



# Statistical Inference

## FPM 2026-27

Subho Majumdar,  
Assistant Professor, Decision Sciences  
IIM Bangalore

Session 1  
**09/09/2026**

# Schedule

| Session | Time           | Day | Date          |
|---------|----------------|-----|---------------|
| 1       | 02:00-03:30    | Wed | 09-Sep        |
| 2       | 02:00-03:30    | Thu | 10-Sep        |
| 3       | 02:00-03:30    | Thu | 17-Sep        |
| 4       | 02:00-03:30    | Wed | 23-Sep        |
| 5       | 02:00-03:30    | Thu | 24-Sep        |
| 6       | 02:00-03:30    | Wed | 30-Sep        |
| 7       | 02:00-03:30    | Thu | 01-Oct        |
| 8       | 02:00-03:30    | Wed | 07-Oct        |
| 9       | 02:00-03:30    | Thu | 08-Oct        |
| 10      | 02:00-03:30    | Wed | 14-Oct        |
| 11      | 02:00-03:30    | Thu | 15-Oct        |
|         | October 20-24  |     | Midterm week  |
| 12      | 02:00-03:30    | Wed | 28-Oct        |
| 13      | 02:00-03:30    | Thu | 29-Oct        |
| 14      | 02:00-03:30    | Wed | 04-Nov        |
| 15      | 02:00-03:30    | Thu | 05-Nov        |
| 16      | 02:00-03:30    | Wed | 11-Nov        |
| 17      | 02:00-03:30    | Thu | 12-Nov        |
| 18      | 02:00-03:30    | Wed | 18-Nov        |
| 19      | 02:00-03:30    | Thu | 19-Nov        |
| 20      | 02:00-03:30    | Wed | 25-Nov        |
|         | December 07-11 |     | End Term Week |

## Notes

- No class on Wed, 16 Sep
- No classes on Midterm week
- Last class on Wed, 25 Nov

# Evaluation components

- **Assignments (20%)**
  - 4 assignments, hard-copy submission
  - Open-everything
- **Paper reading + presentation (20%)**
  - 6 groups of 2 that I'll assign randomly
  - Each team picks a paper, reads it, then presents
  - Graded on clarity of presentation (12 min + 3 min Q&A). Both team members should talk
- **Term project + presentation (30%)**
  - 4 groups of 3 that I'll assign randomly
  - I'll give broad problem statements and datasets
  - Project reports to be submitted (hard or soft copy)
  - Graded on statistical rigour in report and clarity of presentation (15 min + 5 min Q&A)
- **Endterm (30%)**
  - Pen-and-paper
  - Open-note, closed-everything-else (including AI)

# Timeline

| Session | Time           | Day           | Date   | Event                                |
|---------|----------------|---------------|--------|--------------------------------------|
| 1       | 02:00-03:30    | Wed           | 09-Sep |                                      |
| 2       | 02:00-03:30    | Thu           | 10-Sep |                                      |
| 3       | 02:00-03:30    | Thu           | 17-Sep |                                      |
| 4       | 02:00-03:30    | Wed           | 23-Sep | Reading paper choices due            |
| 5       | 02:00-03:30    | Thu           | 24-Sep | Assignment 1                         |
| 6       | 02:00-03:30    | Wed           | 30-Sep |                                      |
| 7       | 02:00-03:30    | Thu           | 01-Oct | Term projects given                  |
| 8       | 02:00-03:30    | Wed           | 07-Oct |                                      |
| 9       | 02:00-03:30    | Thu           | 08-Oct | Assignment 2                         |
| 10      | 02:00-03:30    | Wed           | 14-Oct |                                      |
| 11      | 02:00-03:30    | Thu           | 15-Oct | Paper-reading presentation           |
|         | October 20-24  | Midterm week  |        |                                      |
|         | 02:00-03:30    | Wed           | 28-Oct |                                      |
| 13      | 02:00-03:30    | Thu           | 29-Oct |                                      |
| 14      | 02:00-03:30    | Wed           | 04-Nov |                                      |
| 15      | 02:00-03:30    | Thu           | 05-Nov | Assignment 3                         |
| 16      | 02:00-03:30    | Wed           | 11-Nov |                                      |
| 17      | 02:00-03:30    | Thu           | 12-Nov |                                      |
| 18      | 02:00-03:30    | Wed           | 18-Nov |                                      |
| 19      | 02:00-03:30    | Thu           | 19-Nov | Assignment 4                         |
| 20      | 02:00-03:30    | Wed           | 25-Nov | Term project submission+presentation |
|         | December 07-11 | End Term Week |        | Pen-and-paper endterm                |

Assignments are given out on Thursdays, due start of class the following Wednesday

# Course outline

| Session | Material covered                                                                                                                                                  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | Distributions derived from the Normal distribution: Chi-Squared, t, and F Distributions. Distribution of the Sample Mean and Sample Variance.                     |
| 2-3     | General concepts: unbiasedness, consistency, order statistics, quantiles, confidence intervals                                                                    |
| 4-5     | Theory of estimation: parameter estimates, Method of Moments, Maximum Likelihood Estimation, efficiency and the Cramer-Rao Lower Bound, sufficiency, completeness |
| 6-7     | Hypothesis testing fundamentals: the Neyman-Pearson paradigm; MP, UMP and UMPU tests; Generalized Likelihood Ratio Tests                                          |
| 8-9     | One-sample and Two-sample tests: inference of mean, proportion and variance; comparing independent and paired samples                                             |
| 10      | Analysis of Variance (ANOVA): one-way and two-way ANOVA                                                                                                           |
| 12-13   | Categorical data analysis: fisher's exact test, chi-square test of homogeneity/independence, goodness of fit tests                                                |
| 14-15   | Linear regression: assumptions, inference, and diagnostics                                                                                                        |
| 16      | Experimental Design                                                                                                                                               |
| 17      | Bayesian hypothesis testing                                                                                                                                       |
| 18-19   | Modern inferential tools: multiple testing, conformal prediction, inference in ML/AI                                                                              |