

ACFA7004 — Research Methods and Professional Development

Activity 1: Building Your Research Proposal (Assessment Component 1 — 70%)

Purpose of this activity: This activity breaks the Research Proposal (4,000 words) into the same sections used for marking. Work through each section in order. Answer every prompt question fully and in your own words — your answers are the raw material for your report, not a substitute for writing it. Once you have completed all sections, assemble your answers into a single, well-structured Word document, edit it for flow and academic tone, add your reference list, and upload:

1. The completed **Word document** (Research Proposal)
2. The completed **Ethics Form** (Moodle submission — no marks attached, but a missing form fails the assessment)

Deliverable format reminder: 4,000 words (+/-10%), IEEE referencing throughout, submitted via Turnitin by **14 August 2026, 2PM**.

Suggested word counts are a *guide only*, weighted to the marks available for each section — adjust as your topic requires, provided the overall 4,000-word target is met.

SECTION 1: Introduction (35% of overall mark)

1.1 Context and Background — 10% [~400 words]

Instructions: Set the scene for a reader who is intelligent but not a specialist in your specific sub-topic. Establish the broader field (e.g. cyber security, digital forensics, threat intelligence, incident response, malware analysis, cloud security), then narrow to your specific area, citing recent (last 5 years) literature throughout.

Questions to answer:

1. What is the broad field or domain your research sits within, and why does it matter today?
2. What are the 3–4 most important recent developments, trends, or technologies in this specific area (cite sources)?
3. What real-world events, incidents, statistics, or industry/government reports motivate why this area deserves attention right now?
4. How does your specific topic fit within this broader context — what is the funnel from "field" to "your focus"?

1.2 Research Problem — 7% [~280 words]

Instructions: State the problem precisely — this is not the same as the topic. A topic is an area; a problem is a specific, unresolved issue, gap, weakness, or inefficiency within it, supported by literature.

Questions to answer: 5. In one or two sentences, what is the specific problem your research addresses? (Write this as a clear problem statement.) 6. What limitations, inefficiencies, or gaps exist in current approaches, tools, or research addressing this problem? Cite at least 3 sources that demonstrate the gap. 7. Why is this problem significant — what happens if it remains unsolved (technically, organisationally, or societally)? 8. Have other researchers attempted to solve this problem? If so, what did they miss or fail to fully address?

1.3 Research Aim and Objectives — 10% [~400 words]

Instructions: Your aim is a single, high-level statement of what the research will achieve. Your objectives break the aim into concrete steps. **Every objective must be SMART:** Specific, Measurable, Achievable, Relevant, and Time-bound.

Questions to answer: 9. Write your research aim as a single sentence beginning "This research aims to..." 10. List 3–5 research objectives, each written as an action statement (e.g. "To design...", "To evaluate...", "To critically compare..."). 11. For **each** objective, confirm SMART compliance: - **Specific** — exactly what will be done? - **Measurable** — what evidence or output will show it is achieved (e.g. a working prototype, a comparative accuracy score, a documented framework)? - **Achievable** — what resources, data, tools, or access do you have to realistically complete it? - **Relevant** — how does it directly serve the research aim and problem statement? - **Time-bound** — by which point in your project timeline will it be completed? 12. Do your objectives logically lead from the problem statement to your expected outcome? Check for gaps in the chain.

1.4 Significance of the Research — 3% [~120 words]

Instructions: Explain the "so what" — why this research matters beyond the classroom.

Questions to answer: 13. Who benefits from this research (researchers, practitioners, organisations, the public) and how? 14. What practical, technical, or theoretical applications could result from your findings?

SECTION 2: Literature Review — 25% [~1,000 words]

This must be conducted and written as a Systematic Literature Review (SLR), not a narrative summary of a handful of papers you happened to find.

Instructions: A Systematic Literature Review follows an explicit, repeatable, and justifiable search-and-selection process (e.g. informed by PRISMA principles) rather than an ad hoc reading list. Show your working, not just your conclusions.

Questions to answer — Search Strategy (document this even if summarised briefly in the report): 15. Which databases/sources did you search (e.g. IEEE Xplore, ACM Digital Library, ScienceDirect, Scopus, SpringerLink, government/industry reports such as ENISA, NCSC, NIST)? 16. What search terms and Boolean strings did you use (e.g. "intrusion detection" AND "machine learning" AND "SIEM")? 17. What time frame did you restrict your search to, and why (e.g. last 5 years, with seminal exceptions)? 18. What are your inclusion criteria (e.g. peer-reviewed, English language, empirical studies) and exclusion criteria (e.g. non-peer-reviewed blogs, studies outside scope)? 19. Roughly how many sources did you identify, screen, and finally include? (A simple numbers-in/numbers-out statement is sufficient — a full PRISMA diagram is optional unless your supervisor requests one.)

Questions to answer — Synthesis and Writing: 20. What is the purpose and scope of your literature review, in one introductory paragraph? 21. Will you organise the review **thematically** (by sub-topic/technique) or **chronologically** (by evolution over time)? Justify your choice. 22. What are the 4–6 key themes, techniques, or schools of thought that emerge across your sources? 23. For each theme: what are the major contributions, and what are their limitations or unresolved issues? 24. What theoretical or technical frameworks/models underpin the literature you reviewed (e.g. specific detection models, cryptographic schemes, forensic frameworks, ML architectures)? 25. Where do sources **agree**, and where do they **conflict or contradict** one another? What might explain the disagreement? 26. How does your planned study relate to this body of literature — does it extend, test, challenge, or fill a gap in it? 27. What is unique about your proposed contribution compared to what already exists? 28. Write a short closing summary (3–5 sentences) that restates the key gap your research will address.

Referencing check: Every claim in this section must carry an IEEE in-text citation (e.g. [1], [2]). No unsupported claims.

SECTION 3: Research Design and Methodology — 25%

3.1 Research Design — 7% [~280 words]

Instructions: This is where you justify *how* you know what you claim to know — your philosophical stance — before describing your practical approach.

Questions to answer: 29. What is your **ontological position** (your view on the nature of reality relevant to your topic) — e.g. objectivist/realist (a single measurable truth, common in technical/experimental cyber security work) or constructivist (reality is shaped by perception, more common in socio-technical or policy studies)? 30. What is your **epistemological stance** (how knowledge is validly generated) — e.g. positivist, interpretivist, critical realist, or pragmatist? Justify your choice in relation to your research questions. 31. What is your **positionality** as the researcher — what is your relationship to the topic (e.g. prior professional experience, access to data/systems, assumptions you bring), and how might this influence the research? How will you mitigate any bias this introduces? 32. What overall research approach will you take — e.g. Design Science Research, experimental/simulation-based research, case study, or theoretical/analytical research? Name it explicitly. 33. Justify why this approach is appropriate for your specific research problem and objectives (not just "it is common in this field").

3.2 Research Methods — 10% [~400 words]

Questions to answer: 34. Will your study be **quantitative**, **qualitative**, or **mixed methods**? Justify this choice against your objectives. 35. What is your specific research strategy (e.g. controlled experiment, software/system development and testing, simulation, case study, survey, action research)? Justify why it is the right strategy for your problem. 36. If applicable, describe the system, model, or architecture you intend to design, build, or test (at a proposal level of detail — you are describing a plan, not

reporting results). 37. What data analysis and evaluation techniques or metrics will you use to answer your research question (e.g. precision/recall/F1 for a detection model, statistical tests, thematic analysis)? Justify why these metrics are appropriate.

3.3 Research Materials — 8% [~320 words]

Questions to answer: 38. What data will you use? Specify the source (e.g. a named public dataset such as CICIDS, UNSW-NB15, a specific Kaggle/UCI dataset, synthetic data you will generate, or logs/data you will collect). 39. What is your data collection method or tool (e.g. API, packet capture, sandbox logging, survey instrument)? 40. Why are this data source, collection method, and tool appropriate and sufficient for your objectives? 41. What ethical considerations apply to your data (e.g. anonymisation, consent, use of sensitive/attack data, GDPR, institutional approval)? This should align with your Ethics Form. 42. What software will you use (languages, libraries, frameworks, forensic/security tools)? 43. What hardware or infrastructure will you need (e.g. GPU, cloud compute, isolated lab/VM environment, forensic workstation)? Is it available to you?

SECTION 4: Expected Outcome — 5% [~200 words]

Instructions: You do not have results yet — describe what you *anticipate* and *what could go wrong*.

Questions to answer: 44. What result(s) do you anticipate (e.g. improved detection accuracy over a baseline, a working prototype, a validated framework)? 45. What would this outcome mean in practice — theoretical, practical, or industry implications? 46. What are the likely limitations, risks, or constraints of your study (e.g. dataset bias, limited scope, access constraints, time)?

SECTION 5: Timeline — 5% [~200 words + visual]

Instructions: Produce a realistic timeline (a Gantt chart or a clear milestone table is acceptable) covering the full project period through to submission.

Questions to answer: 47. What are the major phases of your project (e.g. literature review, ethics approval, data collection, development/experimentation, analysis, write-up)? 48. What are your key milestones and target completion dates for each phase? 49. Where are the risk points in your schedule (e.g. dependent on dataset access, ethics approval turnaround), and how will you manage them?

SECTION 6: Overall Presentation of the Proposal — 5%

Questions to answer (self-check before submission): 50. Is the document logically structured with clear headings matching the assessment sections? 51. Is the academic tone, grammar, and formatting consistent and professional throughout? 52. Have you proofread for clarity, avoided contractions/informal language, and used consistent terminology?

SECTION 7: References — 5%

Instructions: IEEE referencing style throughout — numbered in-text citations [1], [2]... in order of first appearance, with a matching numbered reference list.

Questions to answer: 53. Does every in-text citation have a corresponding entry in your reference list, and vice versa? 54. Are your sources recent (last 5 years), with only genuinely seminal/foundational works being older? 55. Have you checked each reference entry against IEEE format conventions (author initials, title in quotes, source in italics, volume/issue/pages, year, DOI where available)?

Final Step: Ethics Form

Questions to answer: 56. Have you completed the ethics form addressing your data source, participants (if any), consent, storage, and any risks? 57. Has this been submitted separately via the Moodle submission link, ready to accompany your proposal?

Before you upload

- ☐ All sections combined into a single Word (.docx) document
- ☐ Word count is within 4,000 words (+/-10%), excluding references/appendices
- ☐ IEEE citations and reference list complete and consistent
- ☐ Headings match the assessment specification structure
- ☐ Ethics form completed and submitted via Moodle
- ☐ Proofread for academic tone and clarity
- ☐ Word document uploaded via Turnitin by **14 August 2026, 2PM**