



INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Sarjana (S1) Teknik Telekomunikasi

1	Nama Mata Kuliah / Course Name :	Probabilitas dan Statistika / Probability & Statistics
2	Kode Mata Kuliah / Course Code :	EL234301
3	Kredit / Credits :	3 SKS
4	Semester / Semester :	3

Deskripsi Mata Kuliah / Course Description

Pada mata kuliah ini mahasiswa akan mempelajari prinsip dan metode statistik beserta aplikasinya di bidang teknik Telekomunikasi. Sebagai gambaran awal kepada mahasiswa, pada mata kuliah ini disampaikan pengenalan teori probabilitas dan statistika beserta aplikasinya pada bidang Teknik Telekomunikasi. Selanjutnya, para mahasiswa akan diajarkan mengenai deskripsi visual dan kualitatif data, probabilitas, variabel acak diskrit dan kontinyu, distribusi probabilitas, distribusi gabungan, pencuplikan acak, estimasi parameter, interval statistik, uji hipotesa, dan regresi linier. Selain itu akan dibahas desain eksperimen dan analisis data hasil pengukuran.

In this course students will study statistical principles and methods and their applications in the field of telecommunications engineering. As an initial description for students, this course introduces probability theory and statistics and their applications in the field of Telecommunication Engineering. Furthermore, students will be taught about visual and qualitative description of data, probabilities, discrete and continuous random variables, probability distributions, composite distributions, random sampling, parameter estimation, statistical intervals, hypothesis testing, and linear regression. In addition, experimental design and analysis of measurement data will be discussed.

Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / Program Learning Outcomes Charged to The Course

1. (CPL-04) Mampu menerapkan ilmu pengetahuan alam dan matematika serta teknologi dan rekayasa informasi untuk memperoleh pemahaman komprehensif pada bidang Teknik Telekomunikasi.

(PLO-04) *Able to apply knowledge of sciences, mathematics, and information technology to acquire comprehensive understanding of engineering principles in Telecommunication Engineering.*

2. (CPL-08) Mampu mengetahui dan mengaplikasi metode dan keahlian sesuai perkembangan terkini di bidang ilmu pengetahuan dan teknologi untuk menyelesaikan permasalahan di bidang Teknik Telekomunikasi dengan mengedepankan nilai-nilai universal

(PLO-08) *Able to know and apply methods, skills according to the latest developments in the field of science and technology to solve electrical engineering problems by prioritizing universal values*

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mahasiswa mampu menguasai konsep statistik deskriptif / *Students are able to master the concept of descriptive statistics*
2. Mahasiswa mampu menguasai konsep-konsep dasar dari probabilitas, probabilitas bersyarat dan teorema Bayes / *Students are able to master the basic concepts of probability, conditional probability and Bayes' theorem*
3. Mahasiswa mampu menguasai konsep variabel acak, distribusi probabilitas untuk variabel acak diskrit dan kontinu dan probabilitas dan ekspektasi / *Students are able to master the concept of random variables, probability distribution for discrete and continuous random variables and probability and expectations*
4. Mahasiswa mampu menguasai prinsip estimasi parameter, distribusi sampling, dan memahami teorema batas tengah, menyusun interval keyakinan pada parameter untuk satu sampel / *Students are able to master the principles of parameter estimation, sampling distribution, and understand the median limit theorem, constructing confidence intervals on parameters for one sample*
5. Mahasiswa mampu menguasai konsep uji hipotesis, analisis regresi linier, dan metode statistik untuk desain eksperimen dan analisis data hasil pengukuran / *Students are able to master the concept of hypothesis testing, linear regression analysis, and statistical methods for experimental design and measurement data analysis.*

Pokok Bahasan / Contents

1. Pengantar dan aplikasi statistik di teknik elektro / *Introduction and application of statistics in electrical engineering*
2. Representasi statistik deskriptif data dengan teknik numerik dan grafis: histogram, pie chart. Lokasi, sebaran dan variabilitas / *Descriptive statistical representation of data using numerical and graphical techniques: histograms, pie charts. Location, distribution and variability.*
3. Konsep-konsep dasar dari probabilitas, probabilitas bersyarat, variabel acak, distribusi probabilitas, distribusi gabungan / *Basic concepts of probability, conditional probability, random variable, probability distribution, compound distribution.*

4. Estimasi parameter, distribusi sampling, dan teorema batas tengah, Interval keyakinan pada parameter untuk satu sampel / *Parameter estimation, sampling distribution, and median limit theorem, Confidence intervals on parameters for a single sample*
5. Uji hipotesa / *Test the hypothesis*
6. Regresi linier: asumsi model. Metode least-squares / Linear regression: model assumptions. The least-squares method
7. Desain eksperimen dan analisa statistik pada permasalahan di teknik elektro / Experimental design and statistical analysis on problems in electrical engineering

Prasyarat / Pre-requisite

Kalkulus 2/ Calculus 2

Pustaka / Reference

Utama / Primary :

1. William M. Mendenhall & Terry L. Sincich, "Statistics for Engineering and the Sciences," 6th ed., CRC Press, 2016.
2. Jay L. Devore, "Probability and Statistics for Engineering and the Sciences," 9th ed., Cengage Learning, 2016.
3. Richard A. Johnson, "Probability and Statistics for Engineers," 9th ed., Pearson, 2018.
4. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, & Keying Ye, "Probability and Statistics for Engineers and Statistics," 9th ed., Prentice Hall, 2012.
5. Andrew Metcalfe, David Green, Tony Greenfield, Mayhayaudin Mansor, Andrew Smith, Jonathan Tuke, "Statistics in Engineering: With Examples in MATLAB® and R", 2nd ed, Chapman and Hall/CRC, 2019