CYBR 615: Cybersecurity Vulnerability Assessment, Spring 2022
Department of Computer Sciences and Electrical Engineering
Marshall University

Course Information:
- Instructor: Cong Pu (Ph.D., Assistant Professor)
- Office: Weisberg Applied Engineering Complex (WAEC) 3109
- Office Phone: (304) 696-6204
- Email: puc@marshall.edu
- Course format: Lecture
- Course meetings: Tue, 4:00 p.m. – 6:20 p.m., WAEC 3245
- Virtual office hours:
    - Important: All office hours will be held virtually during the COVID-19 pandemic.
    - Tentative office hours:
        Tuesday, 8:00 a.m. – 12:00 p.m.
        Thursday, 8:00 a.m. – 12:00 p.m., 3:30 p.m. – 5:30 p.m.
        Or by appointment through email.
    - Students are expected to communicate with instructor to set up video meetings via Microsoft Teams.
- Course web page: MU Online (Blackboard) http://www.marshall.edu/muonline/. It is important to visit MU Online (Blackboard) regularly for up-to-date course information.

COVID-19 Related Information:
- Marshall's official COVID-19 protocols are online at https://www.marshall.edu/coronavirus . Policies and protocols may change over time as we respond to changing conditions. The website will always contain the most recent information.
- Key policies at the start of the Spring 2022 semester include the following:
    - **Masks are required for everyone in all public indoor spaces on university property, regardless of one's vaccination status.** These spaces include classrooms, labs, office suites, hallways, lobbies, stairwells, etc. Instructors may choose to teach either while wearing a mask or face shield or while standing behind the plexiglass barrier in the classroom.

    - **In order to remain in in-person classes, students must sign the Marshall Return to Campus Student Agreement** that outlines public health expectations and University COVID-19 policies: https://bit.ly/2VP3Naa.
    - **In order to remain in in-person classes for the Spring 2022 semester, students must submit their current vaccination status** in the online Student Vaccination Registry here: https://mubert.marshall.edu/vaccinerecord.php. The registry offers several possible responses, including an option to not disclose vaccination status.

- o **Students will disinfect their personal workspaces and virtual learning hubs with** disinfectant wipes provided nearby.
- o **Students who are unable to follow University requirements due to a disability** should seek reasonable accommodations from the Office of Disability Services (ODS) during the first week of class.

Course Description: From Catalog
- This course focuses on the complete cycle of Enterprise security from identifying vulnerabilities, detecting application exploitation and post exploitation mitigations and analysis for an enterprise level cyber infrastructure. (PR: None)

Course Student Learning Outcomes: The table below shows the following relationships: How each student learning outcomes will be practiced and accessed in the course.

Course Student Learning Outcomes	How students will practice each outcome in this course	How student achievement of each outcome will be assessed in this course
Students will be able to perform risk assessment.	• Lecture • Example discussion • In-class exercise	• Assignment • Exam
Students will be able to use various security testing and analysis tools.	• Lecture • Example discussion • In-class exercise	• Assignment • Exam
Students will be able to analyze common security loopholes and identify the cause.	• Lecture • Example discussion • In-class exercise	• Assignment • Exam

Preferred Communication Method and Expected Response Time:
- Students can always meet with the instructor via Microsoft Teams during virtual office hours, no appointment is required.
- Outside virtual office hours, 6 hours advance notice is required when scheduling an appointment. If students ask the instructor to meet on Microsoft Teams immediately, the answer will probably be "No".
- Students can generally expect an email response within 6 hours. If students do not get a response within 6 hours, please forward the previous email to the instructor.
- Students can generally expect the feedback on assignment and exam in one week after submission. If students do not receive the feedback in two weeks, please send an email to the instructor.

Required Textbooks, Additional Reading, and Other Materials:
- A list of reference books will be used. For more information, please refer to the following resources:
  - o Sean-Philip Oriyano. Penetration Testing Essentials. Pearson. 1st Edition. ISBN-10: 1119235308. ISBN-13: 978-1119235309.
    - ▪ Marshall Univ. has unlimited access to this book. Please visit Marshall Library, http://www.marshall.edu/library/

- o Georgia Weidman. Penetration Testing: A Hands-On Introduction to Hacking. 1st Edition. ISBN-10: 1593275641. ISBN-13: 978-1593275648.
    - ▪ Marshall Univ. has unlimited access to this book. Please visit Marshall Library, http://www.marshall.edu/library/
  - o OWASP Testing Guide v4.
    - ▪ Download here, https://www.owasp.org/images/1/19/OTGv4.pdf
  - o William Stallings, Lawrie Brown. Computer Security: Principles and Practice. Pearson. 4th Edition. ISBN-10: 9780134794105. ISBN-13: 978-0134794105.
    - ▪ Marshall Univ. has unlimited access to this book. Please visit Marshall Library, http://www.marshall.edu/library
  - o William Stallings. Cryptography and Network Security: Principles and Practice. Pearson. 7th Edition. ISBN-10: 0134444280. ISBN-13: 978-0134444284.
    - ▪ Marshall Univ. has unlimited access to this book. Please visit Marshall Library, http://www.marshall.edu/library
- • Important concepts/materials will be included in the lecture notes from various sources, and posted on MU Online (Blackboard).

Course Requirements and Grading Policy:
- • **Exam 1: 5%**, Feb 08, Tuesday, 4:00 p.m. – 6:20 p.m., MU Online (Blackboard), WAEC 3245
- • **Exam 2: 5%**, Mar 01, Tuesday, 4:00 p.m. – 6:20 p.m., MU Online (Blackboard), WAEC 3245
- • **Exam 3: 5%**, Mar 29, Tuesday, 4:00 p.m. – 6:20 p.m., MU Online (Blackboard), WAEC 3245
- • **Exam 4: 5%**, Apr 26, Tuesday, 4:00 p.m. – 6:00 p.m., MU Online (Blackboard), WAEC 3245
  - o All exams (non-cumulative) are computer-based exams.
  - o All exams should be taken in the classroom (WAEC 3245). However, you can start exam whenever you want during exam time and SUBMIT on Blackboard.
  - o There will be NO make-up for missing exam. Only university excused absences with appropriate and official DOCUMENTATION will be accepted for make-up exam. Please contact Student Affairs (https://www.marshall.edu/student-affairs/) for university excused absence documentation first, and then schedule make-up exam with instructor.
    - ▪ The make-up exam must be taken within two days after the scheduled exam.
  - o If you take a conflict exam, you must talk to instructor and provide a valid document at least two weeks before the scheduled exam.
    - ▪ The conflict exam must be taken within two days after the scheduled exam.
- • **Research Assignment: 25% (report) + 5% (presentation)**
  - o Students are supposed to read the research paper, write a two-page report, and present the research paper.
    - ▪ Report and presentation should be prepared based on the provided criteria.
    - ▪ Each student needs to make two presentations throughout the semester. Presentation schedule and assigned research paper will be available on Blackboard.
  - o Research assignment (two-page report and presentation slides) should be SUBMITTED on Blackboard before Due Date. *Other submission methods (i.e., email) will NOT be accepted.*

- o LATE Submission will NOT Be Accepted on Blackboard since the submission link will be closed automatically after due date.
- o There will be NO re-submission for missing assignment. Only university excused absences with appropriate and official DOCUMENTATION will be accepted for assignment re-submission*. Please contact Student Affairs (https://www.marshall.edu/student-affairs/) for university excused absence documentation first, and then contact instructor for re-submission.
  - ▪ *The re-submission will be provided *if and only if* the duration of university excused absences is **equal to** or **longer than** the half of the time limit on the assignment.
- o Each student has unlimited submission attempts on Blackboard before due date. However, the instructor only grades the final submission attempt.
- o There will be NO re-submission if the student submitted the wrong assignment.
- **Lab Assignment: 50%**
  - o Lab assignment should be SUBMITTED on Blackboard before Due Date. *Other submission methods (i.e., email) will NOT be accepted.*
  - o LATE Submission will NOT Be Accepted on Blackboard, since the submission link will be closed automatically after due date.
  - o There will be NO re-submission for missing assignment. Only university excused absences with appropriate and official DOCUMENTATION will be accepted for assignment re-submission*. Please contact Student Affairs (https://www.marshall.edu/student-affairs/) for university excused absence documentation first, and then contact instructor for re-submission.
    - ▪ *The re-submission will be provided *if and only if* the duration of university excused absences is **equal to** or **longer than** the half of the time limit on the assignment.
  - o Each student has unlimited submission attempts on Blackboard before due date. However, the instructor only grades the final submission attempt.
  - o There will be NO re-submission if the student submitted the wrong assignment.
- Plagiarism:
  - o Plagiarism or cheating will not be tolerated in the class.
    - ▪ 1st plagiarism will result in zero point in the suspected work.
    - ▪ 2nd plagiarism will result in immediate dismissal (F grade).
- All grades will be posted on Blackboard:
  - o *Students are highly suggested to check the grade on Blackboard frequently and notify instructor immediately if there is any grading error*.
  - o Mid-term grade will be posted around March 21 (Monday)
    - ▪ March 25 (Friday), last day to drop an individual course.
    - ▪ Spring 2022 calendar: https://www.marshall.edu/academic-calendar/spring-2022-semester/
- Grade Scale:
  - o Actual points received in each category should be converted into category percentage.
  - o For example, if you got 70/80 for 8 lab assignments, the percentage of assignment category will be (70 / 80) * 40 = 35 (%).
  - o A (100 - 90), B (89 - 80), C (79 - 70), D (69 - 60), and F (59 - 0)
- Excuses

- Because there is a degree of flexibility in completing items, it is the student's responsibility to keep track of dates and find enough time for completion. If the students wait until the last minute, there is no one to blame but the students themselves. With that said, the instructor is also not heartless. If there is something that occurs which prevents student's access to the course for a significant length of time (e.g., serious illness, death in the family, or personal tragedy), the student needs to contact Student Affairs (https://www.marshall.edu/student-affairs/) and the instructor as soon as possible and they may be able to work something out.

Attendance and Classroom Policy:
- The instructor chooses not to take attendance. However, students are expected to attend punctually all class meetings, from the beginning of the semester until the end of the semester.
- If a student needs self-quarantine for 14 days due to COVID-19, make-up will be provided for exam or assignment that is due during self-quarantine period when the self-quarantine is over.
  - Students need to contact Student Affairs (https://www.marshall.edu/student-affairs/) for university excused absence documentation first, and then discuss the make-up work with the instructor.
- If a student misses a class without university excused absence documentation, the student should not expect individualized instruction on what was missed. This will be effective from the beginning of semester.
- Students are expected to assist in maintaining a classroom environment that is conducive to learning. In order to assure that all students have the opportunity to gain from time spent in class, unless otherwise approved by the instructor, students are prohibited from engaging in any other form of distraction. Inappropriate behavior in the classroom shall result, minimally, in a request to leave class.

Marshall University Policy: By enrolling in this course, you agree to the University Policies. Please read the full text of each policy (listed below) by going to Academic Affairs: Marshall University Policies. (URL: http://www.marshall.edu/academic-affairs/policies/)

- Academic Dishonesty Policy
- Academic Dismissal Policy
- Academic Forgiveness Policy
- Academic Probation and Suspension Policy
- Affirmative Action Policy
- Dead Week Policy
- D/F Repeat Rule
- Excused Absence Policy for Undergraduates
- Inclement Weather Policy
- Sexual Harassment Policy
- Students with Disabilities (Policies and Procedures)
- University Computing Services Acceptable Use Policy

Course Schedule and Important Dates: Topics and/or dates may be changed during the semester at the instructor's discretion because of scheduling issues, developments in the discipline, or other contingencies.

- Jan 11: Welcome & Course Introduction
- Jan 18: Principles of Successful Testing and Testing Techniques
    - Release Research Assignment 1
- Jan 25: Information Gathering
    - Research Assignment 1 Due
    - Release Research Assignment 2
    - Release Lab Assignment 1
- Feb 01: Identity Management Testing
    - Lab Assignment 1 Due
    - Research Assignment 2 Due
    - Release Research Assignment 3
    - Release Lab Assignment 2
- **Feb 08: Exam 1**
- Feb 15: Authentication Testing
    - Lab Assignment 2 Due
    - Research Assignment 3 Due
    - Release Research Assignment 4
    - Release Lab Assignment 3
- Feb 22: Authorization Testing
    - Lab Assignment 3 Due
    - Research Assignment 4 Due
    - Release Research Assignment 5
    - Release Lab Assignment 4
- **Mar 01: Exam 2**
- Mar 08: Session Management Testing
    - Lab Assignment 4 Due
    - Research Assignment 5 Due
    - Release Research Assignment 6
    - Release Lab Assignment 5
- **Mar 15: Spring Break**
- Mar 22: Client Side Testing
    - Lab Assignment 5 Due
    - Research Assignment 6 Due
    - Release Research Assignment 7
    - Release Lab Assignment 6

- **Mar 29: Exam 3**
- Apr 05: Input Validation Testing – Part 1
    - Lab Assignment 6 Due
    - Research Assignment 7 Due
    - Release Research Assignment 8
    - Release Lab Assignment 7
- Apr 12: Input Validation Testing – Part 2
    - Lab Assignment 7 Due
    - Research Assignment 8 Due
    - Release Lab Assignment 8
- **Apr 19: "Dead Week"** – Self Review; No Class
    - Lab Assignment 8 Due
- **Apr 26: Exam 4, 4:00 p.m. – 6:00 p.m.**

Notes:
- Everything you learn in the class is for securing your own applications, not to hack anybody else's applications, because it is illegal.
- It is illegal to perform any type of penetration test without permission and authorization.
- Instructor is not liable for any special, direct or indirect damage or for any other damage resulting from the use of information/knowledge/technique presented in this class.
- In a nutshell, though, if you access any computer without its owner's permission, and obtain any information from it or cause any damage (even accidentally), you've broken the law. See 18 U.S.C. § 1030, https://www.law.cornell.edu/uscode/text/18/1030