

MODULE HANDBOOK
STATISTICAL
QUALITY
CONTROL



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

ENDORSEMENT PAGE



MODULE HANDBOOK STATISTICAL QUALITY CONTROL 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>	Tandatangan <i>Signature</i>	
Perumus <i>Preparation</i>	Dr. Drs Agus Suharsono, MS	Dosen <i>Lecturer</i>		March 28, 2019
Pemeriksa dan Pengendalian <i>Review and Control</i>	Dr. Muhammad Mashuri, M.T; Dr. Muhammad Ahsan, S.Si.; Dr. Hidayatul Khusna, S.Si.	Tim kurikulum <i>Curriculum team</i>		April 15, 2019
Persetujuan <i>Approval</i>	Dr. Wibawati, S.Si., M.Si	Koordinator RMK <i>Course Cluster Coordinator</i>		July 17, 2019
Penetapan <i>Determination</i>	Dr. Kartika Fithriasari, M.Si	Kepala Departemen <i>Head of Department</i>		July 30, 2019

MODULE HANDBOOK

STATISTICAL QUALITY CONTROL

Module name	Statistical Quality Control	
Module level	Undergraduate	
Code	KS184544	
Course (if applicable)	Statistical Quality Control	
Semester	5 (Odd)	
Person responsible for the module	Dr. Drs Agus Suharsono, MS	
Lecturer	Dr. Drs Agus Suharsono, MS Dr. Muhammad Mashuri, M.T Dr. Muhammad Ahsan, S.Si. Dr. Hidayatul Khusna, S.Si.	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, mandatory , 5 th semester.	
Type of teaching, contact hours	Lectures, <50 students	
Workload	1. Lectures: 3 x 50 = 150 minutes per week. 2. Practicum 1 x 170 = 170 minutes per week 3. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 4. Private learning: 3 x 60 = 180 minutes (3 hours) per week.	
Credit points	4 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	Introduction to Statistical Methods	
Learning outcomes and their corresponding PLOs	CLO.1 Able to apply the knowledge of statistical quality control CLO.2 Able to design and collect the data using the appropriate statistical quality control method CLO.3 Able to analyze the data using appropriate statistical quality control methods and interpret the results CLO.4 Able to identify, formulate, and solve the problem in statistical quality control at various fields	PLO.1 PLO.2 PLO.3 PLO.4
Content	Statistical Quality Control is a part of the courses in business and industry fields. The objective of this course is to make the students able to select the appropriate statistical methods in monitoring the product quality and process, particularly in the manufacturing industry. The materials are relating to the concept of quality improvement, seven statistics tools to improve the quality, control chart, the calculation of capability process, measurement system analysis, and acceptance sampling	

	design. To complete the objective, the learning strategies used are discussion, presentation and practice, presentation and written test.
Study and examination requirements and forms of examination	• In-class exercises • Assignment • Mid-term exam • Final exam
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading list	1. Leavenworth, G.E. and Grant, R.S., 1988. Statistical Quality Control. USA: McGraw-Hill. 2. Montgomery, D.C., 2012. Introduction to statistical Quality Control. 7th edition. USA: John Wiley and Sons Inc. 3. Quesenberry, C.P., 1997. SPC Methods for Quality Improvement. USA : John Wiley and Sons Inc.

	Program Studi	Sarjana, Departemen Statistika, FMKSD-ITS
	Mata Kuliah	Pengendalian Kualitas Statistik
	Kode Mata Kuliah	KS184544
	Semester/SKS	V/4
	MK Prasyarat	Pengantar Metode Statistika
RP-S1	Dosen Pengampu	Dr.Drs Agus Suharsono, MS ; Dr. Muhammad Mashuri, M.T ; Wibawati, S.Si, M.Si

Bahan Kajian <i>Study Materials</i>	Dasar Sains, Teori Statistika, Pengumpulan Data, Deskripsi dan Eksplorasi, Komputasi dan Data Processing, Pemodelan, Industri dan Bisnis <i>Basic Science, Statistical Theory, Data Collection, Description and Exploration, Computing and Data Processing, Modeling, Industry and Business</i>
CPL yang dibebankan MK <i>PLO</i>	CPL-1 Mampu menerapkan pengetahuan teori statistika, matematika, dan komputasi CPL-2 Mampu merancang dan melaksanakan pengumpulan data dengan metodologi yang benar CPL-3 Mampu menganalisis data dengan metode statistika yang tepat dan menginterpretasikannya CPL-4 Mampu mengidentifikasi, memformulasi, dan menyelesaikan masalah statistika di berbagai bidang terapan <i>PLO -1 Able to apply knowledge of science, statistical theory, mathematics, and computing to problems in various applied fields</i> <i>PLO -2 Able to design and collect data using correct methodology</i> <i>PLO -3 Able to analyze data using appropriate statistical methods and interpret them</i> <i>PLO -4 Able to identify, formulate, and solve statistical problems in various applied fields</i>
CP-MK <i>CLO</i>	CPMK.1 <u>Mampu menerapkan pengetahuan teori pengendalian kualitas statistika</u> CPMK.2 <u>Mampu merancang dan melaksanakan pengumpulan data dengan metodologi pengendalian kualitas statistika yang benar</u> CPMK.3 Mampu menganalisis data dengan metode pengendalian kualitas statistika yang tepat dan menginterpretasikannya CPMK.4 Mampu mengidentifikasi, memformulasi, dan menyelesaikan masalah pengendalian kualitas statistika di berbagai industri <i>CLO.1 Able to apply the knowledge of statistical quality control</i> <i>CLO.2 Able to design and collect the data using the appropriate statistical quality control method</i> <i>CLO.3 Able to analyze the data using appropriate statistical quality control methods and interpret the results</i> <i>CLO.4 Able to identify, formulate, and solve the problem in statistical quality control at various fields</i>

Minggu ke <i>Week</i>	Kemampuan Akhir Sub CP-MK <i>Final Ability</i>	Keluasan (materi pembelajaran) <i>Extent (learning material)</i>	Metode Pembelajaran <i>Learning methods</i>	Estimasi Waktu <i>Duration</i>	Bentuk Evaluasi <i>Evaluation Type</i>	Kriteria dan Indikator Penilaian <i>Criteria and Assessment Indicators</i>	Bobot Penilaian <i>Scoring</i>
1	1. Dapat menjelaskan konsep peningkatan kualitas suatu proses <i>1. Able to explain the concept of quality improvement of the process</i>	Konsep Peningkatan kualitas berkesinambungan a. Pengertian Statistika Pengendalian Proses b. Quality Design dan quality Conformance	Ceramah Interaktif Diskusi <i>Interactive Lecture Discussion</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	1.1. Dapat menjelaskan Konsep Peningkatan kualitas berkesinambungan 1.2. Pengertian Statistika Pengendalian Proses (SPC) 1.3. Quality Design dan quality Conformance	0%/0%



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		<i>The theoretical concept relating to the continuous quality improvement</i> <i>b. The definition of Statistical Quality Control</i> <i>c. Quality Design and Quality Conformance</i>				1.1. <i>Able to explain the theoretical concept relating to the continuous quality improvement</i> 1.2. <i>The definition of Statistical Quality Control</i> 1.3. <i>Quality Design and Quality Conformance</i>	
2		Prinsip Pengendalian kualitas a. Konsep Variasi b. Tujuh Alat Statistik <i>The fundamental of quality control :</i> a. <i>The concept of Variation</i> b. <i>Seven statistics tools</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit 150 minutes	Observasi Aktifitas di kelas <i>Observe the class activity</i>	1.4. Menggunakan Tujuh Alat Statistik 1.5. Dapat menjelaskan konsep variasi dan hubungan antara peta kendali dan pengujian hipotesis. 1.6. Dapat mencari sumber penyebab terjadinya out of control 1.4. <i>Able to apply the seven statistics tools</i> 1.5. <i>Able to explain the concept of variation and the relationship between control chart and hypothesis testing</i> 1.6. <i>Able to define the source of out of control event</i>	0%/0%
3-4	2. Dapat menerapkan Peta Kendali sesuai dengan permasalahan pada kasus univariat 2. <i>Able to apply a suitable control chart for the univariate problems</i>	Diagram Kontrol Variabel : a. Diagram $\bar{x} - R$ b. Diagram $\bar{x} - S$ <i>Variable control chart :</i> a. $\bar{x} - R$ chart b. $\bar{x} - S$ chart	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit 150 minutes	Observasi Aktifitas di kelas <i>Observe the class activity</i>	2.1. Dapat menggunakan Tujuh Alat Statistik 2.2. Dapat menjelaskan konsep variasi dan hubungan antara peta kendali dan pengujian hipotesis. 2.3. Dapat mencari sumber penyebab terjadinya out of control 2.1. <i>Able to apply the seven statistics tools</i>	10%/10%



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			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>	2.2. <i>Able to explain the concept of variation and the relationship between control chart and hypothesis testing</i> 2.3. <i>Able to define the source of out of control event</i>	
5-6		Diagram Kontrol atribut : a. Diagram -p dan Diagram -np, b. Diagram -c, Diagram -u c. Demerit <i>Attribute control chart :</i> a. <i>p-chart and np-chart,</i> b. <i>c-chart, u-chart</i> c. <i>Demerit chart</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	2.4. Dapat menggunakan Tujuh Alat Statistik 2.5. Dapat menjelaskan konsep variasi dan hubungan antara peta kendali dan pengujian hipotesis. 2.6. Dapat mencari sumber penyebab terjadinya out of control <i>2.4. Able to apply the seven statistics tools</i> <i>2.5. Able to explain the concept of variation and the relationship between control chart and hypothesis testing</i> <i>2.6. Able to define the source of out of control event</i>	10%/10%
7	3. Dapat menentukan Kapabilitas Proses produksi <i>3. Able to define the capability process of a production</i>	Kapabilitas proses <i>Capability process</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) Kuis 1 <i>Interactive Lecture Discussion Exercises Observation Quiz 1</i>			3.1. Mengetahui syarat kapabilitas suatu proses <i>3.1. Understand the requirement of the capability process</i>	25%/50%



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	Dosen Pengampu	Dr.Drs Agus Suharsono, MS ; Dr. Muhammad Mashuri, M.T ; Wibawati, S.Si, M.Si

			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>		
8	ETS MIDTERM EXAM						
9-10	4. Dapat menerapkan Peta Kendali pada kasus khusus 4. <i>Able to apply the control chart for the particular cases</i>	Diagram kontrol lainnya a. Diagram Individu, b. Diagram Cusum, Diagram EWMA <i>Others control chart:</i> <i>a. Individual chart</i> <i>b. Cusum chart, EWMA chart</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	4.1. Mampu menggunakan diagram kontrol Individu 4.2. Mampu menggunakan Diagram Cusum, Diagram EWMA, Demerit <i>4.1. Able to understand the use of Individual control chart</i> <i>4.2. Able to understand the use of Cusum chart, EWMA chart</i>	8%/58%
			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>		
11-12		Peta Multivariat : a. Peta T^2 Hotteling b. Peta GV <i>Multivariate control chart :</i> <i>a. T^2 Hotteling control chart</i> <i>b. GV control chart</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	Dapat menerapkan Diagram Kontrol 4.3. Diagram T^2 Hotteling 4.4. GV <i>Understand the use of:</i> <i>4.3. T^2 Hotteling control chart</i> <i>4.4. GV control chart</i>	10%/68%

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			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>		
13	5. Dapat membuat analisis MSA 5. <i>Able to create the Measurement System Analysis</i>	Measurement System Analysis <i>Measurement System Analysis</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	5.1. Dapat melakukan measuremen sistem analisis <i>5.1. Able to apply the Measurement System Analysis</i>	8%/76%
			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>		
14	6. Dapat menentukan rancangan sampling dengan Standar militer 6. <i>Able to define the sampling design with Military Standard</i>	Sampling penerimaan a. Konsep dasar sampling penerimaan b. Perancangan sampling tunggal dan sampling ganda <i>Acceptance sampling a. Basic concept of acceptance sampling b. Single acceptance sampling and Double acceptance sampling</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Kuis 2 <i>Quiz 2</i>	6.1. Dapat membuat RST 6.2. Dapat menghitung rata jumlah sampel jika ada perbaikan dan rata-rata jumlah sampel pada RSG <i>6.1. Able to create RST 6.2. Able to calculate the mean of the sample if there is an improvement and calculate the mean of the sample for</i>	15%/91%
			Praktikum <i>Practicum</i>	170 menit	Test Pedahuluan, Laporan, Presentasi		

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				170 minutes	Pretest, Report, Presentation		
15		Rancangan sampling: a. Mil-Std-105D b. Mil-Std-414a <i>Sampling design:</i> <i>a. Mil-Std-105D</i> <i>b. Mil-Std-414a</i>	Ceramah Interaktif Diskusi Latihan Soal Observasi (CILSO) <i>Interactive Lecture Discussion Exercises Observation</i>	150 menit <i>150 minutes</i>	Observasi Aktifitas di kelas <i>Observe the class activity</i>	6.3. Dapat menghitung peluang perubahan jenis pemeriksaan pada Mil-std-105D 6.4. Dapat membuat keputusan diterima atau ditolak pada sampling variabel MIL-STD-414 <i>6.3. Able to calculate the probability of the alteration on the Mil-std-105D inspection</i> <i>6.4. Able to decide the acceptance of MIL- STD-414 sampling variable</i>	9%/100%
			Praktikum <i>Practicum</i>	170 menit <i>170 minutes</i>	Test Pedahuluan, Laporan, Presentasi <i>Pretest, Report, Presentation</i>		
16	EAS FINAL EXAM						

PUSTAKA/ REFERENCES:

1. Montgomery, D.C. (2012), Introduction to Statistical Quality Control 7^{ed}, John Wiley and Sons Inc., USA
2. Besterfield, D.H., (2009), Quality Control 8th, Pearson International Edition, USA
3. Quesenberry, C.P., (1997), SPC Methods for Quality Improvement, John Wiley and Sons Inc., USA
4. Duncan, A.J., (1986), Quality Control and Industrial Statistics 5^{ed}, Irwin, USA

	RENCANA ASSESSMENT & EVALUASI Prodi Sarjana Statistika MK PENGENDALIAN KUALITAS STATISTIK <i>ASSESSMENT PLAN AND EVALUATION</i> <i>STATISTICS BACHELOR PROGRAM</i> <i>STATISTICAL QUALITY CONTROL COURSE</i>		RA&E
			SLK-34
Kode: KS184544 <i>Code: KS184544</i>	Bobot sks (T/P): 4 <i>Credits : 4</i>	Rumpun MK: Statistika Bisnis dan Teori <i>Courses Group : Statistical business and theory</i>	Smt: 5 <i>Semester : 5</i>
OTORISASI <i>AUTHORIZATION</i>	Penyusun RA & E <i>Author</i> Dr.Drs Agus Suharsono, MS	Koordinator RMK <i>Coordinator</i>	Ka PRODI <i>Head of Department</i> Dr. Kartika F, M.Si

Mg ke Week (1)	Sub CP-MK <i>Sub CLO</i> (2)	Bentuk Asesmen (Penilaian) <i>Assesment Type</i> (3)	Bobot (%) <i>Weight</i> (4)
	Kemampuan akhir <i>Final Ability</i>		
1-2	1. Dapat menjelaskan konsep peningkatan kualitas suatu proses <i>Able to explain the concept of quality improvement of the process</i>	Kuis 1/ <i>Quiz 1</i>	5%
3-6	2. Dapat menerapkan Diagram Kontrol sesuai dengan permasalahan pada kasus univariat <i>Able to apply a suitable control chart for the univariate problems</i>	Kuis 1/ <i>Quiz 1</i> Praktikum	10%
7	3. Dapat menentukan Kapabilitas Proses produksi <i>Able to define the capability process of a production</i>	Kuis 1/ <i>Quiz 1</i> Praktikum/ <i>Practicum</i>	10%
8	Evaluasi Tengah Semester / <i>Midterm Exam</i>	ETS/ <i>Midterm Exam</i>	25%
9-12	4. Dapat menerapkan Diagram Kontrol pada kasus khusus <i>Able to apply the control chart for the particular cases</i>	Kuis 2/ <i>Quiz 2</i> Praktikum/ <i>Practicum</i>	10%
13	5. Dapat membuat analisis MSA <i>Able to create the Measurement System Analysis</i>	Praktikum/ <i>Practicum</i>	5%
14-15	6. Dapat menentukan rancangan sampling dengan Standar militer <i>Able to define the sampling design with Military Standard</i>	Kuis 2/ <i>Quiz 2</i> Praktikum/ <i>Practicum</i>	10%
16	Evaluasi Akhir/ <i>Final Exam</i>	EAS/ <i>Final Exam</i>	25%
Total bobot penilaian <i>Total Weight</i>			100%

Portofolio penilaian & evaluasi proses dan hasil belajar setiap mahasiswa
Assessment & evaluation portfolio of each student's learning process and outcomes

CPL/ <i>PLO</i>	Sub CPMK/ <i>Sub CLO</i>	Minggu ke/ <i>Week</i>	Bentuk Asesmen	Bobot (%)/ <i>Weight (%)</i>
CPL-01/ <i>PLO-1</i>	Sub CPMK 1,2,3	Mg ke 7	Kuis 1/ <i>Quiz 1</i>	3
	Sub CPMK 1,2,3,4,5	Mg ke 8	Mid term exam	5
	Sub CPMK 6,7	Mg ke 14	Kuis 2/ <i>Quiz 2</i>	2
	Sub CPMK 6,7,8,9	Mg ke 16	Final exam	4
	Sub CPMK 3,5,6,7,8,9	Mg ke 3-15	Praktikum	4
CPL-02/ <i>PLO-2</i>	Sub CPMK 4	Mg ke 7	Kuis 1/ <i>Quiz 1</i>	3
	Sub CPMK 4	Mg ke 8	Mid term exam	5
	Sub CPMK 8	Mg ke 14	Kuis 2/ <i>Quiz 2</i>	2
	Sub CPMK 8,9	Mg ke 16	Final exam	5
	Sub CPMK 3,5,6,7,8,9	Mg ke 3-15	Praktikum	5
CPL-03/ <i>PLO-3</i>	Sub CPMK 3	Mg ke 7	Kuis 1/ <i>Quiz 1</i>	5
	Sub CPMK 3,4,5	Mg ke 8	Mid term exam	5
	Sub CPMK 6,7,8	Mg ke 14	Kuis 2/ <i>Quiz 2</i>	3
	Sub CPMK 6,7,8,9	Mg ke 16	Final exam	10
	Sub CPMK 3,5,6,7,8,9	Mg ke 3-15	Praktikum	10
CPL-04/ <i>PLO-4</i>	Sub CPMK 4	Mg ke 7	Kuis 1/ <i>Quiz 1</i>	4
	Sub CPMK 4,5	Mg ke 8	Mid term exam	5
	Sub CPMK 6,7,8	Mg ke 14	Kuis 2/ <i>Quiz 2</i>	3
	Sub CPMK 6,7,8,9	Mg ke 16	Final exam	6
	Sub CPMK 4,5,6,7,8,9	Mg ke 3-15	Praktikum	6
				Σ = 100%

No	Assesment	PLO-01	PLO-02	PLO-03	PLO-04	PLO-05	PLO-06	PLO-07	PLO-08	PLO-09	TOTAL
1	Kuis 1	0.04		0.05	0.05						0.14
2	Midterm	0.05		0.05	0.05						0.15
3	Kuis 2	0.05		0.1	0.06						0.21
4	Final exam	0.05		0.1	0.07						0.22
5	Praktikum	0.01	0.1	0.1	0.07						0.28
	TOTAL	0.2	0.1	0.4	0.3	0	0	0	0	0	1