BIOS6904: SURVIVAL ANALYSIS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Survival Analysis

Subject Code
BIOS - Biostatistics
Course Number
6904

Academic Unit
Biostatistics (BIOS)

College/School
College of Computing (CC)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract
This course aims to educate students about estimation procedures needed for time to event and other right-censored data. It will begin with examples of such data and then describe types of censoring and truncation, distributions relevant for time to

event data, and assumptions commonly made in conjunction with their analysis. Students will then learn about estimation techniques for univariate survival curves and common summaries of them such as medians, other quantiles, and restricted means. The course will then discuss models for multivariate situations with time to event outcomes including those with accelerated life and proportional hazards assumptions. These will begin by making parametric restrictions which are then relaxed to the nonparametric cases. Finally, frailty and other models for multivariate outcomes will be described. The R statistical software package is used throughout the course to analyze survival data examples and enable students, on completing the course, to analyze and interpret real time to event data arising from observational studies, clinical trials, and other sources.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the fundamental concepts and methods.	20	x	x	
2	Develop a solid understanding of the techniques.	20	x	x	
3	Conduct a thorough reading of the literature and know current state-of-the-art tools.	30	x	x	x
4	Apply the techniques and methods to real data applications.	30	x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures	Learning through teaching is primarily based on lectures	1, 2, 3, 4	3 hours/week
2	Assignments	Learning through take-home assignments helps students understand the key concepts and acquire the techniques	1, 2, 3, 4	After class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignments	1, 2, 3, 4	40	Help to train students with basic knowledge, concepts, and analysis techniques	Yes
2	Midterm/quizzes	1, 2, 3, 4	20	Test students' capabilities in applying the knowledge to solve relevant problems	No

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Minimum Continuous Assessment Passing Requirement (%)

40

Minimum Examination Passing Requirement (%)

35

Additional Information for ATs

Examination questions are designed to see how well students have achieved the learning objectives and acquired the requisite techniques for problem-solving.

To pass the course, students are required to obtain a minimum of 40% in continuous assessment and a minimum of 35% in the examination.

Assessment Rubrics (AR)

Assessment Task

Assignments (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Problem solving skills

Excellent

(A+, A, A-) Consistently exhibits adept comprehension of time to event data analysis principles and their practical implementation

Good

(B+, B, B-) Sufficiently applies time to event data analysis concepts to moderately complex problems

Fair

(C+, C, C-) Demonstrates a moderate understanding of time-to-event data analysis concepts and their practical application to intermediate-level problems.

Marginal

(D) Displays basic grasp of time to event data analysis concepts and their application to straightforward problems.

Failure

(F) Shows limited comprehension of time to event data analysis concepts and lacks the ability to apply them to problem-solving

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Assessment Task

Midterm/quizzes (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Exhibits a thorough grasp of time to event data analysis concepts and effectively applies them to intricate problems

Good

(B+, B, B-) Displays sufficient understanding of time to event data analysis concepts and effectively applies them to moderately complex problems

Fair

(C+, C, C-) Exhibits a moderate level of comprehension regarding time-to-event data analysis concepts and effectively applies them to intermediate-level problems.

Marginal

(D) Shows basic comprehension of time to event data analysis concepts and applies them to straightforward problems

Failure

(F) Displays limited grasp of time to event data analysis concepts and lacks the ability to apply them to problem-solving

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Assessment Task

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Consistently exhibits a deep understanding of time to event data analysis concepts and effectively applies them to complex problems

Good

(B+, B, B-) Effectively applies time to event data analysis concepts to moderately complex problems, demonstrating sufficient understanding

Fair

(C+, C, C-) Applies time-to-event data analysis concepts to intermediate-level problems with a moderate level of understanding.

Marginal

(D) Applies time to event data analysis concepts to simple problems with a basic understanding

Failure

(F) Lacks understanding of time to event data analysis concepts and cannot apply them to problem-solving

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Assessment Task

Assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Problem solving skills

Excellent

(A+, A, A-) Consistently exhibits adept comprehension of time to event data analysis principles and their practical implementation

Good

(B+, B) Sufficiently applies time to event data analysis concepts to moderately complex problems

Marginal

(B-, C+, C) Displays basic grasp of time to event data analysis concepts and their application to straightforward problems.

Failure

(F) Shows limited comprehension of time to event data analysis concepts and lacks the ability to apply them to problem-solving

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Assessment Task

Midterm/quizzes (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Exhibits a thorough grasp of time to event data analysis concepts and effectively applies them to intricate problems

Good

(B+, B) Displays sufficient understanding of time to event data analysis concepts and effectively applies them to moderately complex problems

Marginal

(B-, C+, C) Shows basic comprehension of time to event data analysis concepts and applies them to straightforward problems

Failure

(F) Displays limited grasp of time to event data analysis concepts and lacks the ability to apply them to problem-solving

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Assessment Task

Examination (for students admitted from Semester A 2022/23 to Summer Term 2024)

Criterion

Problem solving based on comprehensive understanding

Excellent

(A+, A, A-) Consistently exhibits a deep understanding of time to event data analysis concepts and effectively applies them to complex problems

Good

(B+, B) Effectively applies time to event data analysis concepts to moderately complex problems, demonstrating sufficient understanding

Marginal

(B-, C+, C) Applies time to event data analysis concepts to simple problems with a basic understanding

Failure

(F) Lacks understanding of time to event data analysis concepts and cannot apply them to problem-solving

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Part III Other Information

Keyword Syllabus

Time to event analysis, survival models, failure time models, censoring, clinical trials

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Survival Analysis: Techniques for Censored and Truncated Data, 2nd ed. (Springer) by Klein, J. and Moeschberger, M.
2	Modern Applied Statistics with S (Springer) by Venables, W.N. and Ripley, B., Ch. 13.
3	Modeling Survival Data: Extending the Cox Model (Springer) by Therneau, T.M. And Grambsch, P.M.