



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Mathematics Department

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Doctoral Program in Mathematics

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MODULE HANDBOOK
Doctoral in Mathematics

Module name:	Analisis Data Survival (Survival Data Analysis)												
Module level, if applicable:	Doctoral Program												
Code, if applicable:	MMM-7415												
Semester(s) in which the module is taught:	2 (even term)												
Person responsible for the module:	Chair of Statistics Research Group												
Lecturer(s):	1. Drs. Danardono, MPH, Ph.D												
Language:	Indonesia												
Relation to curriculum:	Doctoral Degree in Mathematics, Elective Course												
Credit points:	3 Semester Credit Unit												
Type of teaching, contact hours:	3x50 minutes lectures, 3x60 minutes structured activities.												
Workload:	<ul style="list-style-type: none"> • 3x50 minutes lectures, • 3x60 minutes structured activities, • 3x60 minutes individual study, • In 16 weeks per semester (including assignments and examinations) 												
Recommended prerequisites:	Mathematical Statistics (Master Level)												
Module objectives/intended learning outcomes:	<p>On successful completion of this course, students should be able to:</p> <p>CO1. Explain statistical theory underlying survival analysis</p> <p>CO2. Apply certain survival methods or models appropriately given survival data and its assumptions</p> <p>CO3. Evaluate survival models given survival data and its assumptions</p> <p>CO4. Criticize methods or models in Survival Analysis</p>												
Content:	Survival data (<i>event history, duration, time-to-event data</i>). Survival random variable, their functions and properties. Type of survival data (<i>censored, truncated, interval censored</i>). Parametric distribution of survival random variable. Non-parametric methods to estimate survival, hazard and cumulative hazard function. Survival Regression models (parametric AFT and PHM). Multiplicative hazard models and the Cox Regression. Additive hazard models. Counting process method for survival data analysis. Multistate models. Frailty models. Research and Topics in Survival Analysis.												
Study and examination requirements and forms of examination:	<p>The final mark will be weighted as follows:</p> <table border="1"> <thead> <tr> <th>No</th> <th>Assessment methods (components, activities)</th> <th>Weight (percentage)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Final Examination</td> <td>35%</td> </tr> <tr> <td>2</td> <td>Mid-Term Examination</td> <td>35%</td> </tr> <tr> <td>3</td> <td>Projects/Presentation</td> <td>30%</td> </tr> </tbody> </table> <p>Final grade will be determined as follows:</p>	No	Assessment methods (components, activities)	Weight (percentage)	1	Final Examination	35%	2	Mid-Term Examination	35%	3	Projects/Presentation	30%
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1	Final Examination	35%											
2	Mid-Term Examination	35%											
3	Projects/Presentation	30%											

	Grade Criteria The initial cut-off points for grades A, B, C, and D should not be less than 80%, 65%, 50%, and 40%, respectively.
Media employed:	Board, LCD Projector, Laptop/Computer
Reading List:	1. Aalen, O.O., Borgan, O., Gjessing, H.K., 2008, Survival and Event History Analysis: A Process Point of View. Springer, Berlin. 2. Andersen, P.K., Borgan, O., Gill, R.D., Keiding, N., 1993, Statistical Models based on Counting Processes. Springer, New York

Mapping of The COs and PLOs

	PLO - 1 S3 Mat	PLO - 2 S3 Mat	PLO - 3 S3 Mat	PLO - 4 S3 Mat	PLO - 5 S3 Mat	PLO -6 S3 Mat
CO 1	X	X	X			
CO 2	X	X	X		X	
CO 3	X	X	X		X	
CO 4						

Programme Learning Outcomes (PLO) Doctoral Programme in Mathematics

PLO-1	:	Attitude: Devote to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working in the area of expertise independently.
PLO-2	:	Knowledge: Mastering philosophy of mathematics and one of the fields in mathematics (algebra, analysis, applied mathematics, statistics, computational mathematics, computational statistics).
PLO-3	:	Knowledge: Able to think logically, analytically, inductively, deductively, and structured; having the ability to manage, lead, and develop research programs independently, and able to communicate the thoughts as well as his work to the scientific community and the general public.
PLO-4	:	Skill: Creating new concepts and / or new methods (original) in the field of mathematics that are recognized nationally and internationally.
PLO-5	:	Skill: Able to apply mathematics according to their field of expertise to solve problems including those that require a multidisciplinary, cross-disciplinary, or trans-disciplinary approach.
PLO-6	:	Life Long Learning: Having lifelong learning skills and adaptive to the development of science and technology, especially in fields related to Mathematics and its applications.