

GAU, Faculty of Engineering

Course Unit Title	Security of Software Systems	
Course Unit Code	SEN315	
Type of Course Unit	Compulsory for SE	
Level of Course Unit	3rd year BSc	
National Credits	3	
Number of ECTS Credits Allocated	5	
Theoretical (hour/week)	3	
Practice (hour/week)	0	
Laboratory (hour/week)	0	
Year of Study	3	
Semester when the course unit is delivered	5	
Mode of Delivery	Face to face, E-learning	
Language of Instruction	English	
Prerequisites	SEN201	
Corequisites		
Recommended Optional Programme Components		
Objectives of the Course:		
<ul style="list-style-type: none"> • Introduce fundamental principles of software security and secure software development within the software life cycle • Develop student ability to identify common software vulnerabilities and apply secure design and coding practices • Provide practical experience with threat modeling, security testing, and secure code review concepts • Encourage students to connect software engineering practice with security requirements and risk mitigation 		
Learning Outcomes		
When this course has been completed the student should be able to		Assess.
1	Learn how to explain the role of security in software systems and secure software development	1,3
2	Learn to identify common software vulnerabilities, threats, and attack surfaces	1,3
3	Learn how to apply secure design principles, defensive programming, and secure coding practices	1,3
4	Learn how to use threat modeling, code review, and testing concepts for improving software security	1,3
5	Understand the fundamentals of authentication, authorization, cryptography basics, and security testing in software systems	1,3
6	Learn how to analyze a small software project from a software security perspective and propose mitigation strategies	1,3
Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab Work		
Course's Contribution to Program		
		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	2
2	Ability to design and conduct experiments as well as to analyze and interpret	2
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	3
4	Ability to apply systems thinking in problem solving	3
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	3

6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice		3
7	Ability to express their ideas and findings, in written and oral form		2
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints		3
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner		3
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Subject	Exams
1	1	Introduction to Software Security	
2	2	Security Principles and Secure SDLC	
3	3	Threat Modeling and Risk Analysis	
4	4	Authentication, Authorization, and Access Control	
5	5	Common Software Vulnerabilities and Attack Surfaces	
6	6	Secure Design Principles and Defensive Programming	
7	7	Secure Coding and Code Review	
8			Midterm
9	8	Security Testing and Static/Dynamic Analysis	
10	9	Cryptography Basics for Software Engineers	
11	10	Web and Application Security Fundamentals	
12	11	Secure Architecture and Design Patterns	
13	12	Software Security Project and Presentation	
14	13	Course Review	
15			Final
Recommended Sources			
<ul style="list-style-type: none"> Textbook: Software Security: Building Security In, Gary McGraw Supplementary: Computer Security: Principles and Practice, 4th Edition, William Stallings and Lawrie Brown Supplementary: Secure Coding in C and C++, 2nd Edition, Robert C. Seacord 			
Assessment			
Midterm exam	25 %		
Final exam	35 %		
Project/report	25 %		
Assignments/quizzes	15 %		
ECTS Allocated Based on the Student Workload			
Activities	Number	Duration (hour)	Total Workload (hour)
In-class lecture (including exam weeks)	15	3	45
Midterm exam	1	1.5	1.5
Midterm exam preparation	1	15	15
Final exam	1	1.5	1.5
Final exam preparation	1	20	20
Quiz	2	2	4
Assignment	4	3	12
Project/presentation/report writing	1	14	14

Lab and tutorial	0	0	0
Self-study	15	2	30
Total Workload			143.00
Total Workload / 30 (h)			4.77
ECTS Credit of the Course			5