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

Course	Course Name	:	**Introduction to Survival Analysis**
	Course Code	:	SS234418
	Credit	:	3 SKS
	Semester	:	IV

COURSE DESCRIPTION

Survival analysis is a statistical method that can be applied in various fields, one of which is in the health sector. Survival analysis is a statistical method that emphasizes analyzing the time until an event occurs. In this lecture, the basics of survival analysis will be taught such as the Kaplan Meier survival function, Hazard function, Hazard ratio, survival regression with parametric and semiparametric approaches. To better understand this method, applications in real cases will be taught manually or using software, especially SPSS, SAS and R.

PROGRAM LEARNING OUTCOME

PLO-5	Able to apply statistical theory to statistical methods
PLO-6	Able to use modern computing devices to solve statistical problems
PLO-7	Able to design, collect, and perform data management with the right methodology
PLO-10	Able to apply business, industrial, economic, social, health or environmental statistical methods to real problems

COURSE LEARNING OUTCOME

CLO.1	Be able to explain concepts and apply the theory of survival analysis
CLO.2	Able to use software (SPSS, SAS, R) for survival analysis
CLO.3	Able to analyze data using the survival method and interpret it appropriately
CLO.4	Able to identify, formulate and solve problems in the medical/health sector using survival analysis

MAIN SUBJECT

1. Introduction to survival analysis: basic concepts of survival analysis, censored data
2. Survival function: survival function (parametric), Kaplan Meier survival curve, hazard rate
3. The log rank (LR) test: LR test for 2 groups and more than 2 groups:
4. Parametric survival regression: Exponential Regression, Weibull, Logistics
5. The Cox proportional Hazard (PH) model: Cox PH model estimation, Hazard ratio cox PH model, interval estimation
6. Evaluation of proportional hazards assumptions: -- graphical approach(log-log plots, actual values with predicted values)- goodness of fit test approach
7. Stratified Cox models: Model estimation, Hazard ratio, interval estimation
8. Extended Cox models: Model estimation, Hazard ratio, interval estimation

PREREQUISITE
Regression Analysis
REFERENCES
1. Kleinbaum, David G. and Klein, Mitchel. 2012. Survival Analysis: A self-Learning Text. 3rd edition. Springer, Science+Businesness Media, LLC. 2. Cox, D.R. and Oakes, D. 1984. Analysis of Survival Data. Cambridengane : University Printing House 3. David, Collet. 2014. Modelling Survival Data in Medical Research. 3rd edition, Chapman and Hall/CRC. 4. Hosmer, David W., Lemeshow, Stenley. and May, S. 2008. Applied Survival Analysis. Hoboken, New Jersey : John Wiley dan Sons, Inc. 5. Le, C. T. 1997. Applied Survival Analysis. John Wiley dan Sons, Inc.