## **CYBR 460: Secure Software Design and Engineering (3 credits)**

This course provides specialized knowledge about secure software design and engineering. It exposes the knowledge of vast horizon of software assurance during the whole software development lifecycle, hence enabling the students to apply specialist knowledge for secure software development and management. The course also provides the learners, the ability to carry out some critical tasks such as risk assessment, drawing security requirements, designing through threat modeling approach, utilizing security design patterns and testing using static and dynamic analysis as well as code review. This way the students will be able to develop critical security artifacts throughout SDLC phases. *(Prerequisite: SWEN 360)*

**Course Learning Outcomes:**

By the end of the course, students will be able to:

A1. Demonstrate critical knowledge of the specialized concepts and theories related to secure software design and engineering.

A2. Apply specialized methods, tools and standards of software assurance in designing complex software solutions.

B1. Identify the critical software security requirements for overcoming real-life business threats while assuring the secure software development.

B2. Design secure software system for the real-life complex business problems by applying threat modelling and Software Assurance standards.

B3. Critically analyze the security profile of a developed software system.

B4. Communicate secure software design and development concepts effectively, in written and oral forms.

C1. Collaborate effectively in a team environment during secure software projects development.

**Course Learning Materials:**

* Wm. Arthur Conklin, Daniel Paul Shoemaker, “CSSLP Certified Secure Software Lifecycle Professional All-in-One Exam Guide”, 3rd Edition (2022), McGraw Hill, ISBN: 978-1264258208.
* Loren Kohnfelder, “Designing Secure Software: A Guide for Developers”, Kindle Edition (2021), No Starch Press, ISBN: 978-1718501928
* Kris Hermans, “Cyber Secure Software Development”, 1st Edition (2023), Independently published, ISBN: 979-8398126044
* Gerardus Blokdyk, “Secure Software Development A Complete Guide”, (2021), 5STARCooks, ISBN: 978-0655936374.

**Course Content:**

1. Introduction to Software assurance and Properties of secure software
2. Software Vulnerabilities
3. Security in the software lifecycle SDLC models
4. Security Focus in Core SDLC Phases
5. Security in User Requirements
6. Secure Software Design and Modelling
7. Secure Software Design Evaluation
8. Secure Implementation Coding Focus
9. Secure Implementation Coding Focus
10. Secure Implementation: Integration Focus
11. Software Security Validation
12. Secure Software Deployment