

**Form (H)**  
**Short course description**

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| Course title: <b>Decision theory</b>   | Course number and code: <b>STAT 322</b> |
| Previous course requirement: STAT 215  | Language of the course: A               |
| Course level: Compulsory for Statistic in 5 <sup>th</sup> level/ year 3, Elective for OR | Effective hours: 2 (2+0+0)              |

**Course description**

No data decision: Actions Space, State of nature space, loss function. Pure Min Max and Bayes actions. Mixed Min Max and Bayes actions. Data decision problem (Decision Rule). Pure Min Max and Bayes Decision Rules. Value of the data in pure Min Max and Bayes solutions. Mixed Min Max and Bayes Decision Rules. Value of the data in Mixed Min Max and Bayes solutions. Estimation as a decision problem. Bayes Estimation as a decision problem. Testing hypothesis as a decision problem

**Course objectives**

- Training the student to make the statistical decision under uncertainty.
- Training the student on some statistical decision methods with or without data.
- Consider statistical inference (estimation and hypothesis testing) from the standpoint of statistical decision making.

**Learning outcomes (understanding, knowledge, and intellectual and scientific skills)**  
After studying this course, the student is expected to be able to:

- Understand the elements of the decision problem under investigation.
- Use mathematics for making decision.
- Make the suitable type of decision and the analysis among various techniques in the field under uncertainty.
- Choosing the appropriate statistical methods for a particular application.
- Formulate significant research questions, use appropriate statistical decision method, and analyze and interpret the results.
- Read, evaluate, and interpret numerical, statistical information.
- Looking to any subject from different viewpoints.
- Comparing things should always be performed.
- Reaching the appropriate conclusions from the used analysis

**Textbook adopted and supporting references**

| Title of the book                          | Author's name       | Publisher's name          | Date of publication |
|--|---------------------|---------------------------|---------------------|
| The Element of Decision Theory             | B. W. Lindgren      | Macmillan, New York       | 1971                |
| Decision Theory, Principles and Approaches | Giovanni Parmigiani | John Wiley & Sons         | 2009                |
| مبادئ الاستدلال الإحصائي                   | جلال الصياد         | دار المريخ للنشر - الرياض | 1993                |