# Course Specifications

## General Information

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| **Course name** | Information Security |
| **Course number** | ITCS4301 |
| **Faculty** | |
| **Department** | |
| **Course type** | Major Needs |
| **Course level** | 4 |
| **Credit hours (theoretical)** | 3 |
| **Credit hours (practical)** | 0 |
| **Course Prerequisites** | |

## Course Objectives

1 - Understanding the principles and fundamentals of information and network security with emphasis on: Basic concepts of information and computer network security; classical encryption techniques; modern symmetric encryption techniques; public-key encryption; system and network security tools and network security practice

2 - Comprehensive knowledge, skills and attitudes appropriate for careers in information security

3 - Understanding the organization’s policies and processes, thereby reducing the organization’s liability due to security failures

4 - The latest advantages of information security

## Intended Learning Outcomes

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| **Knowledge and Understanding** | * a1. Identify contemporary issues in information security |
| | * a2. Define information security risks |
| | * a3. Define the three aspects of information security: services, mechanisms and attacks |
| | * a4. Describe cipher principles |
| | * a5. Discuss the cryptographic systems |
| | * a6. Describe the basic operations and applications of firewalls, Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS) |
| | * a7. Discuss the Malicious Software and Antivirus Approaches |
| | * a8. Identify the policy and technology trade-offs involved in developing information security systems of adequate quality |
| **Intellectual Skills** | * b1. Evaluate classical techniques of information security |
| | * b2. Evaluate cryptographic systems algorithms |
| | * b3. Identify the impact of different security breaches on Information security |
| | * b4. Explain the guidelines and procedures of Information security investigations |
| | * b5. Perform comparisons between (methods, techniques...etc) related to information security |
| | * b6. Identify countermeasures and review techniques appropriate to the management of information security risks |
| **Professional Skills** | * c1. Institute Information security program management |
| | * c2. Perform contingency and disaster planning |
| | * c3. Use appropriate programming languages |
| | * c4. Implement cryptographic systems algorithms |
| | * c5. Implement different ciphers on Software |
| **General Skill** | * d1. Work in stressful environment and within constraints |
| | * d2. Communicate effectively |
| | * d3. Demonstrate efficient IT capabilities |
| | * d4. Lead and motivate individuals |
| | * d5. Manage tasks and resources |

## Course Contents

1 - Introduction to Information Security: The History of Information Security, What Is Security? Components of an Information System, Components of an Information System, Balancing Information Security and Access, Approaches to Information Security Implementation, The Systems Development Life Cycle

2 - The Need for Security: Threats, Attacks, Secure Software Development

3 - Legal, Ethical, and Professional Issues in Information Security

4 - Risk Management

5 - Planning for Security

6 - Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools

7 - Security Technology: Firewalls and VPNs: Access Control: Identification Authentication ,Authorization, Accountability, Firewalls: Firewall Processing Modes Firewalls Categorized by Generation, Firewalls Categorized by Structure Firewall Architectures Selecting the Right Firewall Configuring and Managing Firewalls, Content Filters , Protecting Remote Connections: Remote Access Virtual Private Networks (VPNs)

8 - Cryptography: Introduction, Foundations of Cryptology, Terminology, Cipher Methods: Substitution Cipher Transposition Cipher, Exclusive OR, Vernam Cipher, Book or Running Key Cipher, Hash Functions

9 - Public-Key Infrastructure (PKI), Digital Signatures ,Digital Certificates

## Teaching and Learning Methods

1 - Lectures
2 - Tutorial Exercises

## Students Assessment

| Assessment Method | TIME | MARKS |
|---|---|---|
| Mid-Term Exam | During the 8th week | 30% |
| Term Project Presentation and discussion | During the 15th week | 20% |
| Final Exam | During the 16th week | 50% |

## Books and References

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| Essential books | Principals of Information Security, Fourth Edition 2012, by Michael E. Whitman and Herbert J. Mattord |
| Recommended books | - William Stallings , Cryptography and Network Security. Principles and Practice, sixth edition, Prentice Hall, 2013 |

## Knowledge and Skills Matrix

| Main Course Contents | Study Week | Knowledge and Understanding | Intellectual Skills | Professional Skills | General Skill |
|---|---|---|---|---|---|
| Introduction to Information Security: The History of Information Security, What Is Security | 1-2 | a1-a3 | b1, b4-b6 | | d1-d5 |
| Components of an Information System, Components of an Information System, Balancing Information Security and Access, Approaches to Information Security Implementation | 3 | a1-a3 | b1, b4-b6 | | d1-d5 |
| The Need for Security: Threats, Attacks, Secure Software Development | 4 | a1, a2, a4, a5 | b1, b2, b5, b6 | c2-c5 | d1-d5 |
| Legal, Ethical, and Professional Issues in Information Security, Risk Management, Planning for Security | 5-6 | a1-a3, a6 | b3, b5, b6 | c2-c4 | d1-d5 |
| Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools | 6,7 | a1, a2, a6-a8 | b1, b3-b6 | c1 | d1-d5 |
| Security Technology: Firewalls and VPNs: Access Control: Identification Authentication ,Authorization | 8 | a1-a3 | b1, b4-b6 | | d1-d5 |
| Accountability, Firewalls: Firewall Processing Modes Firewalls Categorized by Generation | 9 | a1, a2, a6-a8 | b1, b3-b6 | c1 | d1-d5 |
| Firewalls Categorized by Structure Firewall Architectures Selecting the Right Firewall Configuring and Managing Firewalls | 10 | a1, a2, a6-a8 | b1, b3-b6 | c1 | d1-d5 |
| Content Filters , Protecting Remote Connections: Remote Access Virtual Private Networks (VPNs) | 11 | a1, a2, a6-a8 | b1, b3-b6 | c1 | d1-d5 |
| Cryptography: Introduction, Foundations of Cryptology, Terminology, Cipher Methods: Substitution Cipher Transposition Cipher, Exclusive OR, Vernam Cipher, Book or Running Key Cipher, Hash Functions | 12,13 | a1, a2, a8 | b5, b6 | c1 | d1-d5 |
| Public-Key Infrastructure (PKI), Digital Signatures ,Digital Certificates | 14,15 | a1, a2, a8 | b5, b6 | c1 | d1-d5 |