




MT2002 Statistical Modeling

Assignment No: 01	CLO: 01
	Semester: Spring 2023
Due date: 15-Feb-2023	Marks: 100

Instructions:

1. **Plagiarized work will result in zero marks.**
2. **No retake or late submission will be accepted.**
3. Attach complete code, results, and screenshot for questions that require programming solution. Programs/codes should not be handwritten.
4. Questions that show the icon  require partial or complete solution using the approved programming tool.
5. The assignment is to be submitted in softcopy as well as in hardcopy.
6. The softcopy should be a single PDF file of your complete assignment including programming and non-programming questions.
7. The PDF file should be according to the following **format: id_section_A1** e.g. i22123456_A_A1. A1 in the end denotes Assignment 1.
8. The images of the by-hand solution should be properly scanned. You can use any mobile application such as Cam Scanner or Adobe Scan for scanning. Each of these applications allows you to export pdf or image files which you can use to combine with your programming solutions. Do not attach direct images from the camera application of your mobile phone, or screenshots.

Questions:

Question 1 (50 marks):

From domain knowledge you have that a given parameter cannot be negative, and has a mean that is roughly between 3 and 10 units, and a standard deviation of around 2. Determine two prior distribution that satisfy these constraints using Python. This may require trial and error by drawing samples and verifying these criteria have been met using both plots and numerical summaries.

Question 2 (50 marks):

You planted 12 seedlings and 3 germinate. Let us call θ the probability that a seedling germinates. Assuming Beta(1, 1) prior distribution for θ . Use SciPy to compute

- a) the equal-tailed and highest density 94% posterior intervals.
- b) the posterior predictive probability that at least one seedling will germinate if you plant another 12 seedlings.