KENNESAW STATE UNIVERSITY
INSTITUTE FOR CYBERSECURITY WORKFORCE DEVELOPMENT

Addressing the Challenges of Large Online Cybersecurity Classes in the Age of COVID

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1

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Introduction

- MS-Cybersecurity Program -- Fall 2019
- Involved three colleges and five departments
  - Michael J. Coles College of Business
    - Department of Information Systems and Security
  - College of Computing and Software Engineering
    - Department of Information Technology
    - Department of Computer Science
    - Department of Software Engineering and Game Design
  - Norman J. Radow College of Humanities and Social Sciences
    - Department of Sociology & Criminal Justice

2

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Initial Requirements

Prerequisite to be Remediated

- Programming Principles
- Computing Infrastructure
- Foundations of Cybersecurity

Body of Study

- Cyber Law, Policy, and Enforcement {SCJ}
- Cybercrime Detection, Analysis, and Forensics {SCJ}
- Secure Application Development {SWEGD}
- Securing Enterprise Infrastructure {IT}
- Management of Cybersecurity {ISS}
- Mobile and Cloud Security {IT}
- Contingency Planning and Response {ISS}
- Cyber Analytics and Intelligence {IT}
- Introduction to Cryptography and Its Application {CS}
- Capstone in Cybersecurity Practicum {IT} or Capstone in Cybersecurity Management {ISS}

3

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The KSU Institute for Cybersecurity Workforce Development

- Established in 2016 to house the fully online, multidisciplinary, BS-Cybersecurity program, created in a similar fashion.
- Headed by an Executive Director, who is supported by a Director of Undergraduate Education and Outreach and a Director of Research and Graduate Education
- KSU has been designated as a NCAE by the NSA multiple times since 2004.

4

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Impact of COVID

- Program always planned to be 100% online.
- University System of Georgia Board of Regents moratorium on the hiring of new employees, including faculty.
- KSU Leadership indicated degree should move forward, identifying alternative solutions.

5

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MS-CYBR Initial Enrollment

- Exceeded projections, with 130 applicants in the first semester.
- 33% Female, 64% Male, 3% No Response
- 40.9% Black, 38.3% White, 5.2% Asian, 4.3% Hispanic/Latino, 1.7% American Indian or Alaskan Native, 9.6% No Response
- 58.1% “Career Changers” with no previous IT/Security background, 28.2% with previous IT background, but not Security, 13.7% with a previous Security background

6

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Program Constraints

- Limit on hiring permanent, full-time, faculty.
- Allow unrestricted growth.
- Support accreditation guidelines.
- Fully online curriculum.

7

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Preliminary Solutions Identified

- Adjustments to program foundation courses,
- Part-time “Assistant Instructors”,
- Use of best practices.

8

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Moving Prerequisites to CPE Modules

- Initially: Programming Principles, Computing Infrastructure, Foundations of Cybersecurity
- Migrated to self-paced CPE modules:
  - Programming Principles in Python
  - Computing Infrastructure – including Computer Org & Arch and Operating Systems
  - Data Communications & Networking
- CPE modules moderated by part-time faculty with external compensation.

9

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Assistant Instructors

- No qualified Ph.D. students to serve as GTAs, selected qualified PT faculty and incentivized.
- One AI per 35 students over the initial 35, with an unlimited cap. Average class sizes currently 100.
- Allowed simplification of scheduling as only one section/course needed. All courses offered Fall/Spring, with half in Summer.
- Instructor of Record allocates work to AIs as they see fit.

10

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Best Practices: Course Set Up

- Shift the focus from the instructor to the learner,
- Validate design of the course assignments and timetables to suit a large section including designing assignments to support group activities and peer evaluations,
- Plan for coordination of instructional team prior to start of term, and
- Implement comprehensive and dynamic FAQ to anticipate questions with comprehensive responses.

11

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Best Practices: Managing Students

- Establish student expectations comprehensively for all classroom management areas,
- Establish clear virtual office hours and means and methods of communication including discussion boards and other facilitated means of communication, and
- Document and reiterate timing and means of submission for all assignments.

12

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Best Practices: Managing Grading

- Transition from subjective to objective, auto-graded assignments,
- Establish expectations on the frequency and quality of grading feedback,
- Maximize the use of high-quality standardized rubrics to offer maximum feedback with reduced instructor workload, and
- Develop strong time-management requirements for IoR and AI grading workloads.

13

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Managing Labs

- Develop scalable and topical hands-on lab experiences using recommended tools, techniques and learning resources,
- Use lab delivery systems that enable student self-scheduling and automated scoring.

14

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Conclusions

- Instructors must accept their limitations.
- Cannot manage large online classes using the same approach as a small face-to-face class
- Delivery of high-quality, effective instruction through planning, maximizing support personnel, and incorporating best practices is still possible.
- Faculty can maximize student learning and minimize concerns by communicating effectively.

15

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QUESTIONS/COMMENTS?

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16