

MODULE HANDBOOK

CATEGORICAL DATA ANALYSIS



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

ENDORSEMENT PAGE



MODULE HANDBOOK CATEGORICAL DATA ANALYSIS STATISTICS UNDERGRADUATE PROGRAM DEPARTMENT OF STATISTICS INSTITUT TEKNOLOGI SEPULUH NOPEMBER

Proses <i>Process</i>	Penanggung Jawab <i>Person in Charge</i>			Tanggal <i>Date</i>
	Nama <i>Name</i>	Jabatan <i>Position</i>	Tanda tangan <i>Signature</i>	
Perumus <i>Preparation</i>	Dr. Drs. Purhadi, M.Sc	Dosen Lecturer		
Pemeriksa dan Pengendalian <i>Review and Control</i>	Dr. Kartika Fithriasari, M.Si	Kepala Departemen Head of Department		
Persetujuan <i>Approval</i>	Santi Wulan Purnami, M.Si, Ph.D	Sekretaris Departemen I Secretary of Department I		
Penetapan <i>Determination</i>	Prof. Hamzah Fansuri, M.Si, Ph.D.	Dekan Fakultas Sains dan Analitika Data Dean of Faculty Science and Data Analytics		
Pengendalian <i>Conroller</i>	Prof. Dr. Ir. Aulia Siti Aisjah, MT	Kepala Kantor Penjaminan Mutu Head of Quality Contro		

	<p>CLO.7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams</p> <p>CLO.8 Have professional responsibilities and ethics</p> <p>CLO.9 Able to motivate yourself to think creatively and learn throughout life</p>	PLO-3
Content	<p>Categorical data analysis is a statistical modeling course. There are five topics that will be studied in this course, starting from a). Two, three and k dimensional contingency tables. b). Calculates multiple association measures. d). Create two, three and k dimensional linear log models. e). Creating binary, multinomial and ordinal logistic regression models. f). Create a probit regression model. g). Poisson regression model. Through this course, it is hoped that students will have the ability to think critically and be able to make the right decisions to solve problems using categorical Data. The learning strategies used are lectures, discussions, exercises, and assignments</p>	
Assessment and its weight	<p>Assignment I – 20%</p> <p>Midterm Exam – 30%</p> <p>Assignment II – 20%</p> <p>Final Project – 30%</p>	
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom	
Reading list	<ol style="list-style-type: none"> 1. Alan Agresti, An Introduction to Categorical Data Analysis. Hoboken, New Jersey: John Wiley & Sons, Inc, 2007. 2. Alan Agresti, Categorical Data Analysis. Hoboken, New Jersey: A John Wiley & Sons, Inc, 2013. 3. David W. Hosmer JR, Stanley Lemeshow, Rodney X. Sturdivant . Applied Logistic Regression. New York: John Wiley & Sons, Inc, 2013 4. B. S. Everitt : The Analysis of Contingency Tables- Springer US, Monographs on Applied Probability and Statistics, 1977 5. Jurnal dengan topik Analisis Data Kategorikal 	



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)/ <i>Course</i>	KODE/ <i>Code</i>	Rumpun MK/ <i>Course Group</i>	BOBOT (sks)/ <i>Weight (credit)</i>		SEMESTER/ <i>Semester</i>	Tgl Penyusunan/ <i>Drafting Date</i>
ANALISIS DATA KATEGORIK / <i>CATEGORICAL DATA ANALYSIS</i>	SS234420	Lingkes	T=3	P=0	IV	11 Januari 2023
OTORISASI/ <i>AUTHORIZATION</i>	Pengembang RPS/ <i>RPS Developer</i>		Koordinator RMK/ <i>Course Group Coordinator</i>		Ketua PRODI/ <i>Head of Department</i>	
	Dr. Drs. Puhadi, M.Sc		Dr. Bambang W.O., M.Si		Dr. Kartika Fithriasari, M.Si	
Capaian Pembelajaran (CP)/ <i>Learning Achievement</i>	CPL-PRODI yang dibebankan pada MK/ <i>PLO</i>					
	CPL-1	Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi				
	CPL-2	Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang keahlian tertentu, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan pembelajaran lain yang luarannya setara dengan Tugas Akhir melalui pemikiran logis, kritis, sistematis dan inovatif.				
	CPL-3	Mampu menganalisis data dengan metode statistika yang tepat dan menginterpretasikannya				
	<i>PLO-1</i>	<i>Able to apply theoretical knowledge of statistics, mathematics, and computation</i>				
	<i>PLO-2</i>	<i>Able to study and utilize science and technology in order to apply it to certain areas of expertise, and be able to make appropriate decisions from the results of their own work or group work in the form of final project reports or other forms of learning activities whose output is equivalent to the Final Project through logical, critical thinking , systematic and innovative.</i>				

	<i>PLO-3</i>	<i>Able to analyze data with appropriate statistical methods and interpret them</i>																												
	Capaian Pembelajaran Mata Kuliah (CPMK)/ CLO																													
	<p>CPMK.1 Menguasai konsep teoritis metode analisis data kategorikal CPMK.2 Mampu memformulasikan dan menganalisis permasalahan dengan menggunakan metode analisis data kategorikal CPMK.3 Mampu menerapkan analisis data kategorikal dengan menggunakan software statistik CPMK.4 Mampu mengambil keputusan yang tepat berdasarkan analisis data kategorikal dan mampu mengkomunikasikan hasil analisis baik secara lisan maupun tertulis baik secara individu maupun bekerja sama</p> <p><i>CLO.1 Mastering the theoretical concepts of methods for categorical data</i> <i>CLO.2 Able to formulate solutions and analyze procedural problems for categorical data using appropriate statistical methods and interpret them</i> <i>CLO.3 Able to apply methods for categorical data</i> <i>CLO.4 Able to identify, formulate, and solve statistical problems in various applied fields using statistical software</i> <i>CLO.5 Able to adapt to the situation at hand</i> <i>CLO.6 Able to make the right decisions based on categorical data analysis and able to communicate the results of the analysis both orally and in writing</i> <i>CLO.7 Able to communicate effectively and work together in interdisciplinary and multidisciplinary teams</i> <i>CLO.8 Have professional responsibilities and ethics</i> <i>CLO.9 Able to motivate yourself to think creatively and learn throughout life</i></p>																													
		<p>Matrik CPL – CPMK <i>PLO-CLO Matrix</i></p> <table border="1"> <thead> <tr> <th>CPMK</th> <th>CPL-2</th> <th>CPL-4</th> <th>CPL-5</th> <th>CPL-9</th> </tr> </thead> <tbody> <tr> <td>CPMK-1</td> <td></td> <td>√</td> <td>√</td> <td></td> </tr> <tr> <td>CPMK-2</td> <td></td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>CPMK-3</td> <td></td> <td></td> <td></td> <td>√</td> </tr> <tr> <td>CPMK-4</td> <td>√</td> <td></td> <td>√</td> <td>√</td> </tr> </tbody> </table>				CPMK	CPL-2	CPL-4	CPL-5	CPL-9	CPMK-1		√	√		CPMK-2			√	√	CPMK-3				√	CPMK-4	√		√	√
CPMK	CPL-2	CPL-4	CPL-5	CPL-9																										
CPMK-1		√	√																											
CPMK-2			√	√																										
CPMK-3				√																										
CPMK-4	√		√	√																										
Deskripsi Singkat MK/ Course Description	<p>Analisis Data Kategori merupakan salah satu mata kuliah pemodelan statistik. Terdapat lima bahasan yang akan dikaji pada mata kuliah ini, yaitu a). Tabel kontingensi dua, tiga dan k dimensi. b). Menghitung beberapa pengukuran asosiasi. d). Membuat model log linear dua, tiga dan k dimensi. e). Membuat model regresi logistik biner, multinomial dan ordinal. f). Membuat model regresi probit. g). Model regresi poisson. Melalui mata kuliah ini diharapkan mahasiswa akan memiliki kemampuan untuk berfikir secara kritis dan mampu memberikan keputusan yang tepat untuk menyelesaikan permasalahan dengan menggunakan Data Kategori. Strategi pembelajaran yang digunakan adalah ceramah, diskusi, latihan, dan tugas</p>																													

	<p><i>Categorical data analysis is a statistical modeling course. There are five topics that will be studied in this course, starting from a). Two, three and k dimensional contingency tables. b). Calculates multiple association measures. d). Create two, three and k dimensional linear log models. e). Creating binary, multinomial and ordinal logistic regression models. f). Create a probit regression model. g). Poisson regression model. Through this course, it is hoped that students will have the ability to think critically and be able to make the right decisions to solve problems using categorical Data. The learning strategies used are lectures, discussions, exercises, and assignments</i></p>				
Bahan Kajian: Materi Pembelajaran/ Course Material	<p>Dasar Sains, Teori Statistika, Komputasi dan Data Processing, Pemodelan, Industri dan Bisnis, Pemerintahan dan Kependudukan, Ekonomi dan Manajemen, Kesehatan dan Lingkungan, dan Sosial Humaniora <i>Basic Science, Statistical Theory, Computing and Data Processing, Modeling, Industry and Business, Government and Population, Economics and Management, Health and Environment, and Social Humanities</i></p>				
Pustaka/ References	Utama/Primary:				
	<p>6. Alan Agresti, An Introduction to Categorical Data Analysis. Hoboken, New Jersey: John Wiley & Sons, Inc, 2007. 7. Alan Agresti, Categorical Data Analysis. Hoboken, New Jersey: A John Wiley & Sons, Inc, 2013. 8. David W. Hosmer JR, Stanley Lemeshow, Rodney X. Sturdivant . Applied Logistic Regression. New York: John Wiley & Sons, Inc, 2013</p>				
	Pendukung/Secondary:				
	<p>1. B. S. Everitt : The Analysis of Contingency Tables-Springer US, Monographs on Applied Probability and Statistics, 1977 2. Jurnal dengan topik Analisis Data Kategorikal</p>				
Dosen Pengampu/ Lecturers	<p>Dr. Vita Ratnasari, S.Si, M.Si ; Dr. Drs. Purhadi, M.Sc ; Santi Puteri Rahayu, M.Si., Ph.D</p>				
Matakuliah syarat/ Pre-requisite Course	<p>Statistika Matematika <i>Statistics Mathematics</i></p>				
Mg Ke- Week	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) <i>Final capability for each learning step</i>	Penilaian Evaluation	Bantuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu] <i>Learning Format Learning Methods</i>	Materi Pembelajaran [Pustaka] <i>Learning Material [References]</i>	Bobot Penilaian (%) <i>Evaluation Weight (%)</i>

				Assignment for Student [Estimated Time]			
		Indikator <i>Indicator</i>	Kriteria & Bentuk <i>Criteria and Format</i>	Luring <i>Offline</i>	Daring <i>Online</i>		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Dapat menjelaskan konsep analisis data kategorikal <i>Can explain the concept of categorical data analysis</i>	1.1 Dapat menjelaskan dan memberikan contoh data kategorikal 1.2 Dapat menjelaskan skala pengukuran data 1.3 Dapat memberikan aplikasi penggunaan data kategorikal <i>1.1 Can explain and give examples of categorical data</i> <i>1.2 Can explain the scale of data measurement</i> <i>1.3 Can provide categorical data usage applications</i>	Observasi Aktifitas di kelas <i>Observation in class</i>	Ceramah Interaktif, Diskusi <i>Interactive Lecture, Discussion</i> TM: 3x50" LT: 3x60" BM: 3x60"		Pengantar Analisis Data Kategorikal [1] Bab 1 [2] Bab 1 <i>Introduction to Categorical Data Analysis</i> [1] Chapter 1 [2] Chapter 1	5%
2	Dapat menjelaskan Distribusi probabilitas dan inferens data kategorikal <i>Can explain probability distribution and categorical data inference</i>	2.1 Dapat menjelaskan distribusi probabilitas untuk data kategorikal 2.2 Dapat menganalisis secara statistik inferens distribusi probabilitas untuk data kategorikal <i>2.1 Can explain the probability</i>	Observasi Aktifitas di kelas, <i>Observation in class</i>	Ceramah Interaktif, Diskusi <i>Interactive Lecture, Discussion</i> TM: 3x50" LT: 3x60" BM: 3x60"		Distribusi dan inferens [1] Bab 1 [2] Bab 1 <i>Distribution and inferens</i> [1] Chapter 1 [2] Chapter 1	5%

		<p><i>distribution for categorical data</i></p> <p>2.2 <i>Can statistically analyze the probability distribution inference for categorical data</i></p>					
3	<p>Dapat menganalisis Tabel Kontingensi dua dimensi : Odd ratio, Relative Risk, dan Uji independesi</p> <p><i>Can analyze two - dimensional Contingency Tables: Odd ratio, Relative Risk, and Independence test</i></p>	<p>3.1 Mampu menjelaskan dan membuat tabel kontingensi dua dimensi</p> <p>3.2 Mampu menganalisis dengan menggunakan odds ratio, relative risk</p> <p>3.3 Mampu menguji independensi dengan menggunakan metode Chi square, likelihood ratio, Fisher, Mc Nemar</p> <p>3.1 <i>Be able to explain and create a two - dimensional contingency table</i></p> <p>3.2 <i>Able to analyze using the odds ratio, relative risk</i></p> <p>3.3 <i>Able to test independence using the Chi square method, likelihood ratio, Fisher, Mc Nemar</i></p>	<p>Observasi Aktifitas di kelas</p> <p><i>Observation in class</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50" LT: 3x60" BM: 3x60"</p>		<p>Tabel Kontingensi</p> <p><i>Contingency Table</i></p>	10%
4-5	<p>Dapat menganalisis Tabel Kontingensi tiga dimensi dan k dimensi (Odd ratio, Relative Risk, Uji independesi)</p> <p><i>Can analyze three -</i></p>	<p>4.1 Mampu menjelaskan dan membuat tabel kontingensi tiga dimensi dan k dimensi</p> <p>4.2 Mampu menganalisis</p>	<p>Tugas 1</p> <p>Observasi Aktifitas di kelas</p> <p>Tes 1</p> <p><i>Task 1,</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p>		<p>Tabel Kontingensi</p> <p><i>Contingency Table</i></p>	10%

	<i>dimensional and k - dimensional Contingency Tables (Odd ratio, Relative Risk, Independence test)</i>	<p>dengan menggunakan odds ratio, relative risk</p> <p>4.3 Mampu menguji independensi dengan menggunakan metode Chi square (mutually independen, conditionally independen, jointly independen)</p> <p>4.1 <i>Be able to explain and create three - dimensional and k - dimensional contingency tables</i></p> <p>4.2 <i>Able to analyze using the odds ratio, relative risk</i></p> <p>4.3 <i>Able to test independence using the Chi square method (mutually independent, conditionally independent, jointly independent)</i></p>	<i>Observation in class, Test 1</i>	<p>TM: 2x3x50" LT: 2x3x60" BM: 2x3x60"</p>			
6	Mampu membuat Model Log Linear dua dimensi serta menginterpretasikan <i>Able to create two - dimensional Linear Log Models and interpret them</i>	<p>5.1 Mampu mengestimasi dan menguji parameter model log linear dua dimensi</p> <p>5.2 Mampu menganalisa dan menginterpretasikan model log linear dua dimensi (predictor kontinu, predictor</p>	Observasi Aktifitas di kelas <i>Observation in class</i>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50" LT: 3x60" BM: 3x60"</p>		Model Log Linear <i>Log Linear Model</i>	10%

		<p>diskrit)</p> <p>5.1 <i>Be able to estimate and test the parameters of a two - dimensional linear log model</i></p> <p>5.2 <i>Be able to analyze and interpret a two - dimensional linear log model (continuous predictor, discrete predictor)</i></p>					
7	<p>Mampu membuat Model Log Linear tiga dimensi serta menginterpretasikan</p> <p><i>Able to create three dimensional Linear Log Models and interpret them</i></p>	<p>6.1 Mampu mengestimasi dan menguji parameter model log linear tiga dimensi</p> <p>6.2 Mampu menganalisa dan menginterpretasikan model log linear tiga dimensi (predictor kontinu, predictor diskrit)</p> <p>6.1 <i>Be able to estimate and test the parameters of a threedimensional linear log model</i></p> <p>6.2 <i>Be able to analyze and interpret three dimensional linear log models (continuous predictor, discrete predictor)</i></p>	<p>Observasi Aktifitas di kelas</p> <p>Kuis 1</p> <p><i>Observation in class, Quiz 1</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50"</p> <p>LT: 3x60"</p> <p>BM: 3x60"</p>		<p>Model Log Linear</p> <p><i>Log Linear Model</i></p>	10%
8	ETS/Midterm						
9-10	<p>Mampu membuat model regresi logistic biner serta menginterpretasikan</p>	<p>7.1 Mampu mengestimasi dan menguji parameter model regresi logistic</p>	<p>Observasi Aktifitas di kelas</p> <p><i>Observation in class</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture,</i></p>		<p>Model Regresi Logistik</p> <p><i>Logistic Regression Models</i></p>	15%

	<i>Able to create binary logistic regression models and interpret them</i>	<p>biner</p> <p>7.2 Mampu menganalisa dan menginterpretasikan model regresi logistic biner</p> <p>7.1 <i>Be able to estimate and test the parameters of the binary logistic regression model</i></p> <p>7.2 <i>Be able to analyze and interpret binary logistic regression models</i></p>		<p><i>Discussion</i></p> <p>TM: 2x3x50" LT: 2x3x60" BM: 2x3x60"</p>			
11	Mampu membuat model regresi logistic multinomial serta menginterpretasikan <i>Able to create multinomial logistic regression models and interpret them</i>	<p>8.1 Mampu mengestimasi dan menguji parameter model regresi logistic multinomial</p> <p>8.2 Mampu menganalisa dan menginterpretasikan model regresi logistic multinomial</p> <p>8.1 <i>Be able to estimate and test the parameters of multinomial logistic regression models</i></p> <p>8.2 <i>Be able to analyze and interpret multinomial logistic regression models</i></p>	Observasi Aktifitas di kelas <i>Observation in class</i>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50" LT: 3x60" BM: 3x60"</p>		Model Regresi Logistik <i>Logistic Regression Models</i>	10%
12-13	Mampu membuat model regresi logistic ordinal serta menginterpretasikan <i>Able to make ordinal logistic regression</i>	<p>9.1 Mampu mengestimasi dan menguji Parameter model regresi logistic ordinal</p>	Tugas 2 Observasi Aktifitas di kelas <i>Task 2, Observation in class</i>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p>		Model Regresi Logistik <i>Logistic Regression Models</i>	10%

	<i>models and interpret them</i>	<p>9.2 Mampu menganalisa dan menginterpretasikan model regresi logistik ordinal</p> <p><i>9.1 Able to estimate and test Ordinal logistic regression model parameters</i></p> <p><i>9.2 Be able to analyze and interpret ordinal logistic regression models</i></p>		<p>TM: 3x50" LT: 3x60" BM: 3x60"</p>			
14	<p>Mampu membuat model regresi Probit</p> <p><i>Able to make a Probit regression model</i></p>	<p>10.1 Mampu menganalisa dan menginterpretasikan model regresi Probit</p> <p><i>10.1 Able to analyze and interpret the Probit regression model</i></p>	<p>Observasi Aktifitas di kelas</p> <p><i>Observation in class</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50" LT: 3x60" BM: 3x60"</p>		<p>Model Regresi Probit</p> <p><i>Probit Regression Models</i></p>	10%
15	<p>Mampu membuat model regresi Poisson</p> <p><i>Able to make a Poisson regression model</i></p>	<p>11.1 Mampu menganalisa dan menginterpretasikan model regresi Poisson</p> <p><i>11.1 Able to analyze and interpret the Poisson regression model</i></p>	<p>Tugas 3 Observasi Aktifitas di kelas</p> <p><i>Task 3, Observation in class</i></p>	<p>Ceramah Interaktif, Diskusi</p> <p><i>Interactive Lecture, Discussion</i></p> <p>TM: 3x50" LT: 3x60" BM: 3x60"</p>		<p>Model Regresi Poisson</p> <p><i>Poisson Regression Models</i></p>	5%
16	Evaluasi Akhir Semester / Ujian Akhir Semester/Final Exam						

