Graduate Course Research Report Assignment

1. Objective

The goal of this assignment is to help students become familiar with recent research developments in computer security and develop the ability to critically read, analyze, and summarize academic papers. Students will explore a specific research direction in security, review recent literature, and produce a structured research report.

Computer security is an active research field with many specialized subareas, and many influential works are published in top security conferences such as ACM Conference on Computer and Communications Security, Network and Distributed System Security Symposium, USENIX Security Symposium, and IEEE Symposium on Security and Privacy, which are widely regarded as the leading venues for security research.

This assignment will help students learn how to identify important research work and understand state-of-the-art techniques.

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2. Topic Selection

Each student must choose **one research direction** from the following areas:

- Cryptography
- Physical Security
- Operating System (OS) Security
- Software Security
- Web Security
- Malware Analysis
- Network Security

Students may choose **a specific subtopic** within one of these areas. Examples include:

- Zero-Knowledge Proof in cryptography
- Secure enclave systems
- Memory safety and buffer overflow defenses
- Web authentication security
- Ransomware detection techniques
- Network intrusion detection systems

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3. Paper Selection Requirements

Students must select **at least three academic research papers** related to the chosen topic.

The selected papers must satisfy the following requirements:

(1) Recency Requirement

At least **one paper must be published in 2025 or 2026** to ensure that students explore **cutting-edge research**.

(2) Top Venue Requirement

At least **two of the papers must be published in top-tier security venues**, including:

Top Security Conferences

- ACM Conference on Computer and Communications Security (CCS)
- Network and Distributed System Security Symposium (NDSS)
- USENIX Security Symposium
- IEEE Symposium on Security and Privacy (S&P)

Top Security Journals

- IEEE Transactions on Dependable and Secure Computing (TDSC)
- IEEE Transactions on Information Forensics and Security (TIFS)

Top Cryptography Conferences (acceptable for crypto topics)

- EUROCRYPT
- ASIACRYPT

Students are encouraged to search for papers through:

- Google Scholar
- IEEE Xplore
- ACM Digital Library
- USENIX Proceedings

  (If you cannot download papers from ACM and IEEE, you can look for the corresponding arXiv version; many papers are simultaneously hosted on the open-access repository arXiv.org.)

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4. Report Content Requirements

The report should analyze and compare the selected papers. The following aspects **must be included**.

1. Introduction (10%)

- Introduce the selected research topic.
- Explain why this problem is important.
- Briefly summarize the current challenges in this area.

2. Paper Analysis (50%)

For **each paper**, students should clearly describe:

Research Problem

- What problem does the paper aim to solve?

Proposed Method

- What techniques or systems are proposed?
- What is the main idea of the solution?

Implementation

- How is the method implemented?
- What system, algorithm, or model is used?

Experimental Evaluation

- What experiments were conducted?
- What datasets or benchmarks were used?
- What results demonstrate the effectiveness of the proposed method?

3. Comparative Analysis (20%)

Compare the selected papers by discussing:

- Differences in research goals
- Differences in methodologies
- Strengths and limitations of each approach
- Improvements of newer work compared to earlier work (If they are sequential works)

4. Personal Insights and Reflections (20%)

Students should include their own analysis and thoughts, such as:

- What did you learn from these papers?
- What ideas inspired you the most?
- What limitations still exist in current research?
- What potential research directions could be explored in the future?

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5. Report Format Requirements

Template Requirement

Students must use the **IEEE Conference double-column format template** for writing the report. The official template can be downloaded from:

https://www.ieee.org/conferences/publishing/templates

Both **LaTeX and Microsoft Word templates** provided by IEEE are acceptable.

Length Requirement

The report must be **at least 3 pages** using the IEEE conference double-column format.
The page count **include figures, tables, and references**.

Recommended Structure

Although not strictly required, students are encouraged to organize their report using the following structure:

1. Title
2. Abstract
3. Introduction
4. Paper Analysis
5. Comparative Discussion
6. Personal Insights and Reflections
7. Conclusion
8. References

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6. Submission Requirements

Students must submit in PDF/word format on Canvas before the last class, that is, before April 29th, 2026.