

COURSE CODE (CREDITS): 20MSIBT216 (3)

MAX. MARKS: 25

COURSE NAME: Research Methodology and Scientific Communication Skills

COURSE INSTRUCTORS: Dr. Gopal Singh Bisht

MAX. TIME: 1 Hour 30 Min

*Note: All questions are compulsory. Marks are indicated against each question in square brackets. This paper contains two pages.*

Q1. Carefully read following case and Answer questions below.

Two young faculty members—Marie, an epidemiologist in the medical school, and Yuan, a statistician in the mathematics department—have published two well-received papers about the spread of infections in populations. As Yuan is working on the simulation he has created to model infections, he realizes that a coding error has led to incorrect results that were published in the two papers. He sees, with great relief, that correcting the error does not change the average time it takes for an infection to spread. But the correct model exhibits greater uncertainty in its results, making predictions about the spread of an infection less definite. When he discusses the problem with Marie, she argues against sending corrections to the journals where the two earlier articles were published. “Both papers will be seen as suspect if we do that, and the changes don’t affect the main conclusions in the papers anyway,” she says. Their next paper will contain results based on the corrected model, and Yuan can post the corrected model on his Web page.

- a) What obligations do the authors owe their professional colleagues to correct the published record? [2]
- b) How should their decisions be affected by how the model is being used by others? [2]
- c) What other options exist beyond publishing a formal correction? [1]

Q2. Outline a strategy for planning and implementing a comprehensive literature search. Describe how you can keep track of scientific literature using alerting services and RSS feeds. Substantiate that documentation of your literature search is important in research process. [5]

Q3. Answer the following questions. (Answer briefly)

- a) What are the some potential problems with researcher submitting a paper on preliminary findings and not performing sufficient corroboratory experiments? [2]
- b) Why it is important to keep track of retracted publications? Explain the importance of maintaining personal reference database. [2]
- c) How I-10 index and h- index of a scientist is calculated? Explain by taking suitable example. [2]
- d) Provide a basic overview of copyright and how to use copyright material in your work appropriately. [2]
- e) Explain fabrication and falsification by taking suitable example. [2]
- f) What is impact factor of research journal how it is calculated? Does impact factor is true criterion to check quality of research paper? Explain. [2]

Q4. Carefully read following case and Answer questions below.

Sandra was excited about being accepted as a graduate student in the laboratory of Dr. Frederick, a leading scholar in her field, and she embarked on her assigned research project eagerly. But after a few months she began to have misgivings. Though part of Dr. Frederick's work was supported by federal grants, the project on which she was working was totally supported by a grant from a single company. She had asked Dr. Frederick about this before coming to his lab, and he had assured her that he did not think that the company's support would conflict with her education. But the more Sandra worked on the project, the more it seemed skewed toward questions important to the company. For instance, there were so many experiments she needed to carry out for the company's research that she was unable to explore some of the interesting basic questions raised by her work or to develop her own ideas in other areas. Although she was learning a lot, she worried that her ability to publish her work would be limited and that she would not have a coherent dissertation. Also, she had heard from some of the other graduate students doing company-sponsored work that they had signed confidentiality statements agreeing not to discuss their work with others, which made it difficult to get advice. Dr. Frederick and the company's researchers were very excited about her results, but she wondered whether the situation was the best for her.

- a) Has Dr. Frederick done anything wrong in giving Sandra this assignment? [2]
- b) What potential conflicts in terms of data collection, data interpretation, and publishing might Sandra encounter as she continues with her research? [2]