

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Biostatistics  
with effect from Semester A 2024/25**

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**Part I Course Overview**

<b>Course Title:</b>	<b>Statistical Inference</b>
<b>Course Code:</b>	<b>BIOS6902</b>
<b>Course Duration:</b>	<b>1 semester</b>
<b>Credit Units:</b>	<b>3 CUs</b>
<b>Level:</b>	<b>P6</b>
<b>Medium of Instruction:</b>	<b>English</b>
<b>Medium of Assessment:</b>	<b>English</b>
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	<b>Nil</b>
<b>Precursors:</b> <i>(Course Code and Title)</i>	<b>Nil</b>
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	<b>Nil</b>
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	<b>Nil</b>

## Part II Course Details

### 1. Abstract

Recommended background for this course is exposure to an introductory mathematical treatment of the fundamental principles of probability theory (e.g., as covered in BIOS5800), which provide the foundations for statistical inference. After a brief review of these principles, the course covers point estimation, including evaluation of estimators and methods of estimation, interval estimation, and hypothesis testing, including power calculations and likelihood ratio testing.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Understand the fundamental techniques of statistical inference	40%	√	√	
2.	Ability to develop and fit statistical models for applications involving biomedical and public health data	40%	√	√	√
3.	Appreciate the need for rigorous statistical inference in science	20%	√	√	√
		100%			

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.*

### 3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
Teaching	Learning through teaching based on lectures	√	√	√	3 hours/ week
Assignments	Learning through assignments allows students to perform critical problem analysis and develop hands-on skills involving statistical inference	√	√	√	

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting	Remarks
	1	2	3		
Continuous Assessment: 60%					
Assignments	√	√	√	30%	
Midterm/quizzes	√	√	√	20%	
Participation	√	√	√	10%	
Examination: 40%					
Examination (duration: 2 hours)	√	√	√	40%	
				100%	

## 5. Assessment Rubrics

*(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)*

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignments	Problem solving skills	Consistently exhibits adept comprehension of statistical inference principles and their practical implementation	Sufficiently applies statistical inference concepts to moderately complex problems	Possesses a moderate understanding of statistical inference, enabling the application of these concepts to solve intermediate-level problems.	Displays basic grasp of statistical inference concepts and their application to straightforward problems.	Shows limited comprehension of statistical inference concepts and lacks the ability to apply them to problem-solving
2. Quizzes	Problem solving based on comprehensive understanding	Reliably utilizes statistical inference concepts and methods to tackle intricate problems.	Sufficiently employs statistical inference concepts and methods to address moderately complex problems	Utilizes statistical inference concepts and methods adeptly to address problems of intermediate complexity.	Applies statistical inference concepts and methods with limited effectiveness to solve simple problems	Incapable or inept at applying statistical inference concepts and methods to problem-solving
3. Midterm Exam	Problem solving based on comprehensive understanding	Exhibits a thorough grasp of statistical inference concepts and effectively applies them to intricate problems	Displays sufficient understanding of statistical inference concepts and effectively applies them to moderately complex problems	Exhibits a moderate level of comprehension in statistical inference, adeptly applying these concepts to intermediate-level problems.	Shows basic comprehension of statistical inference concepts and applies them to simple problems	Displays limited grasp of statistical inference concepts and lacks the ability to apply them to problem-solving

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
4. Final Exam	Problem solving based on comprehensive understanding	Consistently exhibits a deep understanding of statistical inference concepts and effectively applies them to complex problems	Effectively applies statistical inference concepts to moderately complex problems, demonstrating sufficient understanding	Employs statistical inference concepts with a moderate understanding to effectively address intermediate-level problems.	Applies statistical inference concepts to simple problems with a basic understanding	Lacks understanding of statistical inference concepts and cannot apply them to problem-solving
5. Participation	Communication skills	Engages actively in class discussions, group work, and activities	Participates intermittently or passively in class discussions, group work, and activities	Participates moderately in class discussions, group projects, and activities.	Engages minimally in class discussions, group work, and activities	Infrequently engages in class discussions, group work, and activities

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignments	Problem solving skills	Consistently exhibits adept comprehension of statistical inference principles and their practical implementation	Sufficiently applies statistical inference concepts to moderately complex problems	Displays basic grasp of statistical inference concepts and their application to straightforward problems.	Shows limited comprehension of statistical inference concepts and lacks the ability to apply them to problem-solving
2. Quizzes	Problem solving based on comprehensive understanding	Reliably utilizes statistical inference concepts and methods to tackle intricate problems.	Sufficiently employs statistical inference concepts and methods to address moderately complex problems	Applies statistical inference concepts and methods with limited effectiveness to solve simple problems	Incapable or inept at applying statistical inference concepts and methods to problem-solving
3. Midterm Exam	Problem solving based on comprehensive understanding	Exhibits a thorough grasp of statistical inference concepts and effectively applies them to intricate problems	Displays sufficient understanding of statistical inference concepts and effectively applies them to moderately complex problems	Shows basic comprehension of statistical inference concepts and applies them to straightforward problems	Displays limited grasp of statistical inference concepts and lacks the ability to apply them to problem-solving
4. Final Exam	Problem solving based on comprehensive understanding	Consistently exhibits a deep understanding of statistical inference concepts and effectively applies them to complex problems	Effectively applies statistical inference concepts to moderately complex problems, demonstrating sufficient understanding	Applies statistical inference concepts to simple problems with a basic understanding	Lacks understanding of statistical inference concepts and cannot apply them to problem-solving
5. Participation	Communication skills	Engages actively in class discussions, group work, and activities	Participates intermittently or passively in class discussions, group work, and activities	Engages minimally in class discussions, group work, and activities	Infrequently engages in class discussions, group work, and activities

### Part III Other Information (more details can be provided separately in the teaching plan)

#### 1. Keyword Syllabus

*(An indication of the key topics of the course.)*

Point estimation, interval estimation, hypothesis testing, power calculations, likelihood ratio tests.

#### 2. Reading List

##### 2.1 Compulsory Readings

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

1.	Statistical Inference by George Casella and Roger L. Berger (Cengage Learning; 2nd edition)
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##### 2.2 Additional Readings

*(Additional references for students to learn to expand their knowledge about the subject.)*

1.	All of Statistics: A Concise Course in Statistical Inference (Springer Texts in Statistics) by Larry Wasserman
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