# (INFORMATION ENGINEERING)

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|---|---|
| **Programme(s) on which the course is given** | Information Technology |
| **Major or Minor element of programs** | Major |
| **Department offering the program** | Information Technology |
| **Department offering the course** | Information Technology |
| **Academic year / Level** | Fourth Year |
| | |

## A- Basic Information

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|---|---|---|---|---|---|---|
| **Title** | **Information Engineering** | | | **Code** | **IT473** | |
| **Credit Hours** | **Lecture** | **3** | **Tutorial** | **3** | **Practical** | **-** |
| | **Total** | | | | **6** | |

## B- Professional Information

### 1 – Overall aims of course

- Learn fundamentals of cryptography.
- Understand network security threats and countermeasures.
- Gain hands-on experience with programming techniques for security protocols
- Obtain background for original research in network security

### 2 – Intended learning outcomes of course (ILOs)

**2-a Knowledge and understanding:**

| | |
|---|---|
| **a1** | Understanding security basics |
| **a2** | Understanding basics concepts of Cryptography and Hashing |
| **a3** | Understanding the required security mechanisms for network Security |

**2-b Intellectual skills**

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|---|---|
| **b1** | Analysis of computer security problems |
| **b4** | Problem Solving of computer security threats |
| **b2** | Ability to secure messages and text. |
| **b3** | Ability to design an appropriate secure network system. |

## 2-c Professional and practical skills

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| **c1** | Programming Encryption Techniques |
| **c2** | Design a scenarios for network security |
| **c3** | Analysis of network threats and risks |

## 2-d General and transferable skills

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|---|---|
| **d1-** | Concepts of security |
| **d2** | Risk Analysis and threats. |
| **d3** | Basic knowledge of cryptography. |

## 3- Content

| Topic | No. of hours | Lecture | Tutorial/Practical |
|---|---|---|---|
| Introduction to computer security | 6 | 3 | 3 |
| System Authentication | 6 | 3 | 3 |
| System Authorization | 6 | 3 | 3 |
| Logging | 6 | 3 | 3 |
| Classical System Cryptography | 6 | 3 | 3 |
| Private key Cryptography (DES) | 12 | 6 | 6 |
| Public Key Cryptography (RSA) | 12 | 6 | 6 |
| Hashing Techniques | 12 | 6 | 6 |
| Firewalls | 6 | 3 | 3 |
| Intrusion Detection Systems | 6 | 3 | 3 |
| Virus and Malicious ware | 6 | 3 | 3 |
| **Total sum** | **84** | **42** | **42** |

## 4– Teaching and learning methods

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|---|---|
| **4.1** | Information collection |
| **4.2** | Research assignment |
| **4.3** | Lecture |
| **4.4** | Class activities |
| **4.5** | Practical training / lab |
| **4.6** | Case study |

## 5- Student assessment methods

### 5-a- Methods

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|---|---|
| **5.a.1** | Discussions ……. ***to assess*** … Fundamental concepts gained |
| **5.a.2** | Mid term …… . ***to assess*** …gained outcomes |
| **5.a.3** | Reports ……… …. ***to assess*** Research abilities |
| **5.a.4** | Project…. ***to assess*** Programming Skills |
| **5.a.5** | Final exam … ***to assess*** course outcomes |

### 5-b- Assessment schedule

| | | |
|---|---|---|
| **Assessment 1** | 5th week. | Mid term Exams |

|  |  |  |
|---|---|---|
| **Assessment 2** | 8th week. |  |
| **Assessment 3** | 10th weeks |  |
| **Assessment 4** | 16th weeks (Oral and Practical Exams). |  |
| **Assessment 5** | 17th -18th weeks (final written exam). |  |

### 5-c- Weighting of assessments

|  |  |
|---|---|
| **Semester work** | 10% |
| **Mid-term examination** | 10% |
| **Oral examination.** | 10% |
| **Final-term examination** | 70% |
| **Total** | 100% |

## 6- List of references

### 6-a- Course notes

None

### 6-b- Essential books (text books)

[1] William Stallings, *Network Security Essentials: Applications and Standards*, Prentice-Hall, 2000. ISBN 0-13-016093-8.

### 6-c- Recommended books

[1] Charlie Kaufman, Radia Perlman and Mike Speciner, *Network Security - Private Communication in a Public World*, Prentice Hall, 1995. ISBN 0-13-061466-1.

### 6-d- Periodicals, Web sites, … etc

It is recommended for students to search for similar courses in other universities.

## 7- Facilities required for teaching and learning

- Modeling and simulation laboratories.
- Software programs specified in crises simulation and analysis
- Datashow, screen, and laptop computer.

**Course coordinator:**

**Dr. Hatem Mohammed Said Ahmed**

**Head of Department:**

**Prof. Nabil Abd El Wahed Ismail**

**Date:**