



## Course Specification of Information Security

Course No ( ..... )

2020/2021

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
Rector of Sana'a University			
Prof. Dr. Qassim Mohammed Abbas			



## I. Course Identification and General Information:

1	Course Title:	Information Security			
2	Course Code & Number:				
3	Credit hours:	C.H			
		Th.	Seminar	Pr	Tr.
		2		2	
4	Study level/ semester at which this course is offered:	3 <sup>rd</sup> Level -1 <sup>st</sup> Semester			
5	Pre –requisite (if any):	Computer Programming, Operating Systems and Network Fundamentals			
6	Co –requisite (if any):	None			
7	Program (s) in which the course is offered:	Computer Science, Information Systems and Information Technology			
8	Language of teaching the course:	Arabic/English			
9	Study System	Term based system			
10	Mode of delivery:	Full Time			
11	Location of teaching the course:	Faculty of computer science and technology.			
12	Prepared By:	Dr. Abdul Wasea Al-Azzani			
13	Date of Approval				

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



## II. Course Description:

This course aims to student's acquiring a skills of maintain an information security properties through storing, processing and transmission. The course introduces the security properties, risks, vulnerabilities, threats and attacks and attacker types, authentication, access control, cryptography, software lifecycle, operating system security, networks and practical for develop, implement and manage a secure system to protect and defend information security resources.

III. Course Intended learning outcomes (CILOs)		Referenced PILOs A2,A4, B4,B5, C1,C4, D1,D2,D5
a.1	Explain the important of information security, security properties, risk, threats, vulnerabilities and attacks, access controls, authentication and security policies.	A2, A4
a.2	Describe a cryptography, lifecycle of a product and security considerations in system development, operating system roles, web and network security.	A2, A4
b.1	Explore and differentiate between threats, attacks, programs and programming oversights, security tools and techniques.	B5
b.2	Analyze the impacts of threats, vulnerabilities and attacks on information security, and tradeoffs of balancing key security properties through a system development.	B4,
c.1	Employ a security product lifecycle in system development and make a security considerations in each stage to build a secure system according to needs.	C1
c.2	Solve a security problems and mange a security system to controls the access to computing security resources.	C4
d.1	Work efficiently as a team member or individual according to ethical, legal, organization security policy, and responsibilities to perform a desired tasks.	D1,D5

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



d.2	Write a technical report related to information security topics.	D2
-----	--	----

**(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Explain the important of information security, security properties, risk, threats, vulnerabilities and attacks, access controls, authentication and security policies.	Lecture, Exercises, Guided Individual Reading, Problem-Solving.	Written Examinations, Homework, Quizzes, Problem-Solving Exercises.
a2- Describe a cryptography, lifecycle of a product and security considerations in system development, operating system roles, web and network security.	Lecture, Exercises, Guided Individual Reading, Problem-Solving.	Written Examinations, Homework, Quizzes, Problem-Solving Exercises.

**(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Explore and differentiate between threats, attacks, programs and programming oversights, security tools and techniques.	Lecture, Exercises, Lab sessions, Problem-Solving, Brainstorming, Project.	Written Examinations, Problem-Solving Exercises, Quizzes, Individual and Group Project.
b2- Analyze the impacts of threats, vulnerabilities and attacks on information security, and tradeoffs of balancing key security properties through a system development.	Lecture, Exercises, Lab sessions, Problem-Solving, Brainstorming, Project.	Written Examinations, Problem-Solving Exercises, Quizzes, Individual and Group Project.

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr. Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



**(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1-</b> Employ a security product lifecycle in system development and make a security considerations in each stage to build a secure system according to needs.	Lectures, Individual/group project, Problem-Solving.	Presentation Project, Technical Report, Problem-Solving Exercise.
<b>c2-</b> Solve a security problems and manage a security system to controls the access to computing security resources.	Lectures, Individual/group project, Problem-Solving.	Presentation Project, Technical Report, Problem-Solving Exercise.

**(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Work efficiently as a team member or individual according to ethical, legal, organization security policy, and responsibilities to perform a desired tasks.	Lab Sessions, Practical Report, Project.	Written Examinations (Lab), Technical Report, Individual and Group Project Presentation.
<b>d2-</b> Write a technical report related to information security topics.	Lab Sessions, Practical Report, Project.	Written Examinations (Lab), Technical Report, Individual and Group Project Presentation.

Head of Department	Vice Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr. Huda Al-Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction	a1, b2	Meaning of Security, Information Security Definition and Areas, Information Security Classification, Information Security Properties/Goals (Confidentiality, Integrity, Availability), Acts on Security Properties (Interception, Interruption, Modification, Fabrication) Information Security vulnerability, threats and attacks, Computer Crimes, Information Assurance model, Countermeasures/Controls.	1	2
2	Authentication	a1, b1, c2, d2	Identification Versus Authentication, Authentication Based on Phrase and Facts,	1	2

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



			Authentication Based on Biometric, Authentication Based on Token, Federated Identity Management, Multi Factors Authentication, Secure Authentication.		
3	Access Controls	a1, b1, c2, d2	Access Control, Access Policies, Implementing Access Control: Reference Monitor, Access Control Directory, Access Control Matrix, Access Control List, Privilege List, Capability, Procedure-Oriented Access Control, and Role-Based Access Control.	1	2
4	Cryptography	a1,a2, b1, c2, d2	Cryptography Concepts and Terms, Cipher/Cryptography Types: Substitution, Transpositions, Stream, and Block Ciphers, Symmetric Encryption: Data Encryption Standards(DES), Advanced Encryption Standards(AES)	2	4

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



			Public Key Encryption: RSA, Hash Functions,  Cryptography Used: protected communications channels and to seal a file, Hash Function, Key Exchange, Digital Signature, Public Key Protocol, and Certificates Issue.		
5	Programs and Programming	a2, b1, b2, c1, d2	Introduction: programs, flaw, fault, failure and a taxonomy of program flaws.  Unintentional (Nonmalicious) Programming oversights: buffer overflows, off-by-one errors, incomplete mediation, time-of-check to time-of-use errors.  Malicious code: viruses, worms, Trojan horses.  Countermeasures: Countermeasures for Users, Countermeasures for Developers (software engineering techniques, security life cycle, testing and testing types).	3	6
6	Web-User Side Attacks	a2, b1, c1, c2, d2	Browser Attacks and types, Web Attacks Targeting Users and Protecting	1	2

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
<p style="text-align: right;"><b>Rector of Sana'a University</b> Prof. Dr. Qassim Mohammed Abbas</p>			



			Against Malicious Web Pages. Obtaining User or Website Data. Email Attacks, and Protecting Against Email Attacks.		
7	Operating System Security	a2, b1, c2, d2	<b>Security in Operating Systems:</b> Operating System Structure, A Bit of History, Protected Objects, Operating System Tools to Implement Security Functions and Hardware Protection of Memory. <b>Rootkit:</b> Phone Rootkit, Rootkit Evades Detection, Rootkit Operates Unchecked, Sony XCP Rootkit, TDSS Rootkits, and Other Rootkits.	1.5	3
8	Network Security	a2, b1,b2, c1,c2, d2	<b>Threats to Network Communications:</b> interception, modification, fabrication, interruption, port scanning. <b>Wireless Network Security:</b> Vulnerabilities in Wireless Networks, WEP (Wired Equivalent Privacy), WPA (WiFi Protected Access),	2.5	5

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



			Denial of Service, and Distributed Denial-of-Service Concept.  Strategic Defenses: Security Countermeasures (categories of controls):  Cryptography in Network Security: Network Encryption, Browser Encryption, Onion Routing, IP Security Protocol Suite (IPsec), Virtual Private Networks, System Architecture.  network-protection tool: Firewall Concept.  Intrusion detection system and prevention system Concept. Network Management: Management to Ensure Service, Security Information and Event Management (SIEM).		
9	Individual/Group Project Presentation	a1,a2, b1,b2, c1,c2, d1,d2		1	2
Number of Weeks /and Units Per Semester				14	28

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
<b>Rector of Sana'a University</b> Prof. Dr. Qassim Mohammed Abbas			



### B - Practical Aspect: (if any):

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to information security	1	2	a1, c1, d2
2	Ethical Hacking, Social Engineering	1	2	b1, c1, d2
3	Installing OS (Kalilinux)	1	2	b1,b2, c1, d2
4	Scanning tools NMAP, ZENMAP	1	2	b1,b2, c1,c2,d2
5	Metasploit	1	2	b1,b2, c1,c2,d2
6	Network traffic sniffing	1	2	b2, c1,c2, d1
7	Session hijacking	1	2	b1,b2, c1,c2, d2
8	Password guessing and cracking	1	2	b1,b2, c1,c2, d2
9	Viruses	1	2	b1,b2, d2
10	SQL injection	1	2	b1,b2, c1,c2, d2
11	Data Encryption	1	2	b1, c2, d2
12	Privacy and Data Protection	1	2	b1, c2, d2
13	User Authorization Security	1	2	b1, c1, d2
14	Windows Security	1	2	b1,b2, c1,c2, d1,d2
Number of Weeks /and Units Per Semester		14	28	

### V. Teaching strategies of the course:

Lecture

Head of Department

Vise Dean for Quality Assurance

Dean of the Faculty

Dean of Development center and Quality Assurance

Assoc. Prof. Mansour N. Ali

Dr. Anwar Al-Shamiri

Dr. Nagi Al-Shibani

Assoc. Prof. Dr.Huda Al.Emad

Rector of Sana'a University

Prof. Dr. Qassim Mohammed Abbas



#### Exercises

Guided individual reading

Problem Solving in end of each Chapter,

Brainstorming.

Lab sessions

Practical Report

Case Study

Individual/Group Project.

### VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Homework and Problem-Solving Exercises	a1,a2, b2	Monthly	5
2	Technical Report	a1,a2, b1,b2, c1,c2, d1,d2	Monthly	5
3	Quizzes	a1,a2, b1,b2, c1,c2, d1,d2	Monthly	5
Total				15

### VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
-----	-------------------	----------	------	--------------------------------	----------------------------------

Head of Department

Vise Dean for Quality Assurance

Dean of the Faculty

Dean of Development center and Quality Assurance

Assoc. Prof. Mansour N. Ali

Dr. Anwar Al-Shamiri

Dr. Nagi Al-Shibani

Assoc. Prof. Dr.Huda Al.Emad

Rector of Sana'a University

Prof. Dr. Qassim Mohammed Abbas



1	Assignment	Monthly	15	15%	a1,a2, b1,b2, c1,c2, d2
2	Mid Term Exam (Theoretical)	6 <sup>th</sup>	5	5%	a1,a2, b1,b2, c1
3	Mid Term Exam (Practical)	7 <sup>th</sup>	5	5%	
4	Individual/Group Students Projects	5 <sup>th</sup>	5	5%	a1,a2, b1,b2, c1,c2, d1,d2
5	Final Semester Exam (Practical)	Related to a faculty time-table Exams 6 <sup>th</sup>	10	10%	
6	Final Semester Exam (Theoretical)	Related to a faculty time-table Exams 16 <sup>th</sup>	60	60%	a1,a2, b1,b2, c1,c2
Final Mark			100	100%	

## VII. Learning Resources:

- Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

### 1- Required Textbook(s) ( maximum two ).

1. P. Pfleeger, Shari Lawrence Pfleeger and Jonathan Margulies, 2015, Security in Computing, 5<sup>th</sup> Edition, USA, Pearson Education, Inc.

### 2- Essential References.

1. Whitman, Michael; Mattord, Herbert , 2017, Principles of Information Security, 6<sup>th</sup> ed, Cengage Learning.
2. Charles P. Pfleeger and Shari Lawrence Pfleeger, 2012, Analyzing Computer Security: a threat/vulnerability/countermeasure approach, 1<sup>st</sup> Edition, USA, Pearson Education, Inc.
3. William Stallings, 2014, Cryptography and Network Security-Principles and Practice, 6<sup>th</sup> Edition, USA, Pearson Education, Inc.

### 3- Electronic Materials and Web Sites etc.

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



1.	Lecture Notes,
2.	<a href="http://www.gridsure.com">http://www.gridsure.com</a>
3.	<a href="http://cve.mitre.org/">http://cve.mitre.org/</a>
4.	<a href="http://nvd.nist.gov/cvss.cfm">http://nvd.nist.gov/cvss.cfm</a>
5.	<a href="http://www.rsa-labs.com">RSA Laboratories</a>
6.	<a href="https://www.omnisecu.com/security/index.php">https://www.omnisecu.com/security/index.php</a>
7.	<a href="https://www.tutorialspoint.com/itil/itil_information_security_management.htm">https://www.tutorialspoint.com/itil/itil_information_security_management.htm</a>
8.	<a href="https://searchsecurity.techtarget.com/tutorial/Information-security-tutorials">https://searchsecurity.techtarget.com/tutorial/Information-security-tutorials</a>

IX. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of Computer and Information Technology apply. For the policy, see: ----- -- The University Regulations on academic misconduct will be strictly enforced. Please refer to ----- ----	
1	<b>Class Attendance:</b> A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic
2	<b>Tardy:</b> For late in attending the class, the student will be initially notified. If he repeated lateness in attending class, he will be considered as absent.
3	<b>Exam Attendance/Punctuality:</b> A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.
4	<b>Assignments &amp; Project</b> The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
5	<b>Cheating:</b> For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.
6	<b>Plagiarism:</b> Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he will be

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



	disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7	<b>Other policies:</b> <ul style="list-style-type: none"> <li>- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room</li> <li>- Mobile phones are not allowed in class during the examination.</li> <li>- Lecture notes and assignments my given directly to students using soft or hard copy</li> </ul>

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
<b>Rector of Sana'a University</b> Prof. Dr. Qassim Mohammed Abbas			



## Faculty of Computer & Information Technology

### Department of Computer Science

### Program of Computer Science

### Course syllabus of Information Security

**Course No ( ..... )**

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
Rector of Sana'a University			
Prof. Dr. Qassim Mohammed Abbas			



2020/2021

## Template for Course Plan (Syllabus)

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member	Computer and Information Technology (FCIT)	Office Hours				
Location & Telephone No.	Computer and Information Technology (FCIT)	SAT	SUN	MON	TUE	WED
E-mail						

II. Course Identification and General Information:				
1	Course Title:	Information Security		
2	Course Number & Code:			
3	Credit hours:	C.H		
		Th.	Seminar	Pr.
		2		2
4	Study level/year at which this course is offered:	3 <sup>rd</sup> Level -1 <sup>st</sup> Semester		
5	Pre –requisite (if any):	Computer Programming, Operating Systems and Network Fundamentals		

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



6	Co –requisite (if any):	None
7	Program (s) in which the course is offered	Computer Science, Information Systems and Information Technology
8	Language of teaching the course:	Arabic/English
9	System of Study:	Term based system
10	Mode of delivery:	Full Time
11	Location of teaching the course:	Faculty of computer science and technology.

### III. Course Description:

This course aims to student's acquiring a skills of maintain an information security properties through storing, processing and transmission. The course introduces the security properties, risks, vulnerabilities, threats and attacks and attacker types, authentication, access control, cryptography, software lifecycle, operating system security, networks and practical for develop, implement and manage a secure system to protect and defend information security resources.

### IV. Course Intended learning outcomes (CILOs) of the course

a.1	Explain the important of information security, security properties, risk, threats, vulnerabilities and attacks, access controls, authentication and security policies.
a.2	Describe a cryptography, lifecycle of a product and security considerations in system development, operating system roles, web and network security.
b.1	Explore and differentiate between threats, attacks, programs and programming oversights, security tools and techniques.

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



b.2	Analyze the impacts of threats, vulnerabilities and attacks on information security, and tradeoffs of balancing key security properties through a system development.
c.1	Employ a security product lifecycle in system development and make a security considerations in each stage to build a secure system according to needs.
c.2	Solve a security problems and manage a security system to controls the access to computing security resources.
d.1	Work efficiently as a team member or individual according to ethical, legal, organization security policy, and responsibilities to perform a desired tasks.
d.2	Write a technical report related to information security topics.

## V. Course Content:

### A – Theoretical Aspect:

Order	Topics List	Week Due	Contact Hours
1	<b>Introduction:</b> Meaning of Security, Information Security Definition and Areas, Information Security Classification, Information Security Properties/Goals (Confidentiality, Integrity, Availability), Acts on Security Properties ( Interception, Interruption, Modification, Fabrication) Information Security vulnerability, threats and attacks, Computer Crimes, Information Assurance model,	1 <sup>st</sup>	2

Head of Department	Vice Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



	Countermeasures/Controls.		
2	Authentication Identification Versus Authentication, Authentication Based on Phrase and Facts, Authentication Based on Biometric, Authentication Based on Token, Federated Identity Management, Multi Factors Authentication, Secure Authentication.	2 <sup>nd</sup>	2
3	Access Controls: Access Control, Access Policies, Implementing Access Control: Reference Monitor, Access Control Directory, Access Control Matrix, Access Control List, Privilege List, Capability, Procedure-Oriented Access Control, and Role-Based Access Control.	3 <sup>rd</sup>	2
4	Cryptography: Cryptography Concepts and Terms, Cipher/Cryptography Types: Substitution, Transpositions, Stream, and Block Ciphers, Symmetric Encryption: Data Encryption Standards(DES), Advanced Encryption Standards(AES) Public Key Encryption: RSA, Hash Functions, Cryptography Used: protected communications channels and to seal a file, Hash Function, Key Exchange, Digital Signature, Public Key Protocol, and Certificates Issue.	4 <sup>th</sup> ,5 <sup>th</sup>	4

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



5	Mid Term Exam	6 <sup>th</sup>	2
6	<p>Programs and Programming:</p> <p>Introduction: programs, flaw, fault, failure and a taxonomy of program flaws.</p> <p>Unintentional (Nonmalicious) Programming oversights: buffer overflows, off-by-one errors, incomplete mediation, time-of-check to time-of-use errors.</p> <p>Malicious code: viruses, worms, Trojan horses.</p> <p>Countermeasures: Countermeasures for Users, Countermeasures for Developers (software engineering techniques, security life cycle, testing and testing types).</p>	7 <sup>th</sup> -9 <sup>th</sup>	6
7	<p>Web-User Side Attacks:</p> <p>Browser Attacks and types,</p> <p>Web Attacks Targeting Users and Protecting Against Malicious Web Pages, Obtaining User or Website Data.</p> <p>Email Attacks, and Protecting Against Email Attacks.</p>	10 <sup>th</sup> -12 <sup>th</sup>	3
8	<p>Operating System Security:</p> <p><b>Security in Operating Systems:</b> Operating System Structure, A Bit of History, Protected Objects, Operating System Tools to Implement Security Functions and HW Protection of Memory.</p> <p><b>Rootkit:</b> Phone Rootkit, Rootkit Evades Detection, Rootkit Operates Unchecked, Sony XCP Rootkit, TDSS Rootkits, and Other Rootkits.</p>	1.5	3
9	<p>Network Security:</p> <p><b>Threats to Network Communications:</b> interception, modification, fabrication, interruption, port scanning.</p>	2	4

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



	<b>Wireless Network Security:</b> Vulnerabilities in Wireless Networks, WEP (Wired Equivalent Privacy), WPA (WiFi Protected Access),  Denial of Service, Distributed Denial-of-Service Concept, Strategic Defenses: Security Countermeasures (categories of controls):  Cryptography in Network Security: Network Encryption, Browser Encryption, Onion Routing, IP Security Protocol Suite (IPsec), Virtual Private Networks, System Architecture.  network-protection tool: Firewall Concept.  Intrusion detection system and prevention system Concept. Network Management: Management to Ensure Service, Security Information and Event Management (SIEM).		
10	Students Project Presentation	1	2
11	Final Exam	1	3
Number of Weeks /and Units Per Semester		16	32

### B– Practical Aspect: (if any)

Order	Topics List	Week Due	Contact Hours
1	Introduction to information security	1 <sup>st</sup>	2
2	Ethical Hacking, Social Engineering	2 <sup>nd</sup>	2
3	Installing OS (Kalilinux)	3 <sup>rd</sup>	2

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



4	Scanning tools NMAP, ZENMAP	4 <sup>th</sup>	2
5	Metasploit	5 <sup>th</sup>	2
6	Network traffic sniffing	6 <sup>th</sup>	2
7	Mid Term Exam	7 <sup>th</sup>	2
8	Session hijacking	8 <sup>th</sup>	2
9	Password guessing and cracking	9 <sup>th</sup>	2
10	Viruses	10 <sup>th</sup>	2
11	SQL injection	11 <sup>th</sup>	2
12	Data Encryption	12 <sup>th</sup>	2
13	Privacy and Data Protection	13 <sup>th</sup>	2
14	User Authorization Security	14 <sup>th</sup>	2
15	Windows Security	15 <sup>th</sup>	2
16	Final Exam	16 <sup>th</sup>	2
Number of Weeks /and Units Per Semester			

## VI. Teaching strategies of the course:

Lecture  
Exercises  
Guided individual reading  
Problem Solving in end of each Chapter,  
Brainstorming.

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



Lab sessions  
Practical Report  
Case Study  
Individual/Group Project.

No	Assignments	Week Due	Mark
1	Homework and Problem-Solving Exercises	Monthly	5
2	Technical Report	Monthly	5
3	Quizzes	Monthly	5
Total			15

## VII. Schedule of Assessment Tasks for Students During the Semester:

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Assignment	Monthly	15	15%
2	Mid Term Exam (Theoretical)	6 <sup>th</sup>	5	5%
3	Mid Term Exam (Practical)	7 <sup>th</sup>	5	5%
4	Individual/Group Students Projects	5 <sup>th</sup>	5	5%
5	Final Semester Exam (Practical)	Related to a faculty time-	10	10%

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



		table Exams16 <sup>th</sup>		
	Final Semester Exam (Theoretical)	Related to a faculty time- table Exams16 <sup>th</sup>	60	60%
Final Mark			100	100%

## VIII. Learning Resources:

### 1- Required Textbook(s) ( maximum two ).

1. P. Pfleeger, Shari Lawrence Pfleeger and Jonathan Margulies, 2015, Security in Computing, 5<sup>th</sup> Edition, USA, Pearson Education, Inc.

### 2- Essential References.

1. Whitman, Michael; Mattord, Herbert , 2017, Principles of Information Security, 6<sup>th</sup> ed, Cengage Learning.
2. Charles P. Pfleeger and Shari Lawrence Pfleeger, 2012, Analyzing Computer Security: a threat/vulnerability/countermeasure approach, 1<sup>st</sup> Edition, USA, Pearson Education, Inc.
3. William Stallings, 2014, Cryptography and Network Security-Principles and Practice, 6<sup>th</sup> Edition, USA, Pearson Education, Inc.

### 3- Electronic Materials and Web Sites etc.

1. Lecture Notes,
2. <http://www.gridsure.com>
3. <http://cve.mitre.org/>
4. <http://nvd.nist.gov/cvss.cfm>
5. [RSA Laboratories](https://www.rsa-labs.com/)
6. <https://www.omniseccu.com/security/index.php>
7. [https://www.tutorialspoint.com/itil/itil\\_information\\_security\\_management.htm](https://www.tutorialspoint.com/itil/itil_information_security_management.htm)
8. <https://searchsecurity.techtarget.com/tutorial/Information-security-tutorials>

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad

**Rector of Sana'a University**  
Prof. Dr. Qassim Mohammed Abbas



<b>I. Course Policies:</b>	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of Computer and Information Technology apply. For the policy, see: -----	
--	
The University Regulations on academic misconduct will be strictly enforced. Please refer to -----	
----	
<b>1</b>	<b>Class Attendance:</b> A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic
<b>2</b>	<b>Tardy:</b> For late in attending the class, the student will be initially notified. If he repeated lateness in attending class, he will be considered as absent.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.
<b>4</b>	<b>Assignments &amp; Project</b> The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
<b>5</b>	<b>Cheating:</b> For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.
<b>6</b>	<b>Plagiarism:</b> Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
<b>7</b>	<b>Other policies:</b> - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination.

Head of Department	Vise Dean for Quality Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
<b>Rector of Sana'a University</b> Prof. Dr. Qassim Mohammed Abbas			



	- Lecture notes and assignments my given directly to students using soft or hard copy
--	---

اللجنة الإشرافية			
م.	الاسم	الصفة	التوقيع
١	أ.م.د. عبد الماجد الخليدي	نائب عميد الكلية للشؤون الأكاديمية	
٢	أ.م.د. احمد مجاهد	نائب عميد مركز التطوير الأكاديمي وضمان الجودة	
٣	د. حسين الأشول	ممثل المركز في الكلية	
٤	أ.د. إبراهيم المطاع	نائب رئيس الجامعة للشؤون الأكاديمية	

Head of Department	Vise Dean for Qulity Assurance	Dean of the Faculty	Dean of Development center and Quality Assurance
Assoc. Prof. Mansour N. Ali	Dr. Anwar Al-Shamiri	Dr. Nagi Al-Shibani	Assoc. Prof. Dr.Huda Al.Emad
Rector of Sana'a University			
Prof. Dr. Qassim Mohammed Abbas			