Examples of Scientific Method Exam Question

Lecture 1 - Intro

What is:

- The scientific method?
- Principles of SciMeth?
- Types of inference?
- Naturalistic fallacy?
- Citation analysis?
- The types of journals?

Why do we cite?

How do you assess the quality of an article?

How do you assess the quality of an Author?

What are the drawbacks of CA?

Lecture 3 – Hypothesis, Experimentation

1. What is a hypothesis?
2. What is considered a good hypothesis?
3. What is a theory? What is considered a good theory?
4. Meaning of falsifiable? What makes something falsifiable?
5. What model do we typically use in ScMth?
6. Types of empirical studies?
7. What is considered a good experimental setup?
8. Typical experimental design procedure?
9. Experimental design approaches (choosing factors).

Lecture 4 – Basic Stat

1. Define Statistics, sample, parameter.
2. Types of Statistics?
3. Different central measures, and dispersion measures?
4. What is a confidence interval? What does it tell us?
5. What is the Central Limit Theorem?
6. What is regression?

Lecture 5 – Comparative stat

1. When do you use 1-sample T-test? What assumptions do we make for this?
2. When do you use 2-sample(pairwise) independent T-test? What assumptions do we make for this?
3. When do you use 2-sample(pairwise) dependent T-test? What assumptions do we make for this?
4. How do you check if a sample comes from a population with a specific variance?
5. How do you check if 2 samples have the same variance? Usage example?
6. How to check for normality?
7. Types of errors?

8. Different approaches in hypothesis testing?
9. What is ANOVA? Assumptions?
10. Why not use paired T-tests instead of ANOVA?
11. Alternatives to ANOVA?
12. What is 2-way ANOVA? When do we use it?
13. What is repeated measures ANOVA? When do we use it? Assumptions?
14. When do you use non-parametric tests?

Lecture 6 – Experimental design

1. Principles of experimental design?
2. Difference between repetition and replication with examples?
3. What is randomized complete block design?
4. How do we perform statistical analysis in an RCBD?
5. Define bias. Types?
6. Factors affecting bias?

Lecture 7 – Writing

1. Why and when do you publish articles?
2. Types of peer-review process?
3. Who qualifies as an author?
4. What is plagiarism?
5. A good conclusion is?
   Neither too conclusive or too speculative

Lecture 8 – Guest lectures