Digital Forensics MS

Technical Competence - To Develop And Demonstrate Knowledge Of Theoretical Materials, And Computational And Technical Skills

Goal Description:

Graduates with a master degree in digital forensics will have a strong technical foundation, that is, to develop and demonstrate knowledge of theoretical materials, and computational and technical skills in the areas of digital forensics.

Providing Department: Digital Forensics MS

Progress: Completed

RELATED ITEMS/ELEMENTS

RELATED ITEM LEVEL 1

Understand The Body Of Knowledge Of Digital Forensics

Learning Objective Description:

Students will develop and demonstrate knowledge of theoretical materials, technical skills and project management relevant to digital forensics.

RELATED ITEM LEVEL 2

Written Comprehensive Examination

Indicator Description:

MS in DF's Comprehensive Exam

Our MS in DF offers three options of Degree Plan:

- **Plan 1 – Thesis Option** requires 24 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 6 hours of thesis courses (COSC/DFSC 6348 and 6049). In total, the program requires 30 hours. Thesis students must register for COSC/DFSC 6347 in their proposal semester, and for COSC/DFSC 6049 in their defense semester. Note that continuous enrollment in the thesis course is required upon initiation of the thesis until completion.
- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in DFstudents in Non-Thesis and Professional Options must pass **written comprehensive exams for core subjects where they obtained a grade of B or lower**, **achieving a grade of at least 70**. As exams are conducted during their terminal semester, it is strongly encouraged to finish the core subjects before the terminal semester.

- The core courses for DF program (Non-Thesis) are:
  - DFSC 5315 Network and Cyber Security
  - DFSC 5316 File System Forensics
  - DFSC 5317 Digital Security
  - DFSC 5318 Cyber Law

    - DFSC 5327 Digital Forensics Investigation
- The core courses for DF program (Professional) are:
    - DFSC 5315 Network and Cyber Security
    - DFSC 5316 File System Forensics
    - DFSC 5317 Digital Security
    - DFSC 5318 Cyber Law
    - DFSC 5327 Digital Forensics Investigation
    - DFSC 5338 Ethical Hacking
    - DFSC 6312 Multimedia Forensics

Indicators

The indicators for the MS in DF Program's comprehensive exam are outlined as follows:

- DFSC 5315 Network and Cyber Security
    - Students' understanding of network and cyber security principles is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on methodologies for designing security systems, establishing security protocols, and identifying best practices in administration, testing, and response protocols for secure communications. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5316 File System Forensics
    - Students' understanding of file system forensics concepts is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on the structures, encoding, boot process, and storage technologies of modern computers, focusing on their implications for analyzing volumes and file systems for forensic purposes. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5317 Digital Security
    - Students' understanding of digital security concepts is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on individual vs. government privacy issues, federal encryption standards, cryptography, and the various layers of security. The comprehensive exam scores are collected to assess student performance on these key topics.
- DFSC 5318 Cyber Law
    - Students' understanding of the impact of law on digital security is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on criminal intent, the concept of the digital victim, jurisdictional issues, and legal terms relevant to security management. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5327 Digital Forensics Investigation
    - Students' proficiency in digital forensics investigation is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on tools for information recovery, cryptographic analysis, password recovery, and methods for bypassing specific target operating systems. The comprehensive exam scores are collected to assess student performance on these key topic.
- DFSC 5338 Ethical Hacking
    - Students' understanding of penetration testing and vulnerability analysis is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on methodologies, techniques, and tools used to identify and exploit

vulnerabilities in information technology systems. The comprehensive exam scores are collected to assess student performance on these key topic.

- DFSC 6312 Multimedia Forensics
    - Students' understanding of multimedia security and forensics is assessed using direct measures, including exam scores and project evaluations. The comprehensive exam includes questions on image processing, JPEG compression, audio compression (such as MP3 and Advanced Audio Coding), and multimedia source identification. The comprehensive exam scores are collected to assess student performance on these key topic.

KPI (Key Performance Indicators)

- Pass Rate: The percentage of students who achieve a passing score of at least 70% on their first attempt. This metric indicates how well students are performing on their initial exam.
- Success Rate of Re-Examinations: The percentage of students who pass the comprehensive exam on their re-examination attempt. This shows how effective the re-taking policy is in helping students meet the required standards.
- Percentage of Students Passing All Attempts: The percentage of students who successfully pass the comprehensive exam within the allowed number of attempts (including re-examinations). This reflects the overall effectiveness of the exam preparation and support provided.
- Average Exam Score: The average score of all students who take the comprehensive exam, which helps gauge the overall performance and understanding of the course material.
- Exam Failure Rate: The percentage of students who fail the exam on all attempts, which provides insight into the proportion of students struggling with the exam despite multiple attempts.

Attached Files

Copy of Comp-Exams

Criterion Description:

MS in DF's Comprehensive Exam Criteria

The criterion for each course's comprehensive exam is to achieve a passing score of at least 70%. If a student fails the exam, they are allowed one re-examination. A third attempt may be permitted only with the approval of the appropriate academic dean and the department. Students who fail all three attempts are terminated from the program. This policy ensures that students have multiple opportunities to demonstrate their understanding of the material while maintaining academic standards.

Findings Description:

MS in DF, Comprehensive Exam Results

Fall 2023

We had only one student in their terminal semester who received an A for all core courses, and thus was granted a waiver.

Spring 2024

We had three students in their terminal semester who received an A for all core courses, and thus were granted a waiver.

Summer 2024

We did not have students required to take the tests.

Findings

Throughout the academic year, all students who were required to take the comprehensive exam were exempted due to achieving an A in all core courses. This consistent pattern of receiving waivers suggests that the academic standards for waiver eligibility are effectively met by students in the MS in DF program. The absence of any students taking the exam in the Summer 2024 term further supports the conclusion that students are meeting the program's academic requirements consistently.

RELATED ITEM LEVEL 3

Written Comprehensive Examination
Action Description:

Action Plan for MS in DF's comprehensive exams:

- Maintain the current support and preparation strategies that have led to high passing rates. Regularly review and update the exam preparation resources and support services based on student feedback and performance data.
- While the waiver system is successful in reducing the number of students required to take the exam, evaluate if any adjustments are needed to better align with program objectives or address any emerging trends.
- Regularly review the comprehensive exam content to ensure it aligns with the current curriculum and adequately assesses the students' knowledge and skills. Update exam content if necessary to reflect any changes in the program or industry standards.
- Ensure that students are well-informed about the comprehensive exam requirements and waiver criteria. This will help maintain high levels of performance and minimize any confusion regarding the examination process.

RELATED ITEM LEVEL 1

Apply Knowledge And Skills In Projects And Real Work Environments
Performance Objective Description:
Students will practice and demonstrate their capabilities and skills relevant to digital forensics and investigation in projects simulating real world tasks.

RELATED ITEM LEVEL 2

Final Capstone Project
KPI Description:
MS in DF's Capstone Projects

Our MS in DF offers three options of Degree Plan:

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- **Plan 2 – Non-Thesis Option** requires 27 hours of a coursework which is a combination of compulsory (core) and track elective courses, and 3 hours of a master project course (COSC/DFSC 6347). In total, the program requires 30 hours. Non-thesis students are required to complete written comprehensive exams in core subjects where they received a grade of B or lower. Non-thesis students must register for COSC/DFSC 6347 in their terminal-semester. Note

that continuous enrollment in the COSC 6347 course is required upon initiation of COSC 6347 until completion.
- **Plan 3 – Professional Option** requires 30 hours of a coursework which is a combination of compulsory (core) and track elective courses.

All MS in DF students in Thesis Option are required to complete a Thesis, while students in Non-Thesis Option must complete a master's project.

- A thesis is typically a more extensive and in-depth research project. It involves conducting original research, often contributing new knowledge or insights to the field. Theses require a rigorous investigation, data collection, analysis, and interpretation of results. They are expected to be comprehensive and demonstrate a deep understanding of the chosen topic. The primary purpose of a thesis is to contribute new knowledge or advance the existing body of knowledge in the chosen field.
- On the other hand, a master's project is generally a smaller-scale endeavor compared to a thesis. It might involve applying existing knowledge to solve a practical problem or developing a prototype, application, or creative work. While it still requires research and analysis, the scope is usually narrower and more focused. Master's projects tend to emphasize practical application.

KPIs

Thesis

- Completion Rate: The percentage of students in the Thesis Option who successfully complete and defend their thesis by the end of their program.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their thesis.
- Publication and Contribution: The number of theses that result in a publication, presentation, or significant contribution to the field.
- Time to Completion: The average time taken for students in the Thesis Option to complete their thesis from the start of the project.

Master's Project

- Completion Rate: The percentage of students in the Non-Thesis Option who successfully complete and present their master's project.
- Grade Achievement: The percentage of students who receive an "A" or equivalent grade for their master's project.
- Timeliness: The average time taken for students in the Non-Thesis Option to complete their master's project from initiation to final submission.

Target Description:

The following targets are associated with each Key Performance Indicator (KPI) for the MS in DF program:

Thesis

- Completion Rate: Aim for 90% or higher of students in the Thesis Option to successfully complete and defend their thesis by the end of their program.
- Grade Achievement: Target 80% or higher of theses to receive an "A" grade or its equivalent.
- Publication and Contribution: Aim for 25% of theses to result in a publication, presentation, or significant contribution to the field.

- Time to Completion: Average time for thesis completion should be within 2 semesters from the start of the thesis project.

Master's Project

- Completion Rate: Aim for 90% or higher of students in the Non-Thesis Option to successfully complete and present their master's project.
- Grade Achievement: Target 80% or higher of master's projects to receive an "A" grade or its equivalent.
- Timeliness: Average time for project completion should be within two semesters from the start of the project.

Results Description:

Results

Fall 2023

- Non-Thesis Option: One student successfully completed their project within two semesters, receiving an "B" grade.

Spring 2024

- Non-Thesis Option: Three students completed their projects within two semesters, all receiving "A" grades.

Summer 2024

No students completed a thesis or master's project during Summer 2024.

Findings

Thesis Completion

Since the Thesis Option was recently launched, no students were able to complete their theses during the 2023-2024 academic year. This result highlights the need for further evaluation of the support structures and timelines provided to students opting for the thesis track.

Master’s Project Completion

In Fall 2023, one student in the Non-Thesis Option completed their project within two semesters and received a "B" grade. This result highlights that while the student met the timeline requirements, there is room for improvement in the quality of the master's projects. Conversely, in Spring 2024, three students in the Non-Thesis Option completed their projects within the stipulated two semesters, all receiving "A" grades. This demonstrates that the program is effective in supporting students who receive high-quality outcomes and adhere to academic standards.

Program Effectiveness

The program’s effectiveness is reflected in the Spring 2024 results, where students in the Non-Thesis Option received "A" grades for their projects, indicating high-quality outcomes and successful adherence to the program’s expectations. However, the variation in grades during Fall 2023 suggests that there may be areas for improvement in student support and project guidance to ensure a more consistent quality of work across different terms.

Summer Term

No students completed a thesis or master's project during Summer 2024. This absence of project completions in the summer term may point to a lower number of active students during this period. This finding suggests a need to assess and potentially address the engagement and availability of students during the summer term to ensure continuous progress in thesis and project completions throughout the academic year.

RELATED ITEM LEVEL 3

Final Capstone Project
Action Description:
Action Plans for MS in DF's Casptone Projects

1. Continue to ensure that project proposals are reviewed within the first two weeks of the semester. Consider streamlining the review process if needed, and provide timely feedback to students to help them refine their proposals.
2. Maintain the structure of weekly progress meetings with project advisors. Ensure that these meetings are productive by providing guidelines for effective progress reporting and addressing any issues that arise.
3. Review the midterm evaluation process to ensure it effectively assesses students' progress. Collect feedback from both students and faculty to identify any areas for improvement in the evaluation process.
4. Ensure that the distribution of project activities among committee members is balanced and that all committee members are engaged in the evaluation process. Consider providing additional training or guidelines for committee members to enhance their effectiveness.
5. Evaluate the effectiveness of the final project presentations and provide constructive feedback to students. Consider implementing a formal feedback mechanism for both the presentation and the completed application to help students improve their work.
6. Periodically review the established procedures for managing projects to ensure they align with current best practices and address any emerging needs or challenges. Update procedures as necessary to improve the overall project management process.
7. Promote the identification of significant application development needs by encouraging students to engage with real-world clients or scenarios. Provide additional resources or support to help students address complex, real-world problems in their projects.

Update to Previous Cycle's Plan for Continuous Improvement Item

Previous Cycle's Plan For Continuous Improvement (Do Not Modify):
Closing Summary
The GCC will conduct multiple meetings during the Fall 2023 and Spring 2024 semesters to discuss how to improve the below weaknesses identifed during the DF program review:

1. Low student enrollment
2. Low student degree conferred
3. No Thesis option

Update of Progress to the Previous Cycle's PCI:
The registration status for the previous academic year (MS in DF), based on data from the SHSU Enrollment Fact page, is as follows:

- 2022-2023
  - Fall 2022: 17
  - Spring 2023: 24

    - Summer 2023: 16
- 2023-2024
    - Fall 2023: 24
    - Spring 2024: 28

Actions taken during 2023-2024

- Recruitment Scholarships: To address low student enrollment, we have introduced recruitment scholarships with support from the Dean's office. This initiative offers $1,000 to students who register early, with the first 30 students receiving this benefit. As of May 12, 24 students have registered and been notified of the awards, including 12 from the Computer Science program.
- Advertising to New Students: To enhance student recruitment, we conducted new student orientations at least once a month. These orientations help lift advising holds promptly and highlight the scholarship program, encouraging early registration and securing benefits.
- Remedy for STEM/Preparatory Students: We identified that several STEM/Preparatory students were on the verge of leaving the program due to financial aid issues with their courses. We addressed this by working with the Registrar's office, Financial Aid office, and other departments to ensure these courses are now covered by financial aid, resulting in improved retention.
- Program Options: The addition of *Professional* and *Thesis* options for the DF program has been approved and has been available starting Fall 2024. This addition has aimed to provide more flexibility and enhance the program's appeal.

New Plan for Continuous Improvement Item

Closing Summary:

Continue offering recruitment scholarships to attract new students. Expand the scholarship program if possible and ensure that the promotion of these scholarships is well-publicized during orientations and through other channels.

Ensure that financial aid coverage for STEM/Preparatory courses is maintained. Regularly review and adjust financial aid policies to support students effectively and retain them in the program.

Discuss implementing additional support mechanisms for students working on their theses and projects.

Continue to monitor the impact of the Professional and Thesis Options and make necessary adjustments based on student enrollment trends and feedback.