

## **AYTS5001 – Week 11 Lab (Graded, 6 marks)**

Statistical Analysis with Python (Malazan-Themed)

Duration: 2 hours

Marks: 6

### **TASK 1 — Descriptive Statistics (1 mark)**

Compute:

- Mean Power\_Level
- Median Morale
- Std Dev of Combat\_Skill
- Army with highest average Magic\_Aptitude

Provide a short interpretation.

### **TASK 2 — Distribution Analysis (1 mark)**

Plot histograms + KDE for Power\_Level, Age, Morale.

Describe skew/symmetry/bimodality + Malazan explanation.

### **TASK 3 — Correlation & Heatmap (1 mark)**

Compute correlation matrix + heatmap.

Identify highest positive correlation, negative correlations, and explain in-world.

### **TASK 4 — Hypothesis Testing (t-test) (1.5 marks)**

Compare Morale between mages ( $\text{Magic\_Aptitude} > 50$ ) and non-mages.

Report means, t-statistic, p-value, interpretation.

### **TASK 5 — One-Way ANOVA (1.5 marks)**

ANOVA on Power\_Level across armies.

Report F-statistic, p-value, significance, interpretation.

### **TASK 6 — Bootstrap CI (1 mark)**

Compute 95% CI for Magic\_Aptitude using bootstrapping.

Interpret in 2–3 sentences.