Mohannad Alhanahnah – Teaching Statement

Very few things enlighten and reward like the experience of teaching. My teaching assignments have improved my knowledge and improved my ability to convey knowledge. I have found that I enjoy helping students grow and improve their skills to achieve their future goals.

1 Teaching Experience

My teaching journey began in my undergraduate years, explaining networking and programming ideas to peers. This early teaching foray led to a part-time trainer role post-graduation, where I developed curriculum and course materials for industrial courses like Security +, Network +, and CCNP Security. At Birmingham City University, I advanced from a teaching assistant to a Cisco-certified trainer, responsible for delivering lectures, designing course materials, grading assignments, and mentoring students on projects. During my Ph.D., I guest lectured on Android and IoT security for Dr. Hamid Bagheri's Secure Software Engineering course. This experience offered valuable insights into teaching a diverse student group, highlighting the importance of providing sufficient background information and simplifying complex security concepts. My strategy was to use real-world examples or abstractions, which effectively engaged the students. These experiences reinforced my belief in the efficacy of laboratory-style demonstrations for teaching fundamental concepts and skills.

2 Teaching philosophy

Teaching is an integral aspect of academia, where the ability to spark student interest in the subject is vital. I often employ real-world analogies to engage undergraduate students, leading to deeper learning and engagement. As pioneering researchers, our duty extends to sharing our knowledge and instilling our research findings in students. While teaching provides technical knowledge, it also opens a world of ideas, critical thinking, and problem-solving skills for students. To this end, I've developed distinct teaching approaches for graduate and undergraduate courses, which are the following:

2.1 Undergraduate Teaching

This theme involves providing theoretical underpinnings along with practical aspects of the concept. This approach should foster independent thinking and keep students engaged. It is also vital to introduce students to best practices and principles to avoid making trivial mistakes when they go into the industry. For example, in their first system security course, I will teach students how to avoid buffer overflow vulnerabilities to protect customer data. For assessment, I use the *Problem-Based Learning* (PBL) method, where students work in small groups, looking for solutions to problems themselves. By discussing issues and working together to draw conclusions, formulate answers, and present them to their peers, students. This assessment style will help students to develop essential skills for their future careers.

2.2 Graduate Teaching

Graduate teaching involves two types of classes (1) seminar classes and (2) classes that combine grad and undergrad students. From my experience in the latter, the materials should satisfy different categories of audiences. For example, through the guest lectures that I delivered, I noticed that grad students have the tendency to try the demo. They are also interested in seeing more than one example. Furthermore, graduate students who are actively working on research will ask for references about information mentioned in the lecture. From my own education experience in graduate seminar classes, it is important to train students to review published papers and identify their strengths and weaknesses. As a prerequisite skill, students need to learn how to read an academic paper. Finally, I would like students in their review to think beyond strengths and weaknesses by answering questions (known as Heilmeier Catechism [1]) crafted by George H. Heilmeier, a former DARPA director.

2.3 Mentoring Students

Advising graduate and undergraduate students is another major component of our scholarly lives. Students have different strengths and weaknesses. Understanding these strengths and weaknesses and mentoring them according to their needs is crucial. As mentors, our responsibilities are to advise them on researching and writing research papers, as well as to help them develop professionally into notable scholars. For example, I noticed that encouraging students to participate and present in weekly group meetings will help them define their research interests and help them communicate their ideas. One of my mentees decided to do Ph.D. and after receiving his admission letter he sent me this feedback "*Thank you for being a great mentor and showing me the ropes to research. You will always be a fundamental keystone in whatever career I pursue, by being my very first boss. I really do appreciate all that you have done and our time working together.*" I would like to be an advisor who mentors students at all stages of their education and research and give them constructive feedback as needed. Moreover, I am also excited to engage with students in technical implementations as opposed to observing informalities.

3 Courses I can teach

I would be interested in teaching a wide variety of core courses in the Department of Computer Engineering I would like to offer the Software Supply Chain course. This course will be motivated by analyzing Log4j and SolarWinds incidents. It then introduces students to regulation concepts in this domain, such as Software Bill of Materials (SBOM) and emergent technical concepts like DevOps (Continuous Integration and Continuous Delivery known as CI/CD). This course will also describe industry tools (e.g., OWASP dependency check) for identifying software supply chain dependencies. All things considered, I would be happy to adapt my teaching focus to additional courses based on the needs of the department. Finally, I am interested in involving students in non-academic activities by establishing Capture The Flag (CTF) team for interested students.

[1] https://www.darpa.mil/work-with-us/heilmeier-catechism