# University of Information Technology and Communications (UoITC)

# جامعة تكنولوجيا المعلومات والاتصالات

## College of Medical Informatics

## كلية المعلوماتية الطبية الحيوية

***First Cycle – Bachelor's Degree (B.Sc.) -***

***Science in Intelligent Medical Systems***

بكالوريوس – علوم في الأنظمة الطبية الذكية

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## 1. Mission & Vision Statement

- ***Vision Statement***

The Intelligent Medical Systems Department is aspired to be a distinguished section of the local and international level in the field of supporting and developing health systems and developing scientific research and meeting the needs of government institutions and the labor market with the aim of improving the quality of the health care.

Leadership and excellence in developing an educational and research program in the field of biomedical informatics to meet the requirements of governmental institutions and the labor market at the local and international levels.

- ***Mission Statement***

The Department of Intelligent Medical Systems is a new specialty in Iraqi universities that links the specialty of information technology and medical information systems in order to prepare a distinguished graduate possess the skills needed to keep pace with advances in information technology and mastering them to medical and biological uses and who are qualified for competing in the labor market at the local and international levels.

Providing academic and qualitative programs to prepare graduates with high skills in the field of bioinformatics to be able to contribute in solving the problems of society of an interlaced nature between information technology and biomedical.

## 2. Program Specification

| Program code | BSc-IMS | ECTS | 240 |
|---|---|---|---|
| Duration | 4 level, 8 Semesters | Method of Attendance | Full Time |

Intelligent medical systems, a field that is used in the development of smart medical technologies and systems, and the ability to keep pace with the rapid developments in modern digital medical technologies. Studying in this department we strive to enable students to design and innovate under the close mentorship of our world-class faculty. Our students learn by doing from their very first class, and quickly transition to authentic Technology projects with real-world corporate, government and nonprofit partners.

## 3. Program Goals

The Department of Intelligent Medical Systems seeks to prepare a distinguished graduate with the ability to:

1. Using and developing intelligent medical technologies and systems, and the ability to keep pace with the rapid developments in modern digital medical technologies, and competition in the labor market.
2. Assigning workers in the health field, including surgeons, analysts, and disease specialists, with systems that support their daily work and serve the achievement of results for medical diagnoses and analyzes in less time and with higher accuracy.
3. Collecting, discovering and analyzing medical data and knowing how to use it to serve scientific research and assist various agencies in achieving integrated health care.
4. Strengthening cooperation with interested sectors inside and outside Iraq.
5. Contributing to scientific research with various research ideas to assist to support and enhance the medical diagnosis systems.

6. Upgrading the student's personality by cultivating moral and human values and the national spirit and teaching them the skills of the art of leadership and searching for methods of solving problems and commitment to quality and professional behavior.

7. Providing students with the basic skills that enable them to deal with the environment and conditions of future work effectively, the ability to innovate and diversify, and to find important solutions to the problems they face accurately and quickly, given the importance of these two elements for the success of any medical diagnosis, whether it is manual or digital.

8. Creating an art of dialogue and constructive competition between students with each other, which will have a significant and distinguished reflection on professional work by promoting the spirit of teamwork and constructive professionalism.

## 4. Student Learning Outcomes

1- Intelligent medical systems aim to improve the quality of interventional health care in a way that depends on data collection, analysis, understanding and then employing smart systems that support specialists in this field, which will contribute to reducing medical errors resulting from the hard daily work of doctors and relying on self-assessment, which is not devoid of these errors.

2- The Department of Intelligent Medical Systems works to ensure that the academic program's outputs are based on principles and knowledge from a variety of research areas including artificial intelligence, medical image processing, data analysis, computer vision, bio-imaging, and medicine.

3- Committed to the ultimate goal of creating benefit for patients and medical staff, we aim to develop a holistic concept that spans three important topics: visualization and interpretation of data and real-time assistance and connectivity through a cycle of continuous learning: new spectral imaging technologies are enabled by machine learning deep learning as safe, reliable, and real-time imaging modalities during surgical interventions.

4- When interpreting perceived data in the context of available knowledge, our department specifically addresses common obstacles to clinical translation such as data scarcity, interpretability, and handling uncertainty.

5- With such cooperation with partners in the health and medical field, we can take advantage of these aforementioned methods to develop diagnostic assistance systems and digital analysis using various algorithms and tools in the field of information technology.

6- Transforming medical systems into a medical application machine available to all to facilitate the process of first diagnosis or self-examination by the patients themselves or by doctors who do not have sufficient experience to help them as a preliminary examination or preliminary diagnosis prepared for consultation by specialized centers.

7- One of the most important pillars that the department cares about is working to achieve high accuracy of digital examinations and analyzes, as well as reliable verification of the results of artificial intelligence algorithms and other tools that have been added to design and model various medical systems, applications and sites necessary to perform predictions, classifications of diseases and clinical diagnoses.

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## 6. Credits, Grading and GPA

- **Credit System**

The University of Information Technology and Communications adheres to the Bologna Process, implementing the European Credit Transfer System (ECTS).

The total number of ECTS required for the degree program is 240, with 30 ECTS earned per semester. Each ECTS corresponds to 25 hours of student workload, encompassing both structured and unstructured activities.

- **Grading**

Prior to evaluation, results are categorized into two groups: pass and fail. Consequently, the results are independent of the students who did not pass a course. The grading system is outlined as follows:

| GRADING SCHEME<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | FX – Fail | راسب - قيد المعالجة | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |
| Note: | | | | |
| Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |

- **Calculation of the Cumulative Grade Point Average (CGPA)**

1. The CGPA is determined by summing the product of each module score and its corresponding ECTS, then dividing the total by the program's overall ECTS.

For a 4-year B.Sc. degree, the formula is as follows:

CGPA = [ (1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

## 7. Curriculum/Modules

### Semester 1: 30 ECTS: 1 ECTS = 25hrs

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310000 | Biology | 63 | 87 | 150 | 6 | C | / |
| ITC310011 | Computer Programming I | 63 | 87 | 150 | 6 | B | / |
| ITC310020 | Computer Fundamentals | 63 | 37 | 100 | 4 | B | / |
| ITC310030 | Mathematics | 93 | 57 | 150 | 6 | B | / |
| ITC310040 | Introduction to Medical Informatics | 63 | 87 | 150 | 6 | C | / |
| ITC000000 | Democracy and Human Rights | 33 | 17 | 50 | 2 | S | / |
| Total | | 378 | 372 | 750 | 30.00 | | |

### Semester 2: 30 ECTS: 1 ECTS = 25hrs

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310012 | Computer Programming II | 63 | 87 | 150 | 6.00 | B | ITC310011 |
| ITC310050 | General Anatomy and Physiology | 63 | 62 | 125 | 5.00 | C | ITC310040 |
| ITC310060 | Molecular Biology | 63 | 62 | 125 | 5.00 | C | ITC310000 |
| ITC310070 | Logic Design | 63 | 62 | 125 | 5.00 | B | / |
| ITC310080 | Medical Devices and Terminology | 63 | 62 | 125 | 5.00 | C | ITC310040 |
| ITC000031 | English Language I | 33 | 17 | 50 | 2.00 | S | / |
| ITC000041 | Arabic Language I | 33 | 17 | 50 | 2.00 | S | / |
| Total | | 381 | 369 | 750 | 30.00 | | |

### Semester 3: 30 ECTS: 1 ECTS = 25hrs

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310090 | Object Oriented Programming | 63 | 87 | 150 | 6.00 | C | ITC310012 |
| ITC310100 | Data Structures | 63 | 87 | 150 | 6.00 | C | ITC310012 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ITC310110 | Discrete Mathematics | 33 | 42 | 75 | 3.00 | B | ITC310030 |
| ITC310120 | Human Diseases for the Health Professions | 63 | 87 | 150 | 6.00 | C | ITC310040 |
| ITC310130 | Operating Systems | 63 | 112 | 175 | 7.00 | B | ITC310012 |
| ITC000010 | Crimes of the baath regime in Iraq | 33 | 17 | 50 | 2.00 | S | / |
| Total | | 318 | 432 | 750 | 30.00 | | |

**Semester 4: 30 ECTS: 1 ECTS = 25hrs**

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310140 | Biochemistry | 63 | 87 | 150 | 6.00 | C | ITC310000 |
| ITC310150 | Bioinformatics | 63 | 87 | 150 | 6.00 | C | ITC310040 |
| ITC310160 | Database Systems | 63 | 87 | 150 | 6.00 | B | / |
| ITC310170 | Statistics and Probability | 63 | 87 | 150 | 6.00 | B | ITC310030 |
| ITC310180 | Data Science Ethics | 33 | 17 | 50 | 2.00 | S | / |
| ITC000032 | English Language II | 33 | 17 | 50 | 2.00 | S | ITC000031 |
| ITC000042 | Arabic Language II | 33 | 17 | 50 | 2.00 | S | ITC000041 |
| Total | | 351 | 399 | 750 | 30.00 | | |

**Semester 5: 30 ECTS: 1 ECTS = 25hrs**

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310190 | Artificial Intelligence | 63 | 62 | 125 | 5.00 | C | ITC310090 |
| ITC310200 | Image Processing | 63 | 62 | 125 | 5.00 | C | ITC310090 |
| ITC310210 | Geographical Information Systems | 63 | 62 | 125 | 5.00 | C | / |
| ITC310220 | Applications Development | 63 | 62 | 125 | 5.00 | C | ITC310100 |
| ITC310230 | Software Engineering | 63 | 62 | 125 | 5.00 | B | ITC310090 |
| ITC310240 | Computer Networks | 63 | 62 | 125 | 5.00 | C | ITC310020 |
| Total | | 378 | 372 | 750 | 30.00 | | |

**Semester 6: 30 ECTS: 1 ECTS = 25hrs**

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310250 | Web Development | 63 | 62 | 125 | 5.00 | B | ITC310012 |
| ITC310260 | Machine Learning | 63 | 62 | 125 | 5.00 | C | ITC310190 |
| ITC310270 | Computer Vision | 63 | 62 | 125 | 5.00 | C | ITC310200 |
| ITC310280 | Embedded Systems | 63 | 62 | 125 | 5.00 | C | ITC310130 |
| ITC310290 | Mobile Applications | 63 | 62 | 125 | 5.00 | C | ITC310220 |
| ITC310300 | Wireless Sensor Networks | 63 | 62 | 125 | 5.00 | C | ITC310240 |
| Total | | 378 | 372 | 750 | 30.00 | | |

**Semester 7: 30 ECTS: 1 ECTS = 25hrs**

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310310 | Cloud Computing | 63 | 62 | 125 | 5.00 | E | ITC310250 |
| ITC310320 | Data Mining | 63 | 62 | 125 | 5.00 | C | ITC310260 |
| ITC310330 | Electronic Health Records | 63 | 62 | 125 | 5.00 | C | ITC310040,ITC310160 |
| ITC310340 | Deep Learning | 63 | 62 | 125 | 5.00 | C | ITC310190 |
| ITC310350 | Simulation and Modeling in Medical Applications | 63 | 62 | 125 | 5.00 | E | ITC310190 ,ITC310240 |
| ITC310361 | Final Project I | 32 | 93 | 125 | 5.00 | C | / |
| Total | | 347 | 403 | 750 | 30.0 | | |

**Semester 8: 30 ECTS: 1 ECTS = 25hrs**

| Module Code | Module Name in English | SSWL | USSWL | SWL | ECTS | Module Type | Pre-request |
|---|---|---|---|---|---|---|---|
| ITC310370 | Big Data Analytics | 63 | 62 | 125 | 5.00 | E | ITC310310 |
| ITC310380 | Information Security | 63 | 62 | 125 | 5.00 | C | ITC310030 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **ITC310390** | **Health Care Systems Administration** | **63** | **62** | **125** | **5.00** | **C** | **ITC310040,ITC310160,ITC310240** |
| **ITC310400** | **Human and Computer Interaction** | **63** | **62** | **125** | **5.00** | **C** | **ITC310220, ITC310290** |
| **ITC310410** | **Medical Multimedia** | **63** | **62** | **125** | **5.00** | **C** | **ITC310200** |
| **ITC310362** | **Final Project II** | **32** | **93** | **125** | **5.00** | **C** | **ITC310361** |
| **Total** | | **347** | **403** | **750** | **30.0** | | |

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