The 25th Meeting of COMSATS Coordinating Council

Higher Institute for Applied Sciences and Technology

المعهد العالي للعلوم التطبيقية والتكنولوجيا

For highly qualified engineers

Dr. Chadi ALBITAR

Director of Scientific Collaboration, Media and Publishing

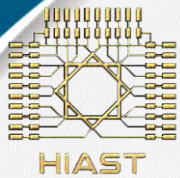**Tel**: +963-11-5123819   **Fax**:+963-11-5140761

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Outlines

- About HIAST
- Achievements in 2023
- Collaborations with other Centers of Excellence
- Future Work

www.hiast.edu.sy

About HIAST

- Established in 1983 in collaboration with the EU to provide highly-qualified **engineers** and **researchers** in applied sciences and technology, so they can actively participate in the scientific and economic development process in Syria.

- Selecting high ranked students in Baccalaureate + NCD students.

- Limited number of students.

- Highly qualified teaching staff.

- Ideal academic environment.
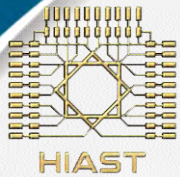
About HIAST

- Staff:
  - 69 Researchers
  - 110 Engineers
  - 37 Technicians
  - 31 Administrative staff
- Students:
  - 422 undergraduates
  - 78 postgraduates (59 Master, 19 PhD)

Excellent **ratio**
teacher/student < **1/5**
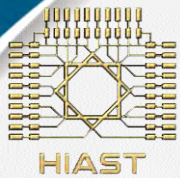
About HIAST

- Accepted students are from two categories:
    - Students funded by public institutions
    - Self-financed students
- Offered degrees:
    - Bachelor of Science in Engineering (**5 years**)
    - Masters (**2 years**)
    - PhDs (**3 years**)

Bachelor of Science in Engineering Programs

Mechatronics

Telecommunication

Electronic Systems

Aeronautics (Aleppo)
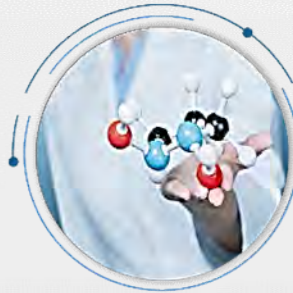
Materials Science & Engineering

Informatic Systems

Postgraduate Studies: Academic Master Programs
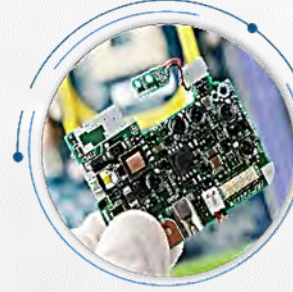
Automatic Control and Robotics

- Automatic Control
- Robotics

Informatics

- Information & Decision Support Systems
- Big Data Systems

Materials Science and Engineering

- Metallurgy Science & Technology
- Polymer Science & Technology
- Glass & Ceramic Science & Technology

Communications Systems

- Signal Processing
- Digital Communication
- Communication Networks
- Radio & mobile Communication

Optical Science and Engineering

- Optical Systems
- Laser Systems
- Optical Measurement Systems

PhD Programs: Informatics, Communication, Control Systems, Applied Physics

- # Informatics
  - Big Data and Machine learning
  - Decision Support Systems
  - Networks' Security

<u>**Research Axes:**</u>

I. AI and Big Data

II. Computer Processing of Arabic Language

III. Networks & Data Security

- # Telecommunications

    - ## Radio, Optical and Digital communications
    - ## Signal and Image processing
    - ## Communication networks and networking

Research Axes:

I. Signal Processing (speech, Image, advanced SP)

II. Advanced and Mobile Networks

III. Antennas and Microwave Equipment

IV. Computer Processing of Arabic Language

V. Networks & Data Security

VI. Intelligent Systems

- ## Mechanical and Electronic Systems:

  - Robotics and Mechatronics Systems
  - Advanced Control, Navigation
  - Machine Learning

Research Axes:

I. Intelligent Control Systems

   - Navigation and Path Planning

   - Adaptation to Failures for mobile robots

   - Advanced Control Systems

II. Signal Processing

Physics:

- Materials Sciences
- Optics and laser
- Theoretical Physics
- Renewable energy, Emulsified Fuel

Research Axes in Nano-Materials

I.   Materials for Environmental Applications

    I.1. Water Treatment: a. Hydrogels   b. Membranes   c. Quantum dots

    I.2. Agricultural Applications (Hydrogels)

II.   Pharmaceutical Applications (Hydrogels, nanofibrous scaffolds Quantum dots)

III. Microwave Applications (Nanoferrites, Conducting polymers, Nanocomposites)

IV. Electronic and Optoelectronic Applications (Nano-ceramics, Conducting polymers)

- # Aeronautics (Aleppo Branch):
  - Aerodynamics
  - Flight Control
  - Aircraft Structure
  - Propulsion
  - Avionics

- # Mathematics:
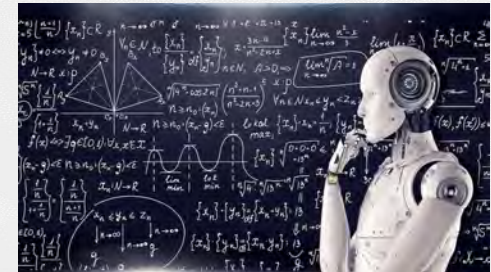 Responsible of the mathematics curricula.
  ### Research Axes:
  I. Algorithmic Number theory
  II. Applied mathematics
  III. Numerical analysis and its applications
  IV. Probability Theory and Mathematical Statistics.

- ## Laboratory of Environmental Studies
  - Chemical pollutants analysis of water and soil
  - Air pollution analysis.
  - Water microbiological analysis.
  - Wastewater treatment stations

HIAST in 2023

- Admitted students in 2022:
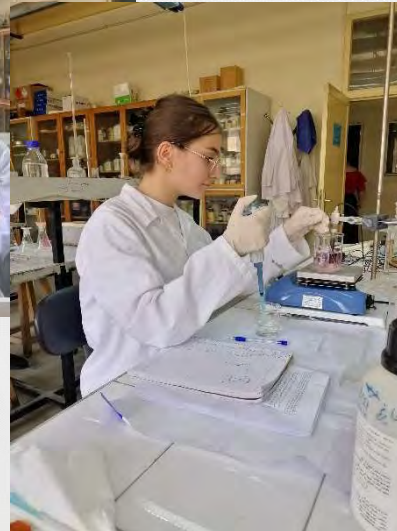 - **127 undergraduates.**
  - **22 Masters**
  - **9 PhDs**

- HIAST participated in sponsoring HiTech Second Conference on "**Intelligent Systems**"

Training Activities:

- Hosting training camps for Syrian Science Olympiad students in the fields of Physics, Chemistry and Mathematics.

Training Activities:

- In-house training courses for the employees and for external customers to acquire knowledge and to enhance their professional skills in wide range of subjects.

- More than **20 Trainings** were realized in 2023: Python programming, C#, Arduino, basics in Cybersecurity, PLC, Dynamic Modelling in MatLab, Microsoft Office, Web Applications Development, Welding Technology, FPGA, Foreign Languages…

Workshops:

- Good Manufacturing Practices (GMP)
in Pharmaceutical Industry)

Exhibitions:

- HIAST participated in 2 local exhibitions: (HiTech 2023 – SyrPetro)

Achievements 2023
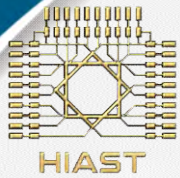
- Graduated students :
  - **51 Engineers**
  - **19 Masters**

- Publishing :

  - Scientific Books (3 new)

  - **28 Research papers**

Achievements 2023

- Upgrading our educational system to comply with credit system standards

- External Projects

  - Development of "Fault Management System" for SyriaTel Telecommunication Company

  - Informatics' System Maintenance for two hospitals

Achievements 2023

- The project "Developing control of an alternative prosthetic limb using vision and artificial intelligence algorithms" from HIAST, won the **Gold medal** in the **medicine axis** (medical technology) at Al-Basel Exhibition for Creativity and Invention in its twenty-first session.

- Also, the project "Developing a shape-shifting and rolling quadrupedal robot" from HIAST, won the **Silver medal** in the Engineering technology axis.

Achievements 2023

- The HIAST team "Lightning Storm" was crowned **Champion** of the 13th Syrian Programming Competition, and won a **silver** medal after achieving the fifth place among 154 university teams from universities in the Arab world and North Africa, and the team "Blind Power" came in eighth place in the competition, winning a **silver** medal as well.

Achievements 2023

- Syria won the title of African and Arab champion in the 47th final of the International Collegiate Programming Contest, which was achieved by a the team nON-sTOP from HIAST.

nON-sTOP Team
[ICPC WF 47th]
Africa and Arab Champion
Higher Institute for Applied Sciences and Technology
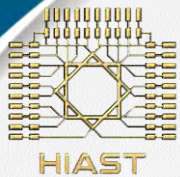
Collaborations with other Centers of Excellence

- Following the workshop on: "Challenges and Innovations in Nanotechnology" which was held in 2019 at HIAST with the support of COMSATS, Prof. Yomen ATASSI (HIAST-Syria) and Prof. Saeid Hosseini (Tarbiat Modares, Iran) collaborated to launch a PhD project entitled "Membrane gas separation processes: model amelioration and process design," on which an engineer at HIAST began working toward her doctorate in 2022.

- With the support of COMSATS, Prof. Hosseini will visit HIAST next November to stand on the progress of the doctorate project and to provide guidance and insights on first hand.

- A series of lectures and extensive meetings on separation membranes and their important industrial applications will be organized during his visit in order to benefit from the experience of Prof. Hosseini in this field.
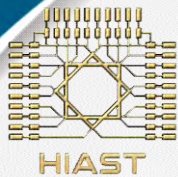
- HIAST and the Arab School of Science would like to organize a summer school on "**GMP in Pharmaceutical Industry**" and an international conference on "**Engineering Applications of AI**". They invite COMSATS and the centers of excellence to sponsor these activities by supporting the participation of external experts.

- HIAST Works on linking other Syrian research organizations with COMSTATS Centers of Excellence

- Three organizations are interested in cooperation on biotechnology:
  - Research Institute for Pharmaceutical and Chemical Industries (RIPCI)
    - A Cooperation proposal has been sent to TIB
  - Atomic Energy Commission of Syria (AECS)
  - National Commission for biotechnology (NCBT)
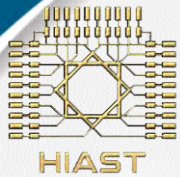
Future Work

- Upgrading the educational system to comply with credit system standards.

- Upgrading and renovating the infrastructure of our laboratories.

- Launching a new Engineering program in Laser Engineering and Applications

- Formation of future teachers in Basic Sciences.

- Launching a new Master program in Aeronautics

- HIAST is also ready to collaborate with other organizations in the R&D domains of common interests.

Thank you for your attention...