

## Assignment-1 – Research Methodology

Total Marks: 10

Deadline: 22-09-2025

Mode of Submission: Handwritten hard copy on A4 sheets

Type: Individual Work

Faculty: Dr. Gokulakrishnan S

Department of Computer Science and Engineering

### Assignment Question (10 Marks)

#### Q1. (Analyze–Evaluate–Create, 10 Marks)

You are required to prepare a **Research Study Outline** in the field of **Computing/Information Technology** (choose any area such as Artificial Intelligence, Cybersecurity, Cloud Computing, Internet of Things, or Software Engineering).

Your outline should include the following sections:

#### 1. Introduction to Research Problem (2 Marks)

- Clearly define the problem you want to study.
- Explain why this problem is important.
- Conduct a **research gap analysis** (identify what has already been studied and what is missing).

#### 2. Research Objectives & Hypothesis (2 Marks)

- Write at least **two clear objectives** for your research.
- Formulate a **testable hypothesis** (state whether it is null, alternative, directional, or non-directional).

#### 3. Research Design Justification (2 Marks)

- Select a research design (Exploratory, Experimental, or Simulation-based).
- Justify why your chosen design is the most suitable.

#### 4. Data Sources & Collection Strategy (2 Marks)

- Mention whether you will use **primary data** (e.g., surveys, experiments) or **secondary data** (e.g., existing datasets, published reports).
- Explain how you plan to collect and use this data.

#### 5. Ethics & Academic Integrity (2 Marks)

- Discuss at least **two ethical issues** (such as plagiarism, privacy, bias, or data misuse).
- Suggest **practical steps** to maintain ethics and academic integrity in your research.

## Detailed Instructions

### 1. Submission Format

- Write your answers in a **neat handwritten format** on **A4 sheets**.
- Use proper headings, sub-headings, and numbering for each section.
- Attach a **cover page** with your **Name, Roll Number, Course, and Date of Submission**.

### 2. Word Limit

- Write between **1000–1200 words** (approximately 6–8 pages).

### 3. Referencing

- You may refer to books, research papers, or online resources.
- Do not copy-paste; write in **your own words**.
- Mention references at the end (APA/MLA format preferred).

### 4. Work Policy

- This is an **individual assignment**.
- Do not copy from your classmates. **Copied work will be rejected**.
- Use your **original ideas and creativity**.

### 5. Deadline

- Last date for submission is **16th September 2025**.
- Late submissions will not be accepted.

## Expected Structure of Submission

### 1. Cover Page

- Name, Roll Number, Course, Assignment Title, Date - **Sheet Attached**

### 2. Main Content (1000–1200 words)

- Section 1: Introduction to Research Problem
- Section 2: Research Objectives & Hypothesis
- Section 3: Research Design Justification
- Section 4: Data Sources & Collection Strategy
- Section 5: Ethics & Academic Integrity

### 3. References (at the end)

- Cite books, research papers, and online articles used.

## Sample Answer Framework – Research Study Outline

### Topic Chosen (Example): Cybersecurity in Online Banking Systems

#### 1. Introduction to Research Problem (2 Marks)

##### Problem Definition:

Online banking has become an essential part of modern financial services, but it is also highly vulnerable to cyberattacks such as phishing, malware, identity theft, and ransomware. Customers face risks of losing sensitive financial data and money, while banks face legal issues and reputational damage.

##### Importance:

The significance of this problem lies in the fact that financial institutions are responsible for safeguarding the wealth and personal details of millions of users. If online banking security fails, it can lead to large-scale financial fraud, loss of customer trust, and damage to the credibility of the banking system.

##### Research Gap Analysis:

- Most existing studies focus on **technical measures** like encryption, firewalls, and biometric authentication.
- However, there is **less focus on the human factor**, such as user awareness, safe online behavior, and how customers respond to suspicious activities.
- Therefore, the research gap lies in **exploring how user awareness and human-centered security measures can reduce cyberattacks in online banking**.

#### 2. Research Objectives & Hypothesis (2 Marks)

##### Research Objectives:

1. To investigate whether educating banking users about common cyber threats (such as phishing and password management) reduces the chances of successful attacks.
2. To evaluate the effectiveness of multi-factor authentication in preventing unauthorized access to banking accounts.

##### Hypothesis:

- **Type:** Alternative and Directional.
- **Statement:** *“Enhancing customer awareness and implementing stronger authentication mechanisms will significantly reduce cyber fraud in online banking.”*
- This hypothesis is testable because it can be measured through experiments and user behavior studies.

### 3. Research Design Justification (2 Marks)

#### Chosen Research Design: Experimental Research

##### Justification:

- An experimental design is suitable because the research seeks to **test the effect of awareness training and authentication methods** on cybersecurity outcomes.
- For example, two groups of banking users could be created:
  - **Group A:** Receives awareness training and uses multi-factor authentication.
  - **Group B (control group):** Uses only standard password-based login, without training.
- By comparing outcomes, it will be possible to determine if interventions lead to fewer successful cyberattacks.

This approach allows measurable, evidence-based conclusions, which makes it appropriate for this type of research problem.

### 4. Data Sources & Collection Strategy (2 Marks)

##### Data Sources:

- **Primary Data:**
  - Surveys of online banking users about their knowledge of cyber threats.
  - Controlled experiments where participants attempt to detect phishing emails or secure their accounts after training.
- **Secondary Data:**
  - Reports from cybersecurity organizations like CERT (Computer Emergency Response Team).
  - Case studies from banks that have adopted multi-factor authentication.

##### Collection Strategy:

- **Surveys:** Design a questionnaire for at least 200 banking customers to measure their cybersecurity awareness.
- **Experiments:** Simulate phishing attempts and record how many participants in trained vs. untrained groups detect the attack.
- **Secondary Data Analysis:** Review existing financial reports to compare fraud cases before and after banks implemented new security measures.

## 5. Ethics & Academic Integrity (2 Marks)

### Ethical Concerns:

1. **Privacy:** Banking data is highly sensitive. The study must ensure that no personal account details or confidential financial information are collected.
2. **Informed Consent:** Participants should be informed about the study's purpose, and their consent should be taken before collecting any survey or experimental data.

### Academic Integrity Measures:

- Avoid plagiarism by paraphrasing ideas from sources and providing proper references in APA/MLA style.
- Report findings honestly, even if they do not support the hypothesis. Fabrication or falsification of data will be strictly avoided.
- Respect intellectual property rights of authors when using published research.



Department of Computer Science and Engineering

Assignment-1 – Research Methodology

Student Name:

USN:

Semester:

Section:

Submission Date:

Marking Rubric (10 Marks)

Criteria	Excellent (Full Marks)	Good	Fair	Poor	Marks
1. Introduction & Research Gap (2 Marks)	Problem is <b>clearly defined</b> , importance explained with <b>real-world context</b> , and gap is <b>logically identified</b> .	Problem is clear but gap analysis is <b>partial</b> .	Problem vague, little mention of importance or gap.	No clear problem statement or gap.	/2
2. Objectives & Hypothesis (2 Marks)	At least <b>2 measurable objectives</b> ; Hypothesis is <b>clear, testable, and type identified</b> .	Objectives present but not fully measurable; Hypothesis lacks clarity.	One vague objective; Hypothesis generic.	No objectives or hypothesis.	/2
3. Research Design (2 Marks)	Design is <b>appropriate, well-justified with examples</b> .	Design chosen but justification is <b>basic</b> .	Design mentioned but <b>not justified</b> .	No design or irrelevant design.	/2
4. Data Sources & Collection (2 Marks)	Clear distinction between <b>primary &amp; secondary data</b> , detailed collection strategy.	Data sources identified but collection strategy <b>weak</b> .	Only one source mentioned; little detail.	No sources or strategy.	/2
5. Ethics & Integrity (2 Marks)	At least <b>two ethical issues</b> explained with <b>practical solutions</b> ; strong integrity measures.	One ethical issue or vague solutions.	Issues listed but not explained.	No mention of ethics/integrity.	/2
				TOTAL	/10

Signature - Student

Signature – Faculty