



## Faculty of Engineering and Basic and Applied Sciences Graduate Programs Admission Guidelines for Fall 2024 – International Admission

### Table of Contents

<b>Faculty of Engineering and Basic and Applied Sciences Graduate Programs Admission Guidelines for Fall 2024 – International Admission</b> .....	<b>1</b>
<b>Awarded Degree:</b> .....	<b>3</b>
<b>Study Duration:</b> .....	<b>3</b>
<b>Admission Requirements:</b> .....	<b>4</b>
Educational Background and Records .....	4
Language (English) Proficiency .....	4
Admission Examination- Personal and Academic Interview: .....	4
Equivalency Certificate and Security Clearance: .....	4
<b>Academic Background for Engineering Programs (M.Sc. and PhD Programs):</b> .....	<b>5</b>
<b>Academic Background for Basic and Applied Science Programs (M.Sc. and PhD Programs):</b> .....	<b>6</b>
<b>Selection Procedures / Dates and deadline:</b> .....	<b>7</b>
Application Submission .....	7
Primary Screening Announcement .....	7
Interview and Exams .....	7
Result announcement.....	7
Deadline to receive all the original certificates certified by the Egyptian Embassy.....	7
Arrival in E-JUST .....	7
Medical Check up .....	7
Orientation Week .....	7
Fall 2024 International Admission Dates and Deadlines .....	8
<b>Admission Examination (Personal and Academic Interview):</b> .....	<b>9</b>
<b>Faculty of Engineering Research Areas and Topics</b> .....	<b>10</b>
Electronics and Communications Engineering (ECE) .....	10
Computer Science and Engineering (CSE).....	13
Mechatronics and Robotics Engineering (MTR) .....	15
Industrial Engineering and Systems Management (IME) .....	17
Materials Science and Engineering (MSE) .....	19
Energy Resources Engineering (ERE) .....	21



---

Environmental Engineering (ENV) .....	23
Chemicals and Petrochemicals Engineering (CPE).....	25
Electrical Power Engineering (EPE) .....	26
<b>Basic and Applied Science Institute Research Areas .....</b>	<b>29</b>
Nanoscience Program (Nano) .....	29
Biotechnology Program (Bio) .....	29
Applied and Computational Mathematics (ACM) Program.....	29
Energy Materials (EMA) Program .....	30
Space Environment (SEN) Program .....	30
<b>Documents Required for Application .....</b>	<b>31</b>
<b>Scholarships Terms and Conditions .....</b>	<b>33</b>
E-JUST TICAD8 African Scholarships for STI .....	33

---

### Awarded Degree:

Egypt-Japan University of Science and Technology offers opportunities of advanced study and academic research to Graduate students. The programs involve Master's and Doctoral courses leading to the corresponding degrees (M.Sc. and Ph.D.).

Accepted applicants to the programs will be enrolled in the next Fall 2024 semester, which will begin during September 2024. Lectures and instructions for research are given generally in English.

### Study Duration:

The maximum period to complete the Master program study and obtain the MSc degree is three academic years. However, the student can graduate and obtain the MSc degree after two years from the enrollment date if he/she can finish all the graduation requirements in these two years.

The maximum period to complete the PhD program study and obtain the PhD degree is five academic years. However, the student can graduate and obtain the PhD degree after three years from the enrollment date if he/she can finish all the graduation requirements in these three years.

The scholarship's term is the period necessary to complete the degree requirements in E-JUST, which should be two years for the M.Sc. degree preceded by 6 months for preparatory courses (if necessary).

For the PhD degree the scholarship term is three years

### Preparatory Course

The objectives of the preparatory courses are:

- To cover the deficiencies of E-JUST PG applicants in the basic research skills, English language, computer programming, statistics and liberal arts.
- To prepare E-JUST PG students to the required nature of PG study in E-JUST including Japanese culture, Japanese language, Arabic language for international students, Research and Publications ethic and method.
- To make the PG students familiar with E-JUST labs, center of excellences and professors before registering the point of research and before the formation of the supervision committee. This will help the student in the proper selection of the research point and supervision committee.



### Admission Requirements:

	Condition	Requirements
1	<b>Educational Background and Records</b>	<p><b><u>For Faculty of Engineering (FOE) Programs</u></b></p> <ul style="list-style-type: none"><li>• <b><u>FOE M.Sc. applicants:</u></b> should hold a Bachelor degree in engineering with CGPA <math>\geq 3</math> out of 4 / Description <math>\geq</math> very good/ classification <math>\geq</math> second class upper or equivalent to the mentioned before.</li><li>• <b><u>FOE PhD applicants:</u></b> should have M.Sc. (thesis-based) degrees in engineering, related to his proposed research topic, with a distinguished academic record in the related undergraduate program's major.</li></ul> <p><b><u>For Basic and Applied Sciences (BAS) Programs</u></b></p> <ul style="list-style-type: none"><li>• <b><u>BAS M.Sc. applicants:</u></b> should hold a Bachelor degree in Science in the field of specialization with a CGPA <math>\geq 3</math> out of 4 / Description <math>\geq</math> very good/ classification <math>\geq</math> second class upper or equivalent to the mentioned before.</li><li>• <b><u>BAS PhD applicants:</u></b> should have M.Sc. (thesis-based) degrees in Science, related to his proposed research topic, with a distinguished academic record in the related undergraduate program's major.</li></ul> <p><u>The student's academic background should match the academic requirements of the program he/she is applying for (Please refer to academic background tables).</u></p>
2	<b>Language (English) Proficiency</b>	<p>Admission Requirement: TOEFL iBT 79 or Academic IELTS: 6.5.</p> <ul style="list-style-type: none"><li>• The Language certificate should be valid on the date of the application submission.</li><li>• <b><u>Applicants whose native language is English are not required to submit official evidence of English Language Proficiency.</u></b></li></ul>
3	<b>Admission Examination- Personal and Academic Interview:</b>	<p>Applicants must pass successfully the personal and academic interview</p> <ul style="list-style-type: none"><li>• Applicant minimum acceptance percentage of is 60% at the interview</li><li>• Interview (Personal and Academic)</li><li>• Oral Examination</li></ul>
4	<b>Equivalency Certificate and Security Clearance:</b>	<p>According to the Egyptian Ministry of Higher Education regulations for accepting foreign students (Non-Egyptian), the student must acquire the following:</p> <ul style="list-style-type: none"><li>• <b><u>Equivalency Certificate</u></b> from the Egyptian Supreme Council of Universities (SCU).</li><li>• <b><u>Security clearance</u></b> from Ministry of Interior Affairs.</li></ul> <p>E-JUST applies on behalf of the applicants who pass successfully the admission interview and oral examination for the equivalency certificate and security clearance. However, failing to acquire any of the said documents, will lead to termination of the application.</p>

### Academic Background for Engineering Programs (M.Sc. and PhD Programs):

Program	Academic Background
Electronics and Communications Engineering (ECE)	The students' academic background should be: Electronics and Communications Engineering, Biomedical and Bioinformatics Engineering
Computer Science and Engineering (CSE)	The students' academic background should be: Engineering Degree in Computer Science and Engineering
Mechatronics and Robotics Engineering (MTR)	The students' academic background should be: Mechatronics and Robotics, Computers and Automatic control, Power Electronics, Mechanical Engineering, Production Engineering and Mechanical Design, Automotive Engineering. Students are expected to have good knowledge of Control Engineering, Electronics and Programming.
Industrial Engineering and Systems Management (IME)	The students' academic background should be: Industrial Engineering, Production Engineering, Manufacturing Engineering, Mechanical Engineering, and Mechanical Design Engineering.
Materials Science and Engineering (MSE)	The students' academic background should be: Metallurgy, Materials Science and Engineering, Mechanical Engineering, Production Engineering, Chemical Engineering, Textile Engineering, Nuclear Engineering, Electrical Engineering, Civil Engineering, other related Engineering discipline
Energy Resources Engineering (ERE)	The students' academic background should be: Mechanical Power Engineering, Energy Engineering, Nuclear Engineering, Chemical Engineering, and other related disciplines.
Environmental Engineering (ENV)	The students' academic background should be: Chemical, Architecture, Electrical, Mechanical, Nuclear, Civil, Environmental Engineering, Sanitary Engineering, and other related disciplines.
Chemicals and Petrochemicals Engineering (CPE)	The students' academic background should be: Chemical and Petrochemicals Engineering, Material Science and Engineering, Mechanical Engineering and Metallurgy, other related disciplines
Electrical Power Engineering (EPE)	The students' academic background should be: Electrical Power Engineering.

**Academic Background for Basic and Applied Science Programs (M.Sc. and PhD Programs):**

Program	Academic Background
Nanoscience (NAN)	The students' academic background should be: Science background with specialization in Special Chemistry, Chemistry major with any other subject (minor), Materials Science and Other related fields.
Biotechnology (BIO)	The students' academic background should be: Sciences Fields of specialization should be: Biotechnology, Microbiology, Biochemistry, Bioinformatics (Science or Computer Science) or any field of Biological Sciences including botany, Zoology, Entomology, Agriculture, Vet Medicine, Chemistry, Biophysics
Applied and Computational Mathematics (ACM)	The students' academic background should be: Science background with specialization in Mathematics, Engineering with a Mathematics background, or other related fields
Energy Materials (EMA)	The students' academic background should be: Science background with specialization in: Physics, Chemistry, Materials Science, Biophysics, Other related fields
Space Environment (SEN)	The students' academic background should be: Science, Graduates holding BSc or MSc degree from any Faculty/ Institute in one of the following fields of specialization: Physics, Mathematical Physics, Space Science, Astrophysics, Astronomy, Navigation Science, Space Technology, Environmental Science, Meteorology, Geophysics, Remote Sensing

## Selection Procedures / Dates and deadline:

### Application Submission

- Online submission is opened through E-JUST website
- The applicant should complete the application before the deadline and attach all the required documents.

### Primary Screening Announcement

- E-JUST will send the result to each applicant after documents classification and analysis, the accepted applicants will be invited to the interview.

### Interview and Exams

- The exam and interview will be held by online via Zoom (requires good internet connection).

### Result announcement

- E-JUST will announce the final decision to the applicants by email.

### Deadline to receive all the original certificates certified by the Egyptian Embassy

- Accepted applicants have to submit their documents to E-JUST international office. All the certificates must be certified by the Egyptian embassy from applicants' home country. Further details on the required documents and the certifications will be announced to the accepted applicants.

### Arrival in E-JUST

- Accepted applicants should arrive before the start of the semester.

### Medical Check up

- Students have to be tested for HIV examination in governmental hospital in Egypt and in case of positivity of the result the applicant will be forced to leave Egypt according to the Egyptian law.

### Orientation Week

- Introducing E-JUST research and campus life to the students.



## Fall 2024 International Admission Dates and Deadlines

	Process	Due Dates for <b>Fall 2024</b> Semester
1	Application Submission	November 8, 2023 - February 10, 2024
2	Primary Screening Announcement	March 14, 2024
3	Interview and exams	March 24 - March 28, 2024
4	Result announcement	April 30, 2024
5	Deadline to receive all the original certificates certified by the Egyptian Embassy	May 31, 2024
6	Arrival in E-JUST	September 14, 2024
7	Medical Check up	To be determined
8	Orientation week	To be determined
9	Start of lectures	September 24, 2024

\* **Note:** Reasons for disqualification in any stage of selection procedure will **NOT** be disclosed.





### Admission Examination (Personal and Academic Interview):

Personal Interview and Research Proposal Presentation Assessment Criteria

1. Oral Examination
  - Knowledge of basics principles in the field
2. Interview and proposal assessment
  - Research ability and potential
    - Potential for conducting independent experiments/surveys
    - Research ability and potential
    - Potential for conducting independent experiments/surveys
  - Presentation skills
    - Originality of the presentation (Percentage taken from web sites, borrowed material)
    - Logic and clearness to expose ideas (looking to audience)
    - Answering questions logic, and consistently
    - Clear and concise spoken English
  - Personal Character
    - Motivation and neatness
  - Awards and publication, others

The candidate conducts a 15-minute presentation by PPT (Power Point Presentation) for his/her research proposal in front of an evaluation committee. The presentation is followed by 25-minute discussion with the candidate to evaluate the main points given in the research proposal and to evaluate the candidate's research potential.

**Applicants are required to provide a copy of the research proposal attached to his/her application.**



## Faculty of Engineering Research Areas and Topics

### Electronics and Communications Engineering (ECE)

#### Radio Frequency Integrated Circuits and Systems

- Design of Integrated Circuits for Wireless Power Transfer Systems
- Design of Low Phase Noise CMOS Oscillators for Millimeter Wave Applications
- Sensors Electronics
- Radio Frequency Transceivers Design
- RF-CMOS Front-End (LNA, PA, Mixer, VCO, VGA)
- RFID Systems

#### Digital and Embedded Systems

- Embedded Systems
- Embedded Machine Vision
- Embedded Artificial Intelligence (AI)
- Embedded Internet of Things (IIoT) In Industry 4.0
- Embedded Systems for Agriculture Applications
- Application Specific and Reconfigurable Architectures
- Field Programmable Gate Arrays (FPGAs)
- Artificial Intelligence and Deep Learning Applications On FPGAs
- System-On-Chip (SoC)
- Hardware/Software Co-Design
- High Efficiency Video Coding (HEVC/H.265)
- Versatile Video Coding (VVC/H.266)
- Human Body Communication
- Smart Body Area Networks

#### Digital Signal Processing

- Image and Video Processing
- Computer Vision
- Vision and Artificial Intelligence
- Speech and Audio Processing
- Multi-Dimension Signal Processing and Stochastic Processes
- Multimedia Systems
- Pattern Recognition
- Adaptive Filtering Design
- Sparse Signal Processing and Applications
- Compressive Sensing
- Bioinformatics



- Biomedical Signal Processing

#### Wireless Communication Systems

- 5G and B5G Communication System
- Machine Learning for Wireless Communications
- Quantum Communications
- Coding for Communication Systems
- Aerial and Satellite Communications
- Open RAN Communications
- Edge Computing and Caching
- PHY Layer Design
- Cognitive and Software-Defined Radio
- PHY Layer Security
- Wireless-Optical Communications
- Broadband Wireless Systems

#### Microwave Engineering and Remote Sensing

- Wireless Power Transfer and Energy Harvesting
- Batteryless Internet of Things (IoT) Sensing Systems Using Green RF Energy
- Artificial Intelligence (AI), Machine Learning (ML) for Wireless and Antennas Applications
- Wireless Electric Vehicle (EV) Battery Chargers
- Antenna and Resonators for Imaging Technologies
- Microwave and 60GHz mm Wave Antennas And Circuits
- Antenna and Rectennas for IoT Applications
- Diagnostic and Therapeutic Electromagnetic Applications
- Reconfigurable Antennas and Arrays
- Novel Electromagnetic Materials
- Remote Sensing and Satellite Observation
- Quantum Microwave Systems and Applications
- Antennas and Resonators On Glass
- MHz-To-THz Sensors for Healthcare Applications
- Mm- Wave and THz Systems for Sensing and Communications
- Nano Electromagnetics
- Wearable Microwave Components, Antennas, and Systems
- Smart Antennas, Digital Beam Forming and MIMO Antennas and Future Networks
- Short Range Wireless Applications, RFID, NFC, IoT, WSN
- Frequency and Time Domain Techniques for Antennas and Microwave Devices



- Communication Channel Characterisation

### **Biomedical Engineering**

- Biomedical Signal Processing
- Biomedical Imaging, Image Processing and Visualization
- Video Techniques for Medical Images
- Biomedical Engineering and Nanotechnology
- Biomedical Devices, Sensors, and Artificial Organs
- Bio-Signal Processing and Analysis
- Biometric and Bio-Measurement
- Diagnostic and Therapeutic Services
- Biomedical Applications of IoT.

### **Bioinformatics and Computational Biology**

- Health Care Systems
- Machine Learning in Bioinformatics
- E-Health Technology and Devices
- E-Health Information Processing
- Health Monitoring Systems and Wearable System
- Telemedicine/E-Health Application and Services
- DNA and RNA Structure, Function and Sequence Analysis
- Gene Engineering and Protein Engineering
- Computer Aided Diagnosis



## Computer Science and Engineering (CSE)

### Parallel Computing and Computer Architecture

- High Performance Computing
- Heterogeneous Systems/Accelerators
- Parallelizing Compilers
- Quantum Computing
- Neuro-Processing Acceleration
- High Performance Architecture
- Processor Architecture
- Multicore / Many-Core Processors
- FPGA / System Implementation

### Computer Networks and Cyber Security

- Cloud Computing and Fog/Edge Computing
- Wireless Networks
- Internet of Things (IoT)
- Interconnected Vehicles
- Cellular Networks and 5G and Beyond
- Cloud/Centralized Radio Access Network (C-RAN)
- Cognitive Radio Networks
- Software-Defined Networks
- Network Security
- Wireless Network Security
- IoT Security
- Quantum Internet

### Cyber-Physical Systems

- Machine Learning
- Autonomous Systems
- Activity Recognition
- Natural Language Understanding
- Wearables
- Embedded Systems and Internet of Things (IoT)
- Learning in Resource-Constrained Settings
- Embedded Machine Learning

### Intelligent Systems and Computer Vision

- Deep Learning
- Data Mining



- Ai and Multi-Agent Systems
- Bioinformatics
- Object/Person/Face Detection
- Optical Character Recognition
- Image Segmentation
- 3D Computer Vision
- Feature Engineering
- Video Surveillance

#### Computer Science and Engineering Research Main Themes

- Health Care
- Wearables
- Smart City
- Industry 4.0
- Cybersecurity
- Quantum Computing Engineering



## Mechatronics and Robotics Engineering (MTR)

### Bio-Medical-Mechatronic Systems

- Rehabilitation/Healthcare Robots/ Assistive Robots
- Human-Robot Interaction
- Prosthetic Devices
- Bio-Inspired Robots
- Brain-Based Devices
- Upper and Lower Limbs Assistive Devices
- Surgical Robots

### Micro/Nano Electro-Mechanical Systems

- Tactile Sensing Systems (Tactile Sensors and Tactile Display)
- Smart Sensor/ Actuators
- Energy Harvesting Devices (Piezoelectric / Electromagnetic, Frequency Tuning, Frequency-Up Conversion, 2 And 3 DoF Energy Harvesting Devices)
- Microfluidics Systems (Micro Droplet Formation, Micro Mixing, Micro Sorting) For Environmental and Medical Application
- Biosensors
- Micro Thermal Systems (Sensors/Heater) and Its Applications
- Land Mine Detection Sensors
- Development of Micro Pump or Medical Applications
- Gas Sensors for Environmental and Medical Application
- Micro Optical Sensors/Devices

### Artificial Intelligence in Mechatronics and Robotics:

- AI and Robotics Integration in Design, Control and Perception
- Human-Robot Interaction/Collaboration
- AI for Machine Vision in Robotics
- Reinforcement Learning for Robotics Control
- Swarm Robotics
- Intelligent Control of Robotics Systems
- Simultaneous Localization and Mapping (SLAM) and Visual SLAM
- Transfer Learning in Robotics and Mechatronics Systems
- Embodied Intelligence in Rigid, Continuum and Soft Robotics Systems
- Deep Learning Based Control and State Estimation of Robotics Systems

### Bio-Inspired Soft Robotics

- Soft Serial Manipulation and Soft Gripper



- Soft Artificial Muscle and E-Skin
- Embodied Soft Intelligence
- Soft-Folding Modular Robot
- Modeling of Soft Actuators
- Morphological Computing
- Soft Biped Robots
- Soft ROV

#### **Dynamics and Control Systems:**

- Dynamic Modeling of Mechatronics-Multibody System
- Dynamics and Control of Flexible Robots and Flexible Multibody Systems
- Identification of Mechatronics Systems
- Model Predictive Control of Rigid, Continuum, And Hybrid Robotic System
- Sliding Mode Control of Mechatronics Systems
- Robust Control of Uncertain Mechatronics Systems
- Vibration Analysis and Design of Harvesting Systems
- Control Applications Using FPGA
- Autonomous Driving and Embedded Systems for Automotives
- Control of Mechatronics-Medical Devices





## Industrial Engineering and Systems Management (IME)

### Applied Operations Research Laboratory

- Production Planning and Analysis
- Job Shop Scheduling and Line Balancing
- Master Production Scheduling
- Aggregate Planning
- Inventory Planning and Management
- Agriculture 4.0 Application for Strategic African Crops

### Supply Chain Management and Applications

- Green Vehicle Routing Problem / Pollution Routing Problem
- Ride Hailing / Sharing Models
- The Joint Replenishment Problem and Supply Chain Coordination

### Ergonomics and Human Factors Engineering

- Applied Workspace Ergonomics
- Design of Household Tools and Kitchenware
- Psychological Workload Assessment
- The Association Between Work Factors and Health Outcomes
- Impact of Long Hours Usage of Handheld Devices, Mobile Phones, and Tablets On User's Health. Work Load (Mental and Physical) Study for Worker Which is Dealing with IT Systems
- Motion and GAIT Analysis in Orthopedics and Sports
- Eye Tracking Application in GUI Design
- Man-Machine System Design for Higher Level Automation
- Touch Panel Usability for Children and Elderly People
- Movement/Gait Analysis for Special Needs

### Conventional Machining Laboratory

- Modelling and Simulation of Metal Cutting Processes
- Ultrasonic-Assisted Machining (Milling or Drilling)
- Machinability of Hard-To-Cut Materials (Milling or Drilling)
- The Application of Green Cutting Fluids in Machining Processes
- Nanotribology Using Advanced Nano Materials as Cutting Fluid Additive

### Machine-Tool / Cutting Process Interaction

- Multi-Directional Ultrasonic-Assisted Milling of Hard-To-Cut Materials
- Chatter Occurrence and Prevention in Milling of Thin-Walled Parts
- Machine-Tool / Milling Process Interaction



- Dynamic Interaction Between Feed Drive Systems and Cutting Process in Milling Machines

#### Machinery Condition Monitoring and Fault Diagnostics

- Early Fault Detection and Diagnosis of Rotating Machinery Components
- Modelling and Simulation of Rotating Machinery Components Dynamic Behavior



## Materials Science and Engineering (MSE)

### Nano-materials for energy, sensing, environmental and electronic applications

- Carbon Nanostructured Materials (Graphene, Carbon Nanofibers and CNTs): Synthesis, Characterization and Device Engineering in Supercapacitors / Batteries/Fuel Cells Applications
- Nano-Piezo Electronic Materials: Approaches to Energy Scavenging

### Mechanics of materials: Modeling, Simulation and characterization (properties, stress, strain and displacement)

- Electrical and Mechanical Properties of Engineering Materials and Biological Materials and Hydroxyapatite
- Mechanics of Superplastic Forming and Micro-Forming, Micro-Laser Machining
- Modeling and Simulation of Smart Materials in Multi-Physics and Multi-Scale Analysis Techniques
- Fracture Mechanics Using Finite Element and Boundary Element Techniques
- Material Models On Macro and Micro Levels for Logical and Biological Materials and Nanocomposites
- Dynamic Mechanical Properties of Composites and Nano-Composites
- Die and Mold Design for Micro-Injection Forming
- Evaluation of Damage and Fatigue Performance of New High Strength Materials for Structural Engineering Application
- Stir Casting of Metal Matrix Composites, Laser Welding of Similar and Dissimilar Materials
- Crashworthiness and Impact Analysis of High Strength Alloys and Composites, Modeling and Simulation

### <AFMM>Advanced Functional Metallic Materials (Design, Processing and Characterization)

- New Casting Technologies and Alloy Design Methodologies (Including Machine Learning)
- Dental, Bio-Implants, and Bio-Degradable Metallic Materials
- Micro/Macro Laser and Advanced Processing of Metals
- Materials for Energy Storage (Thermal and Battery)
- 3D Printing of Ceramics, Metals, and Alloys (Printability and Characterization)
- High Entropy Alloys, Ultra-High Strength, and Super-Alloys for Structural, Nuclear and Power Plants Applications (Design, Production and Characterization)
- Shape Memory and Superelastic Alloys for Structural, Biomedical, and Sensing Application
- Metal Forming, Bulk-Nanostructure Materials and Severe Plastic Deformation



- Nanomaterials for Biomedical, Energy and Structural Applications (Production, Characterization and Applications)
- Green Composites and Natural Fiber for Engineering Applications
- Advanced Materials and Systems for Water Treatments

#### **Materials for Environmental and Biomedical Applications (MEBA)**

- High Performance Patterned Polymeric Membranes for Water Treatment and Desalination
- Hybrid Graphene/TMDs Nanocomposites for Water Treatment and Energy Storage

#### **Polymeric and Composites materials**

- Nanofiber Formation Technologies (Electrospinning, Solution Blown, Centrifugal Spinning) and Its Applications (Medical, Energy, Filtration...Etc.)
- Sustainable or Green Composites for Industrial Applications

#### **Impact and dynamics properties of materials**

- Dynamic Fracture Properties of Composite Materials
- High Speed Machining Using Split Hopkinson Pressure Bars
- Measuring Dynamic Sliding Friction Using Split Hopkinson Pressure Bar
- Designing of New Friction Material Composite for Engineering Applications
- Mechanical Characterization of Biomaterials
- Bulk Molded Composites and Sheet Molded Composites Enhancement for Engineering Applications
- Stir Welding of Dissimilar Materials with Pre and Post Treatment Techniques
- Designing of Special Concrete Composite for Dynamic Loads Resistance Application
- Dynamic Properties of Cellular and Foam Material
- Design and Characterization of Function Graded Materials



## Energy Resources Engineering (ERE)

### Alternative Energy Systems Laboratory

- Concentrator Photovoltaic (CPV/T) Systems-Design and Fabrication-Performance Analysis
- Thermal Regulation of Concentrator Photovoltaic (CPV/T) Systems Using Nanotechnology
- Hybrid Concentrator Photovoltaic/Thermoelectric Power Generator (CPV/TEG/T)- Design and Performance Evaluation- Modeling and Experiments
- Wind Turbine Aerodynamics - Modeling and Experiments
- Fuel Cell Technology (PEMFCs, DMFCs, and SOFCs)- Modeling and Experiments
- Solar Hydrogen Production Via Photoelectrochemical Cells or Concentrator Photovoltaic/ Photoelectrochemical Cells - Modeling and Experiments
- Thermal Hydraulic of Nuclear Reactors- Modeling and Experiments
- Geothermal Energy in Industrial Applications- Modeling and Experiments
- Membrane Desalination Systems- Modeling and Experiments

### Fluid Science and Engineering Laboratory

- Computational Fluid Dynamics and Heat Transfer
- Micro-and Nano Scale Flows- Modeling, Simulation, And Experimentation
- Flow in Porous Media- Modeling, Simulation, And Experimentation
- Complex Fluid Dynamics-Modeling and Simulation
- Spray and Liquid Atomization Systems - Design and Characterization- Modeling, Simulation, and Experimentation
- Multi-Phase Flows- Modeling, Simulation, and Experimentation
- Multiscale Computations (Continuum-Meso), Molecular Dynamic Simulation
- Blood Flow- Modeling, Simulation, Experimentation
- Respiratory Fluid Mechanics- Modeling, Simulation, and Experimentation

### Renewable Energy Systems Laboratory

- Renewable Energy Systems
- Renewable-Energy-Based Multigeneration Systems
- Renewable Energy- Driven Seawater Desalination
- Thermal Energy Storage Application in Renewable Energy System
- Renewable Energy Resources Applications
- Design of Solar Energy System
- Solar Systems for Energy-Efficient Buildings
- Photovoltaics Systems Thermal Management



- Wind Energy Systems
- Solar-Driven Adsorption Cooling Systems
- Solar-Driven Multigeneration Systems
- Hybrid Adsorption Desalination-Cooling Systems
- Solar Energy Utilization in Water Harvesting from Atmospheric Air
- Solar Systems for Energy-Efficient Housing
- Renewable Energy-Based Hybrid Adsorption-Vapor Compression Refrigeration Systems
- Thermoelectric System
- Heat Pipe
- Heat and Mass Transfer

#### **Fuel and Combustion Engines Laboratory**

- Nanoparticles Synthesis Using CI Engines and Flames
- Experimental and Numerical Investigations of Burners
- Combustion and Co-Combustion of Conventional and Green Fuels (H<sub>2</sub>, And NH<sub>3</sub>)
- Morphology and Nanostructure of Soot
- Biomass Gasification and Carbonization
- Spray and Liquid Atomization
- Droplet Heating and Evaporation
- Performance of Compression Ignition Engines
- Alternative, Cleaner and Low-Grade Fuels

#### **Energy Storage Systems Laboratory**

- Energy Storage Systems Including Thermal, Mechanical, Electrochemical, and Hydrogen Storage
- Passive and Active Cooling Systems Using Innovative Heat Sink Designs
- Applications of Energy Storage in Energy Systems
- Thermal Energy Storage in Energy Systems
- High-Performance, Cost-Effective, and Safe Energy Storage Systems to Power the Next Generation of Electric-Drive Vehicles.
- Energy Management Strategies for Power Battery Packs, Electronic Components, and Aerospace Applications
- Ground Energy Storage Systems for Energy Efficiency and Energy Management in Buildings to Create Smart, Zero-Carbon Infrastructures
- Ground Source Heat Pump Systems (GHP) for Energy Management in Residential and Commercial Buildings



## Environmental Engineering (ENV)

### Waste Treatment and Management Laboratory

- Wastewater Treatment Technologies
- Industrial Waste Treatment and Management
- Biofuels, Chemicals and Bio-Fertilizers Production from Solid Wastes
- Hydrogen and Methane Generation from Waste Materials
- Waste Recycling and Management
- Applications of Nanotechnologies for Water and Wastewater Treatment
- Sludge Treatment
- Advanced Oxidation Processes
- Application of Water Chemistry and Microbiology for Treatment of Organic and Inorganic Pollutant
- Sustainability and Sustainable Development
- Environmental Impact Assessment
- Sustainable Cities
- In-Plant Control
- Cleaner Production
- Climate Change Related to SDGs 2030
- Policy, Strategy, Control and Management Aspects of Water Quality
- Artificial Intelligence and Smart Wastewater Management Systems
- Water 4.0 Digital Revolution
- Municipal Solid Waste Management
- Hazardous Waste Management

### Natural Resources Management Laboratory

- Integrated Water Resources Management (IWRM)
- Applications of Remote Sensing and GIS in Water Resources, Sewer Systems, and Coastal Issues
- Sustainability of Water Supply Systems
- Coastal Modeling, Sediment Transport, Sediment Yield, and Beach Erosion Studies
- Impact of Climate Change on Water Resources /Groundwater/ Coastal Regions
- Coastal Hazards Management and Disaster Risks
- Innovative Coastal Engineering/Technologies to Mitigate Saltwater Intrusion Based SLR
- Environmental Change Risk Analysis and Assessment (Storm Surges, High Waves, and Flash Floods)
- Economic Evaluation of Coastal Hazards and Coastal Adaptations to SLR



### Environmental Assessment and Management Laboratory

- Environmental Management for Sustaining a Green Environment
- Sustainable Buildings and Cities
- Greening the Built Environment
- Passive Architecture and Urban Environment
- Building Energy Efficiency
- Impact of Climate Change On the Design of Energy Efficient Buildings
- Adapting Urban Planning for Climate Change
- Thermal Mitigation Effects of Urban Vegetation
- Natural Ventilation Efficiency of Houses by Using Computational Techniques
- Remote Sensing and Its Applications in Urban Planning
- Satellite Images Analysis to Assess the Surface Thermal Distribution in Urban Areas
- Building Materials for Hot and Humid Climate

### Air Quality Laboratory

- Air Pollution Assessment and Control
- Implementation of Nanotechnology for Pollution Control and Detection
- Sensors and Detectors Technology
- Assessment of Industrial Emissions
- Climate Change and Sustainability (Greenhouse Effect)
- Indoor Air Quality Improvement Techniques
- Air Pollution Filtration and Treatment





## Chemicals and Petrochemicals Engineering (CPE)

### Desalination using solar Energy

- Design of New Solar Collectors Using Nanofluids and Its Applications in Water Desalination
- Desalination Using Capacitive Deionization Techniques

### Design of wastewater treatment units and its applications

- Advanced Oxidation Techniques Such as Plasma for Water Purification
- Photocatalysis and Its Applications in Water Treatment
- Using New Materials as Ion Exchange for Water Treatment
- Preparation of New Electrodes and Its Applications for Wastewater Treatment by Electrooxidation Techniques

### Preparation of Nano-materials and its applications

- Ion Exchange
- Electrocatalysis
- Fuel Cells

### Corrosion Protection

- Preparation of New Smart Materials and Its Applications for Corrosion Control

### Catalysis and its applications

- Photocatalysis and Its Applications in Wastewater Treatment, Production of New Chemical and Petrochemical Materials
- Electrocatalysis and Its Applications in Supercapacitors, Batteries, Sensors and Biosensors
- Enzyme-Catalysis and Its Applications in Wastewater Treatment, Production of Foodstuffs and Pharmaceutical Materials

### Membrane fabrication and modifications and its applications in

- Desalination and Ultrafiltration Processes
- Membrane Distillation
- Fuel Cells and Hydrogen Production
- Separation Processes

### Design of Micro-reactor and its applications such as:

- Preparation of Fine Chemicals, Foodstuffs and Pharmaceutical Drugs, Etc.

### Development of new polymeric materials:

- Composites, Insulators, Fibrous Materials and Conducting Polymers, Etc.



### **Biodiesel production from agricultural and oil wastes.**

- Chemical and Petrochemicals Operations Development and Performance Improvement

### **Separation processes development**

- Distillation, Liquid Extraction, Gas Absorption, Crystallization, Adsorption, and Many Other Separation Techniques Performance and Productivity Improvement

### **Oil, Gas, Petrochemical and related chemical processes**

- Synthesis and Development of New Gaseous and Liquid Fuels and Related Chemical Processes
- Carbon Dioxide Capture, Storage, Transportation, and Sequestration
- Conversion of Carbon Dioxide to Fuels and Chemical Products
- Development of Separation and Liquefaction Processes
- Development of Hydrogen Production and Storage
- Chemical Enhanced Oil Recovery

### **Electrical Power Engineering (EPE)**

#### **Power System Planning, Operation and Control**

- Power System Stability
- Power System Reliability
- Power System Flexibility
- Power System Resilience
- Power System Security
- Flexible Alternating Current Transmission Systems (FACTS) Applied to Power Systems
- Application of Optimization Methods to Power Systems
- Power System Protection
- Monitoring and Online Diagnosis
- Control of Power Systems

#### **Networks for Renewable Generation**

- Renewable Energy Technologies
- Microgrids and Active Distribution Networks
- Virtual Power Plants and Demand Response
- Security Assessment and Risk Analysis in Renewable Energy
- Assessment and The Impacts of High Penetration of Renewable Energy
- System Side Technologies/Controls for Renewable Energy Integration
- Demand Side Technologies/Controls for Renewable Energy Integration
- Grid Modelling, Simulation, And Data Management



- Energy Management Systems
- Wide Area Protection, Communication, And Control in Energy Systems

### Smart Grid

- New Trends and Technologies for Smart Grid
- Novel Energy Conversion Studies in Smart Grid Systems
- Microgrids for Transportation Electrification
- Power Devices and Driving Circuits for Smart Grid
- Decision Support Systems for Smart Grid
- ICT, IoT, Real-Time Monitoring and Control
- Smart Metering, Measurement, Instrumentation, and Control
- Impact of Smart Grid On Distributed Energy Resources
- Self-Healing
- Smart Homes, Cities, Communities
- Policies and Strategies for Smart Grid

### Energy Markets

- Market Structure and Operation
- Transmission Cost/Loss Allocation
- Congestion Management
- Pricing of Energy and Ancillary Services
- Impact of Renewable Energy Integration On Energy Market Operation
- Energy Audit

### Energy Storage

- Modelling Aspects of Energy Storage Systems
- Control and Planning of Centralized and Distributed Energy Storage
- Grid Scale Energy Storage
- Management and Control of Large Number of Distributed Small Storage, V2G and Similar
- Battery Management Systems

### Power electronics and machine drives

- Power Electronics for Renewable Energy Systems
- Power Electronics Applications in Electric Vehicles
- Power Electronics for Green Power Generations



- Power Electronics Converters Applications in Smart Microgrids
- Power Electronics Applications in Aircraft Applications
- Power Electronics Applications in Machine Drives Applications
- Power Electronics Applications in High Voltage DC Applications
- Electrical Machines Control

#### **Net Zero Carbon Technologies**

- Wind Energy Operation and Control
- PV Energy Operation and Control
- Green Energy Sources
- Clean Hydrogen
- Electrification of Major Load Sectors, Transportation is the Main Focus

#### **High voltage engineering and applications**

- Development of Nanocomposites for Electrical Insulation
- Condition Monitoring and Diagnosis of Power Equipment
- Aging Phenomena of Electrical Insulating Materials
- Environmentally Friendly Materials for High Voltage Applications
- Superconducting Power Equipment



## Basic and Applied Science Institute Research Areas

### Nanoscience Program (Nano)

- Water Splitting for Both H<sub>2</sub> and O<sub>2</sub> Evolution
- Biofuel Production
- Photocatalytic Remediation of Different Water Pollutants Using Visible/Solar Irradiations
- Nanostructured Conducting Polymers and Their Application in Sensors, Catalysis, Photocatalysis, Nanocoating, Drug Delivery, Super Adsorbents, Energy, Etc.
- Nanoporous Materials and Their Application in Sensors, Catalysis, Adsorbents, Energy, Drug Delivery, Etc.
- Nanostructured Conductive Carbon (Graphene/CNTs/CNFs) and Polymers Materials for Inkjet and Laser Printed 2D and 3D Wearable (Flexible) Electronics Applications (Ultra Supercapacitors, Li-Batteries, Thermoelectric Devices, Biosensors, and Gas, Temperature and Humidity Sensors-IR, and Microwave Detection Sensors)
- Heterogeneous Catalysis for High Temperature and Pressure Conversion of Pollutant Gases (CO<sub>2</sub>, CO, Etc.,) to Add- Value Liquid Petrochemical Products and Liquid to Gas Production. Green Hydrogen Fuel Production from Direct Water Electrolysis
- Nanostructured Coating For Corrosion Protection
- Carbon Nanostructured Materials for Optical Sensors, Photocatalysis and Water Treatment (Toxic Metal Ions, Organic Pollutants, and Radioactive Species)
- Nanoporous Materials and Core Shell Nanomaterials and Their Application in Sensors, Adsorbents and Drug Delivery
- Carbon Nanostructured Materials for Solar Energy Conversion Systems (Solar Fuels, Green Hydrogen Generation, Etc.), Nano Photonics, Optical Sensors, Photocatalysis, Electronic Memory Devices, and Water Treatment (Toxic Metal Ions, Organic Pollutants, And Radioactive Species)
- Biomedical Applications (Light Therapy for Cancer Tissues, Drug Delivery Release Systems, Detection and Quantification of Proteins, Etc.)

### Biotechnology Program (Bio)

- Medical: Diagnostics, Biomarkers, Therapeutics
- Microbiological Biotechnology: Host – Pathogen Interface, Bio-Active Products
- Agricultural Biotechnology: Microbiology, Pest / Disease Control, GMO's
- Nanobiotechnology
- Spectroscopic Applications in Biotechnology

### Applied and Computational Mathematics (ACM) Program

- Computational Methods for Ordinary and Partial Differential Equations
- Fractional Calculus and Applications



- Dynamical Systems
- Applications of Computational Mathematics to Science and Engineering

### Energy Materials (EMA) Program

- Nano-Physics
- Nanomaterials for Optoelectronics, Thermoelectricity and Energy Application
- Nanotechnology
- Nano-Dots, Nano-Wires and Graphene Based Materials
- E Green Hydrogen (Materials Physical Properties)
- Optical and Electrical Properties of Carbon Nanostructures-Based Materials and Devices
- Nano-Sensors
- Device Physics (Including Solar Cells and Light Emitting Diodes)
- E Hybrid Graphene/TMDs Nanocomposites for Energy Storage and IoT Applications
- Biochar Based Nanocomposites for Electronic, Optoelectronic, and Environmental Applications
- High Performance Polymeric Membranes for Water and Energy Applications
- 2d Material-Based Membranes for Wastewater Treatment and Desalination

### Space Environment (SEN) Program

- Space Environment
- Space Weather
- Space Plasma
- Solar Physics
- Geophysics
- Geomagnetism
- Global Navigation Satellite Systems
- Heliospheric Physics
- Ionospheric Physics
- Earth's Atmosphere
- Cosmic Rays
- Muon Tomography
- Elementary Particles
- Detector Physics
- Radiation Physics

## Documents Required for Application

The following documents (SCANNED Copies) should be attached to the Online Application Form. Once the applicant passes the interview he/ she will be required to submit certified hard copies to E-JUST (certified by the Egyptian embassy):

Research Proposal	The applicant must attach his/her research proposal to the application. The proposal shall be about the research area that he/she chose from the application form.
Statement of Purpose	A statement of your reasons to join E-JUST
CV	
B.Sc. Certificate and B.Sc. Transcript	<b><u>The B.Sc. transcript must include the grading system (the scanned copy of the transcript must be both sides front and back)</u></b>
B.Sc. Graduation Project	The file shall include the whole project (not a summarized copy)
M.Sc. Certificate and M.Sc. Transcript	For PhD applicants only
Summary of M.Sc. Thesis	For PhD applicants only
M.Sc. Thesis	For PhD applicants only
Two academic recommendation letters	Attach two letters of recommendation from professors or ex-advisors in the applicant's affiliating university/academic institution
International TOEFL 79/Academic IELTS 6.5	<b><u>Applicants whose native language is English are not required to submit official evidence of English language proficiency</u></b>
Personal Data Passport Page	The page containing the applicant's name and date of birth (Valid for at least two year from the date of application)
Personal Photograph (Formal Photo)	Attach one personal professional photograph (size 4x6 cm, upper half of body, full-faced, hatless, white background, same as passport photo) taken within the past 6 months.
Certificate of health (E-JUST designated form)	<a href="#">Click Here to Download the Form</a>
Security Application (E-JUST designated form)	<a href="#">Click Here to Download the Form</a>
Endorsement Letter (For Currently employed TAs/ Researchers...etc.)	Applicants who apply for TICAD8 scholarship and currently working as teaching or research assistants must submit an endorsement letter. The endorsement letter states that the applicants shall continue their jobs in their home universities or institutions after completion of their postgraduate programs at E-JUST.



	It must be an official statement signed and stamped by the affiliated institution
Handbook of the university / faculty / institute ....etc. of the certificate for Bachelor degree (and M.Sc. degree for PhD applicants)	It should be stating clearly the conditions of registration, conditions of obtaining the certificate and the scientific content of the study curriculum The part that includes the required information only). It can be obtained from the university website.

**Note<sup>1</sup>:** All credentials submitted must be in English, or alternatively, an official translation must be attached to the documents originally not issued in English.

**Note<sup>2</sup>:** Original documents submitted shall NOT be returned under any circumstances

**Note<sup>3</sup>:** Any Costs incurred during the selection procedures including travel expenses, documents preparation (official papers, photos, visa application, etc.) and any other personal expenses will NOT be covered but should be paid by the applicant.



## Scholarships Terms and Conditions

### E-JUST TICAD8 African Scholarships for STI

E-JUST offers “E-JUST TICAD8 African Scholarships for STI” – i.e. TICAD8 Scholarships to develop high quality human resources in the field of STI (Science, Technology and Innovation) toward future African STI network and beyond. These scholarships are provided under the cooperation of the Egyptian government and JICA (Japan International Cooperation Agency).

TICAD8 Scholarships are available for applicants who wish to pursue their M.Sc. or Ph.D. degree in the field of Science or Engineering.

- For **Fall 2024** Intake: Around 20 M.Sc. and 42 Ph.D. Scholarship Slots.

#### *Eligibility Requirements:*

- Applicants shall be researchers or instructors (or potentially expected to become those) who needs to obtain M.Sc. or Ph.D. degree in the fields of Science or Engineering or other specialization.
- Applicant must be a holder of nationality of a country in Africa except for Egypt.
- Applicant must have a current home address in an African country.
- Applicant must not be serving in the military.
- Applicants should fulfill all of the admission requirements and pass the academic interview and oral examination.
- Applicants who shall continue their jobs in their home universities or institutions after completion of his postgraduate program at E-JUST are preferable. In this case, Endorsement of the application forms by their home institution is required in order to assure that they would return to home institutions in the future.

#### *Scholarship Coverage:*

E-JUST TICAD8 scholarship is a fully funded scholarship that covers:

- Tuition fees
- Accommodation
- Monthly stipend
- Medical care
- International Flight Fare (Round Tickets; from and to the applicant’s home country)

#### *How to apply?*

Please click on “Apply now” available through international admission tab at E-JUST website and fill in the online application and attach all of the required documents.

#### *Scholarship Term:*

- The scholarship’s term is the period necessary to complete the degree requirements in E-JUST, which should be two years for the M.Sc. degree in addition to six months of



preparatory courses (if necessary) and three years for the Ph.D. degree.

- The scholarship's support is dependent upon the student good standing with E-JUST graduate program in which he/she is registered. An evaluation progress report will be sent semi-annually to the sponsor reporting about the student's study level, including the student's transcript, academic advisor report, and the updated student research situation.
- Scholarships are full-time scholarships; this means that E-JUST students are fully devoting to their study and research in E-JUST and are not allowed to work elsewhere during their scholarships' period.