

Research Methodology – Group Assignment

Drafting a Mini Research Paper (40 Marks)

Objective

To apply research methodology principles and practice academic writing skills by preparing an 8–10 page research paper on a chosen computing-related topic, demonstrating team collaboration, academic integrity, and professional writing standards.

1. Group Formation & Topic Selection

- Group Size: 3–4 members
- Topic Source: Select from the list provided by the faculty.
- Deadline for Topic Selection: Within 3 days of assignment announcement.
- Faculty Allocation: If no group is formed or no topic is selected within the deadline, a group/topic will be allotted by the faculty.
- No Changes: Once allotted, the topic cannot be changed.

Team To-Do:

1. Form your group and share member details (name, roll number, email) with the faculty.
 2. Finalize a topic from the faculty-provided list and get it approved.
 3. Assign roles within the team for literature review, methodology, results & discussion, formatting, and citations.
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2. Literature Review

- Sources: 7–10 scholarly references from Google Scholar, IEEE Xplore, or Scopus only.
- Content: Summarize prior work in your own words, identify research gaps, and justify your study.
- Plagiarism Threshold: ≤15% similarity.

Team To-Do:

1. Divide the reference collection task among members.
 2. Create a summary table with columns: Author, Year, Methodology, Findings, Gaps.
 3. Integrate summaries into a cohesive narrative rather than disconnected points.
 4. Insert in-text IEEE citations immediately while writing to avoid missing references later.
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3. Paper Structure & Formatting

Your paper must be 8–10 pages (excluding references) in IEEE or Springer format. The following sections are mandatory:

Section	Weightage	What to Include
Abstract	4 Marks	150–200 words summarizing the problem, research approach, and key findings.
Introduction	4 Marks	Background, motivation, problem statement, research objectives, and scope.
Methodology	4 Marks	Detailed step-by-step approach, algorithms, tools, datasets, experimental setup.
Results & Discussion	4 Marks	Findings, comparisons with existing work, interpretation, and visuals (charts, graphs, tables).
Conclusion & Future Work	4 Marks	Summary of contributions, identified limitations, and possible future research directions.
Formatting & Presentation	4 Marks	Strict adherence to IEEE/Springer formatting guidelines, professional layout, clarity, and figure/table alignment.

Team To-Do:

1. Download and use the official IEEE or Springer Word template provided by the faculty.
2. Assign each section to different team members for drafting.
3. Use figures, diagrams, and tables where relevant for better clarity.
4. Conduct a joint review session to unify writing style before merging.

4. Academic Integrity & Citations

- Plagiarism Threshold: $\leq 15\%$ (Turnitin official check).
- Citation Style: IEEE numbered in-text citations and reference list.
- Reference Tools: Mendeley, Zotero, or EndNote recommended.

Team To-Do:

1. Email the faculty requesting a Turnitin plagiarism check before submission.
2. Revise flagged areas by paraphrasing and proper citation.
3. Ensure all figures, tables, and ideas from external sources are credited.

5. Submission Package

- Deadline: November 10, 2025 (strict)
- Late Penalty: 50% of obtained marks will be deducted for late submissions.

Required Files:

1. Final research paper (.docx) in IEEE or Springer format.
 2. Plagiarism report (PDF or screenshot).
 3. Work distribution document (with names, assigned sections, and signatures).
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6. Recommended Workflow

Week 1: Group formation, topic approval, and role assignment.

Week 2: Literature collection and writing the literature review.

Week 3: Draft methodology, conduct experiments/analysis, prepare results.

Week 4: Merge sections, proofread, format according to IEEE/Springer guidelines.

Week 5: Plagiarism check, final revisions, prepare submission package.

7. Evaluation Criteria (Total = 40 Marks)

Criteria	Marks
Literature Review Quality	7
Abstract	3
Introduction	3
Methodology	3
Results & Discussion	3
Conclusion & Future Work	3
Formatting & Presentation	3
Academic Integrity & Citations	7
PPT Presentation	5
Total	40

Specific, Research-Ready Topics

1. Designing an explainable AI model for early-stage breast cancer detection using SHAP and mammogram image datasets. *(AI & ML)*
2. Sentiment analysis of Twitter data on India's Union Budget using RoBERTa NLP model. *(Data Science)*
3. AI-powered network intrusion detection system using the CICIDS 2017 dataset. *(Cybersecurity)*
4. Deploying an IoT-based air quality monitoring network with MQ-135 sensors and ThingSpeak cloud analytics in Bengaluru. *(IoT)*
5. AI-driven cloud resource allocation optimization using reinforcement learning on Kubernetes clusters. *(Cloud Computing)*
6. Decentralized identity verification system for job applicants using Ethereum smart contracts. *(Blockchain)*
7. Object detection for pedestrian safety in autonomous vehicles using YOLOv8 on KITTI dataset. *(Computer Vision)*
8. Neural machine translation for Kannada-English using Transformer models. *(NLP)*
9. VR-based collaborative whiteboard for remote education using Unity. *(HCI)*
10. Implementing scaled Agile framework in a distributed software development team. *(Software Engineering)*
11. Performance benchmarking of 5G NR vs LTE networks in urban Bengaluru using network simulation tools. *(Networking)*
12. AI-driven navigation of autonomous underwater vehicles using sonar mapping data. *(Robotics)*
13. Ultra-low-power wearable heart rate monitoring device using ARM Cortex-M microcontroller. *(Embedded Systems)*
14. VR-based English language learning environment for primary school children. *(AR/VR)*
15. Blockchain-secured chain-of-custody tracking for digital forensic evidence. *(Digital Forensics)*
16. Protein 3D structure prediction using AlphaFold model integration. *(Bioinformatics)*
17. IoT-based smart irrigation system for reducing agricultural water usage. *(Green Computing)*
18. Quantum cryptographic key exchange simulation using BB84 protocol. *(Quantum Computing)*
19. VR-based chemistry lab simulation for high school students. *(EdTech)*
20. Edge AI system for real-time wildlife poaching detection using camera traps. *(Emerging Tech)*
21. IoT-enabled wearable glucose monitoring system with Bluetooth integration. *(Digital Health)*
22. Computer vision for tracking space debris from ground-based telescopes. *(Space Tech)*
23. IoT-based dynamic garbage collection route optimization. *(Smart Cities)*
24. LIDAR-based navigation for autonomous vehicles in urban environments. *(Automotive)*

25. Blockchain-enabled fraud detection for online transactions. (*FinTech*)