisis MANOVA dan TWO-WAY MANOVA baik secara manual maupun menggunakan piranti lunak *1. Can check assumptions in MANOVA, TWO -WAY MANOVA and how to overcome* *2. Can perform MANOVA and TWO -WAY MANOVA analysis either manually or using software*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 2x3x50"** **LT: 2x3x60"** **BM: 2x3x60"**		1. Pemeriksaan asumsi 2. One way MANOVA/ TWO-WAY MANOVA 3. Interpretasil hasil analisis MANOVA/ TWO-WAY MANOVA *1. Examination of assumptions* *2. One way MANOVA/ TWO -WAY MANOVA* *3. Interpret the results of the MANOVA/TWO -WAY MANOVA analysis*	15%
7	Dapat menjelaskan konsep MANOVA dan dapat menerapkan dalam problem riil *Can explain the concept of MANOVA and can apply it in real problems*	1. Dapat melakukan pemeriksaan asumsi dalam MANACOVA serta cara mengatasi 2. Dapat melakukan analisis MANACOVA baik secara manual maupun menggunakan	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture,*		1. MANACOVA 2. Interpretasil hasil analisis MANACOVA *1.MANACOVA* *2.Interpretation of manacova analysis results*	15%

		piranti lunak 1. *Can check assumptions in MANACOVA and how to overcome* 2. *Can perform MANACOVA analysis either manually or using software*		*Discussion, Practice, Exercise, Observation* **TM: 2x3x50"** **LT: 2x3x60"** **BM: 2x3x60"**			
8	**ETS/*Midterm***						
9	Dapat menjelaskan konsep PCA dan dapat menerapkan dalam problem riil *Can explain the concept of PCA and can apply it in real problems*	1. Dapat melakukan pemeriksaan asumsi dalam PCA dan cara mengatasi 2. Dapat melakukan analisis PCA baik secara manual maupun piranti lunak 1. *Can check assumptions in PCA and how to overcome* 2. *Can perform PCA analysis both manually and software*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 3x50"** **LT: 3x60"** **BM: 3x60"**		1. Aplikasi PCA di problem riil 2. Pemeriksaan kelayakan sebelum menerapkan PCA dan intepretasi 1. *PCA application in real problems* 2. *Feasibility checks before applying PCA and intepretation*	10%
10	Dapat menjelaskan konsep analisis faktor dan dapat menerapkan dalam problem riil. *Can explain the concept of factor analysis and can apply it in real problems.*	1. Dapat melakukan pemeriksaan asumsi dalam analisis faktor dan cara mengatasi 2. Dapat melakukan analisis faktor baik secara manual maupun menggunakan piranti lunak 1. *Can check assumptions in factor analysis and how to*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation*		1. Konsep dasar dan aplikasi di problem riil 2. Pemeriksaan asumsi Analisis faktor dan interpretasi 1. *Basic concepts and applications in real problems* 2. *Examination of assumptions Factor analysis and interpretation*	10%

		overcome *2. Can perform fa ktor analysis either manually or using software*		**TM: 3x50"** **LT: 3x60"** **BM: 3x60"**			
11	Dapat menjelaskan konsep analisis cluster hirarki dan dapat menerapkan dalam problem riil *Can explain the concept of hierarchical cluster analysis and can apply in real problems*	1. Dapat melakukan analisis kluster baik secara manual maupun menggunakan piranti lunak 2. Dapat mengevaluasi hasil analisis kluster hirarki *1. Can perform cluster analysis either manually or using software* *2. Can evaluate the results of hierarchical cluster analysis*	Tugas, Kuis *Assignment, Quiz*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 2x3x50"** **LT: 2x3x60"** **BM: 2x3x60"**		1. Pendekatan hierarki 2. Evaluasi hasil analisis 3. Konsep dasar dan aplikasi di problem riil *1. Hierarchical approach* *2. Evaluation of the results of the analysis* *3. Basic concepts and applications in real problems*	10%
12	Dapat menjelaskan konsep analisis cluster non hirarki dan dapat menerapkan dalam problem riil *Can explain the concept of non -hierarchical cluster analysis and can apply in real problems*	1. Dapat melakukan analisis kluster non hirarki baik secara manual maupun menggunakan piranti lunak 2. Dapat mengevaluasi hasil analisis kluster non hirarki *1. Can perform non - hierarchical cluster analysis either manually or using software* *2. Can evaluate the results of non -hierarchical cluster analysis*	Tugas, Kuis *Assignment, Quiz*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 2x3x50"** **LT: 2x3x60"** **BM: 2x3x60"**		1. Pendekatan non hierarki 2. Evaluasi hasil analisis 3. Konsep dasar dan aplikasi di problem riil *1. Non -hierarchical approach* *2. Evaluation of the results of the analysis* *3. Basic concepts and applications in real problems*	10%
13	Dapat menjelaskan konsep analisis	1. Dapat melakukan pemeriksaan asumsi	Tugas, Kuis	Ceramah Interaktif Diskusi		1. Konsep dasar dan aplikasi di problem	10%

	diskriminan dan dapat menerapkan dalam problem riil *Can explain the concept of discriminant analysis and can apply it in real problems*	dalam analisis diskriminan dan cara mengatasi 2. Dapat melakukan analisis diskriminan baik secara manual maupun menggunakan piranti lunak *1. Can perform an examination of assumptions in discriminant analysis and how to overcome* *2. Can perform discriminant analysis either manually or using software*	*Assignment, Quiz*	Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 2x3x50"** **LT: 2x3x60"** **BM: 2x3x60"**		riil 2. Pemeriksaan asumsi 3. Estimasi model diskriminan dan interpretasi *1. Basic concepts and applications in real problems* *2. Examination of assumptions* *3. Estimation of discriminant models and interpretations*	
14	Dapat menerapkan analisis korespondensi dalam problem riil *Can apply correspondence analysis in real problems*	1. Dapat melakukan analisis korespondensi menggunakan piranti lunak dan menginterpretasikan hasilnya *1. Can perform correspondence analysis using software and interpret the results*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive Lecture, Discussion, Practice, Exercise, Observation* **TM: 3x50"** **LT: 3x60"** **BM: 3x60"**		1. Konsep dasar analisis korespondensi dan aplikasinya 2. Analisis korespondensi menggunakan piranti lunak *1. Basic concepts of correspondence analysis and its application* *2. Analysis of correspondence using the device luna k*	10%
15	Dapat menerapkan analisis MDS dalam problem riil *Can apply MDS analysis in real problems*	1. Dapat melakukan analisis MDS menggunakan piranti lunak dan menginterpretasikan hasilnya *1. Can perform MDS*	Observasi di kelas *Observation in the classroom*	Ceramah Interaktif Diskusi Praktikum Latihan Soal Observasi *Interactive*		1. Konsep dasar MDS dan aplikasinya 2. MDS menggunakan piranti lunak *1. Basic concepts of MDS and its application*	10%

		analysis using software and interpret the results		*Lecture, Discussion, Practice, Exercise, Observation* **TM: 3x50”** **LT: 3x60”** **BM: 3x60”**		*2. MDS using the luna k tool*	
16	**Evaluasi Akhir Semester / Ujian Akhir Semester/*Final Exam***						