Department of Artificial Intelligence and Machine Learning
YZZ205 - Probability and Statistics
Midterm Exam

3rd Nov 2026, 11:00-12:30

Full Name : _____ Student ID: _____

Grade Table (for Lecturer use only)

Question	Points	Score
1	30	
2	20	
3	10	
4	20	
5	20	
Total:	100	

Instructions for Midterm Exam

Welcome to the midterm exam of YZZ205 - Probability and Statistics and good luck! Please read the following rules and confirm by signing that you have read and understood the rules before you receive your exam:

1. The midterm exam shall be conducted between 11:00 and 12:30. Exam duration is 90 minutes. Students must finalise the exam by delivering it before 12:30. Students are not allowed to leave the exam in the first 30 minutes.

2. Student ID cards shall visibly be on the edge of desks till the end of the exam. Students without the student ID cards or Turkish identity cards shall not be participated into the exam.

3. This is a closed-book exam which means that students are not allowed to take notes, books, or any other reference material into the exam. Throughout the exam, students shall not possess mobile phones and electronic devices that are capable of storing, receiving, or transmitting information or electronic signals, such as computerised watches.

4. Students are not allowed to take a glance at the exam questions until told to do so. Students shall not communicate with any other student under any circumstances during the exam period. A student, who cheats, tries to cheat during the exam, or is identified to be cheating after investigating exam documents, is given 0 (zero) for that exam and a disciplinary investigation is opened against the student.

5. All numerical values in the exam shall be calculated according to two decimal digits. Otherwise, there will be a penalty.

6. An incorrect answer to a question is awarded no marks with no consideration of any partial credit. Therefore, no partial credit will be given.

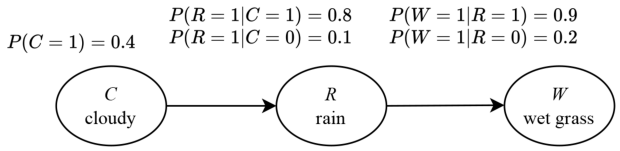
In recognition of and in the spirit of the above rules, I certify that I will neither give nor receive unpermitted aid on this examination.

Signature: _____

Department of Artificial Intelligence and Machine Learning
YZZ205 - Probability and Statistics
Midterm Exam

3rd Nov 2026, 11:00-12:30

1. Assume that I have a house with a lawn, and and every day when I leave for work I check if the weather is cloudy, and when it is, there is a high chance that it rains during the day. If it rains, there is a high probability that I find my grass wet when I return home in the evening. The graphical model is illustrated below.



   Calculate the following probabilities
   (a) **(10 points)** It rains on any day.
   (b) **(10 points)** The grass is wet if we know that the weather was not cloudy that morning.
   (c) **(10 points)** The weather was not cloudy if I observe the grass is wet.
2. **(20 points)** Define statistic, random sample, population, statistical inference, and estimation.
3. **(10 points)** List the measures of central tendency and spread.
4. **(20 points)** Calculate the maximum likelihood estimators for the following random sample:

   $$\{6.76, 5.40, 5.98, 7.24, 6.87, 4.02, 5.95, 4.85, 4.90\}$$

5. **(20 points)** Show that the sample mean and median minimise the empirical MSE and MAE, respectively.