

Egypt-Japan University of Science and Technology

School of Electronics, Communications and Computer Engineering

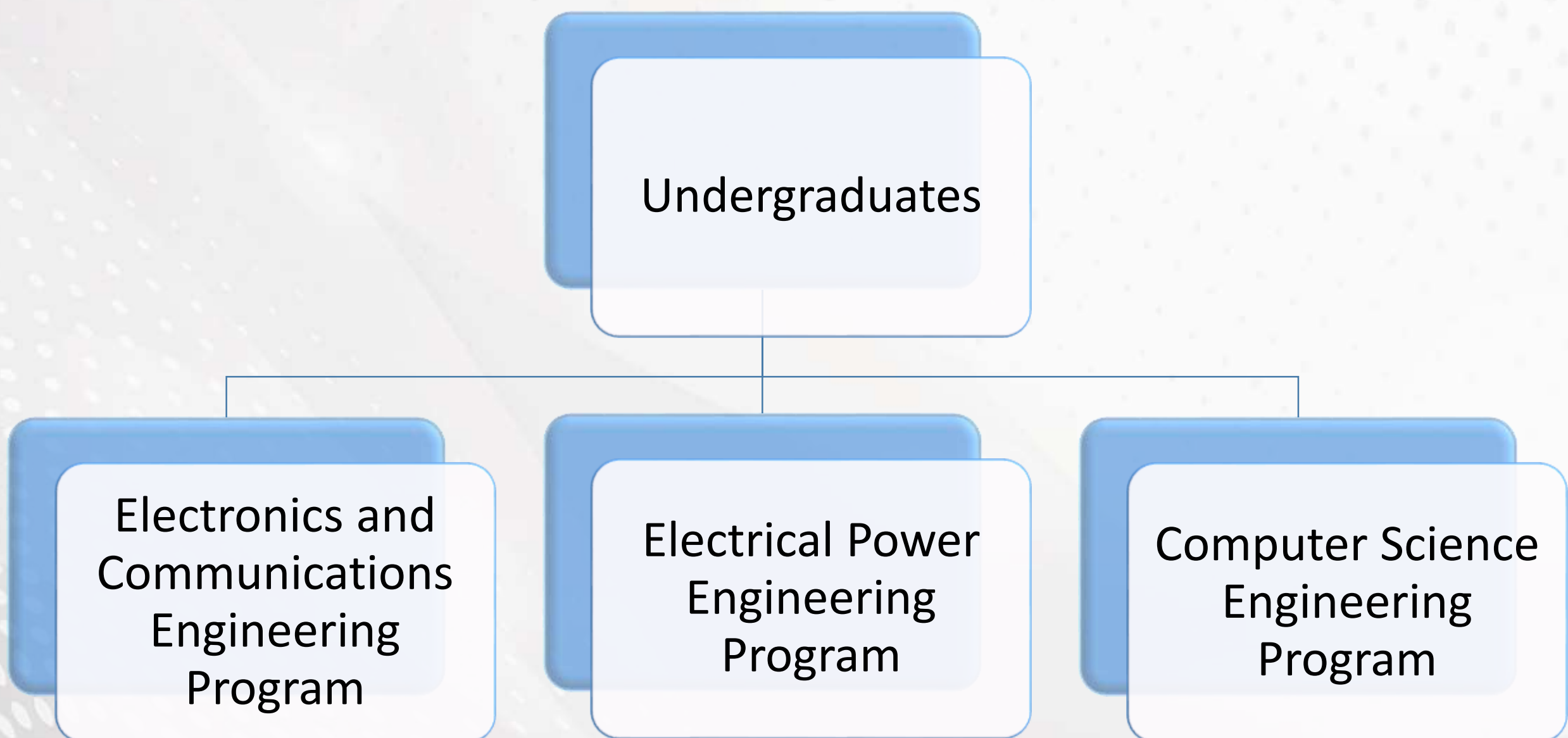
Undergraduate Program



جامعة بحثية مصرية ... ذات شراكة يابانية

**EGYPTIAN RESEARCH-ORIENTED UNIVERSITY
____WITH JAPANESE PARTNERSHIP____**

Undergraduates Programs Structure



Electronics and Communications Engineering (ECE):

The Electronics and Communications Engineering program aims to providing advanced analytical as well as technological knowledge in various fields of Electronics and Communications systems. The program includes a number of core as well as elective courses, which permit the students to specialize in a particular area while covering a broad scope of various engineering fields. The integrated skills of Electronics and Communications engineers are becoming increasingly valuable to the industry and advanced research, especially in areas of: (Analog and Digital VLSI Design), (Radio Frequency (RF) Integrated Circuit Design), (Embedded Systems), (Wired and Wireless Communication Systems and Networks), (Signal, Image and Video Processing), (Photonics Systems) and (Microwave and Antenna Engineering).

VISION:

To become a nationally and internationally highly recognized program offering high quality education in Electronics and Communications Engineering.

MISSION:

- To provide a high quality, effective, and efficient teaching environment to the best practices adopted in Japanese higher engineering education.
- To prepare qualified engineers to be capable to apply the state-of-the-art techniques in Electronics and Communications engineering to improve products quality and systems performance.
- Preparing students for employment in a variety of challenging professional environments and participating in and lead quality improvement Electronics and Communications projects.
- To prepare engineers to be capable to lead teams in industrial sectors and community services.
- To prepare students for graduate studies.

OBJECTIVES:

- Providing a comprehensive educational program in electronics and communications engineering based on establishment of the theoretical background in physics, mathematics, basic engineering and related subjects.
- Produce graduates with profound knowledge and skills of a specialization area in Electronics and Communications Engineering, and familiarity with associated areas.
- Graduate engineers who will pursue lifelong learning and providing necessary skills to enable the students to pursue postgraduate studies.
- Provide the students with competence in performing independent learning, communicating effectively, and teamwork, leadership and other personal skills.
- Advance the state-of-the-art in the specialized fields of Analog and Digital Communications, Communication Networks, Optical Communications, Microwaves and Antennas, Analog and Digital VLSI Design, Radio Frequency (RF) Integrated Circuit Design, Embedded Systems, Instruments and Instrumentation System Analysis and Design, Digital Signal and Image Processing.
- Enhance the relationships between the university and industry by preparing students for identifying, formulating and solving fundamental engineering problems.
- Training students to become leading engineers by considering technologies for efficient "information" exchange to help human society.
- Preparing students for using technical languages and writing technical reports.
- Foster the relationship with Japanese academia and industry.

PROGRAM OUTCOMES:

General Outcomes:

Apply knowledge of mathematics, science and engineering concepts to the solution of engineering problems.

- 2) Design and conduct experiments as well as analyze and interpret data.
- 3) Design a system; component and process to meet the required needs within realistic constraints.
- 4) Work effectively within multi-disciplinary teams.
- 5) Identify, formulate and solve fundamental engineering problems.
- 6) Display professional and ethical responsibilities; and contextual Understanding
- 7) Communicate effectively.
- 8) Consider the impacts of engineering solutions on society & environment.
- 9) Engage in self- and life- long learning.
- 10) Demonstrate knowledge of contemporary engineering issues.
- 11) Use the techniques, skills, and modern engineering tools, necessary for engineering practice.

Specialization outcomes (ECE Program):

- 12) Apply basic knowledge and concepts of mathematics and sciences and engineering principles to electronics systems.
- 13) Have the ability to design and execute an individual project.
- 14) Have the relevant mathematical and computational skills.
- 15) Know the technology required to design, build, operate and maintain electronic systems, analog or/and digital, and all types of computers.
- 16) Manipulate with the electronic circuits, all the way from the discrete components level, circuits' analysis and design, to the troubleshooting.
- 17) Realize control theory and measurement systems for industrial variables, signal conversion, conditioning and processing.
- 18) Deal with the computer hardware, software, and interfacing.
- 19) Know the field of digital and analog communication, mobile communication, coding, and decoding.
- 20) Know the basics and techniques of communication systems and signal processing.

Compulsory Courses:

(each course, possibly with its lab, weights three credit hours).

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 221	Digital Logic Design	2	CSE 211 + ECE 211
ECE 222	Digital Logic Design Lab	1	ECE 221*
ECE 310	Microprocessors and Microcontrollers	2	ECE 221
ECE 311	Microprocessors and Microcontrollers Lab	1	ECE 311*
ECE 312	Electric Circuits	2	EPE 121
ECE 313	Electric Circuits Lab	1	ECE 312*
ECE 314	Signal and Systems	2	MTH 121
ECE 315	Signal and Systems Lab	1	ECE 314*
ECE 316	Engineering Mathematics	3	MTH 121
ECE 317	Electronic Devices	2	PHY 121 + MTH 121
ECE 318	Electronic Devices Lab	1	ECE 317*

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 321	Project Based Learning on ECE	2	EPE 221 + ECE 312 + ECE 314 + ECE 310
ECE 322	Electronic Circuits	2	ECE 211 + ECE 312
ECE 323	Electronic Circuits La	1	ECE 322*
ECE 324	Digital Signal Processing	2	ECE 314
ECE 325	Digital Signal Processing Lab	1	ECE 324*
ECE 326	Communications Systems Fundamentals	2	ECE 314 + ECE 316
ECE 327	Communications Systems Fundamentals Lab	1	ECE 326*
ECE 328	Engineering Electromagnetics	2	ECE 316
ECE 329	Engineering Electromagnetics Lab	1	ECE 328*
ECE 411	Electromagnetic Fields and Waves	2	ECE 328

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 412	Electromagnetic Fields and Waves Lab	1	ECE 411*
ECE 413	Digital Communications Systems	2	MTH 211 + ECE 326
ECE 414	Digital Communications Systems Lab	1	ECE 413*
MTE 324	Automatic Control	2	MTH 121
MTE 325	Automatic Control Lab	1	MTE 324*
ECE 421	Principles of information theory and coding	2	ECE 413
ECE 422	Principles of information theory and coding Lab	1	ECE 421*

* Co-requisite

Elective Courses:

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 430	Radio Frequency Electronics	3	ECE 317 + ECE 322
ECE 431	CMOS Analog Integrated Circuits	3	ECE 317 + ECE 322
ECE 432	Digital VLSI Modeling and Design	3	ECE 310 or CSE 311
ECE 433	Digital Integrated Circuits	3	ECE 221 + ECE 322
ECE 434	Embedded Systems	3	ECE 310 or CSE 311
ECE 435	Fundamentals of wireless communications	3	ECE 413
ECE 436	Optical Communications Devices	3	ECE 317
ECE 437	Satellite communications	3	ECE 413
ECE 438	Mobile communication systems	3	ECE 413
ECE 439	Data Communication Networks	3	ECE 413
ECE 440	Optical Communications Systems	3	ECE 436

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 441	Microwave Engineering	3	ECE 328 + ECE 411
ECE 442	Antenna Engineering and Remote Sensing	3	ECE 328 + ECE 411
ECE 443	Advanced Topics in signal processing	3	ECE 324
ECE 444	Digital image processing	3	ECE 324
EPE 323 & EPE 324	Power Electronics (1) & Power Electronics (1) Lab	3	ECE 312
MTE 430	Micro Electromechanical Systems (MEMS)	3	
MTE 434	Sensors & Actuators	3	EPE 221 + EPE 222

Graduation Project:

ECE 420/500 Graduation Project (10 Credit hours)

Industrial Training:

ECE 599 (4 credit hours)

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Electrical Power Engineering Programs (EPE):

The electrical power engineering encompasses the generation, distribution and control of electric power. Power systems include electromechanical transducers, motors, generators and transformers. Key technical challenges are the stability of power systems, possible new sources of power (e.g., solar, wind and geothermal energy) and emerging technologies such as magnetically levitated trains and the use of high-temperature superconductors in electrical machinery.

VISION :

The vision of the electrical power engineering (EPE) program is to provide top-quality education in the field of electrical power engineering, to engage in society-related research and development, and to enhance the quality of life within the society.

MISSION :

The mission of the electrical power engineering (EPE) program is to produce high quality engineering graduates in the area of electrical power and machines who distinguish themselves as responsible members of the society at the national and regional levels, and who, through a high sense of belonging, dedicate their scientific knowledge and technical experience for the service of their country, and have the spirit of continuous learning to update their knowledge and improve their technical experience.

OBJECTIVES:

- To endow the students with a sense of professionalism with encouragement of professional ethics, professional licensing, and active participation in the affairs of the profession.
- To apply knowledge of the physical sciences, mathematics, and engineering fundamentals to the solution of electrical power engineering problems.
- To design and conduct experiments in electrical engineering, and to analyze and interpret the data generated by those experiments.
- To be able to design components, devices, and systems to meet specific needs in electrical power engineering.
- To function effectively on multi-disciplinary teams involving people from diverse backgrounds.
- To identify and define problems in electrical power engineering, and to generate and evaluate solutions to those problems.
- To understand the professional and ethical responsibilities incumbent upon the practicing electrical engineer.

Compulsory Courses:

Code	Course Title	Credit Hours	Pre- & Co-requisite
EPE 121	Electrical Engineering (Circuits + Machines)	2	PHY 111
EPE 122	Electrical Engineering Lab(Circuits + Machines)	1	EPE 121*
EPE 221	Measurements and Instrumentations	2	ECE 211
EPE 222	Measurements and Instrumentations Lab	1	EPE 221*
EPE 310	Seminar on EPE	2	
MTE 324	Automatic Control	2	MTH 121
MTE 325	Automatic Control Lab	1	MTH 121
ECE 221	Digital Logic Design	2	CSE 211 + ECE 211
ECE 222	Digital Logic Design Lab	1	ECE 221*
ECE 312	Electric Circuits	2	EPE 121
ECE 313	Electric Circuits Lab	1	ECE 313*

Code	Course Title	Credit Hours	Pre- & Co-requisite
ECE 314	Signal and Systems	2	MTH 121
ECE 315	Signal and Systems Lab	1	ECE 315*
ECE 316	Engineering Mathematics	3	MTH 121
ECE 328	Engineering Electromagnetics	2	ECE 316*
ECE 329	Engineering Electromagnetics Lab	1	ECE 328*
EPE 320	Project Based Learning on EPE	2	EPE 221
EPE 321	Power System Analysis (1)	2	ECE 312
EPE 322	Power System Analysis (1) Lab	1	EPE 321*
EPE 323	Power Electronics (1)	2	ECE 312
EPE 324	Power Electronics (1) Lab	1	EPE 323*
EPE 325	Electrical machines (1)	2	ECE 327

Code	Course Title	Credit Hours	Pre- & Co-requisite
EPE 326	Electrical machines (1)Lab	1	EPE 325*
EPE 411	Electrical machines (2)	2	EPE 325
EPE 412	Electrical machines (2)Lab	1	EPE411*
EPE 413	Power System Analysis (2)	2	EPE 321
EPE 414	Power System Analysis (2) Lab	1	EPE 413*
EPE 421	Energy Conversion and Utilization	3	EPE 321
EPE 422	Switch Gear and Protection Systems	2	EPE 321
EPE 423	Switch Gear and Protection Systems Lab	1	EPE 422*
EPE 410	Senior Project(1)	4	
EPE 420	Senior project(2)	4	
EPE 450	Industrial Training	3	

*** Co-requisite**

Elective Courses:

Code	Course Title	Credit Hours	Pre- & Co-requisite
EPE 424	High Voltage Engineering	3	EPE 321+ EPE 322
EPE 425	Power Electronics (2)	3	EPE 323+EPE324
EPE 426	Economic Operation of Power Systems	3	EPE 321+ EPE 322
EPE 427	Renewable Energy Systems	3	EPE 321+ EPE 322
EPE 428	Power Quality	3	EPE 321+ EPE 322
EPE 429	Distributed Control of Power Systems	3	MTE 324+MTE325
EPE 430	Power Transmission and Distribution	3	EPE 321+ EPE 322
EPE 431	Power System Control and Stability	3	EPE 321+MTE 324
EPE 432	Simulation and Design Power Electronics Systems	3	EPE 323+EPE324

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Computer Science Engineering (CSE)

Compulsory Courses (each course, possibly with its lab, weights three credit hours)

ECE 221 Digital Logic Design

ECE 222 Digital Logic Design Lab

CSE 311 Computer Organization

CSE 312 Discrete Mathematics

CSE 313 Advanced Programming

CSE 314 Advanced Programming Lab

ECE 314 Signals and Systems & ECE 315 Signals and Systems Lab

CSE 315 Seminar on CSE

CSE 317 Data Structures

CSE 321 Project Based Learning on CSE

CSE 322 Software Engineering & CSE 323 Software Engineering Lab

CSE 324 Embedded Systems

CSE 325 Embedded Systems Lab

CSE 326 Analysis and Design of Algorithms

CSE 328 Computer Networks & CSE 329 Computer Networks lab

CSE 411 Cryptography

CSE 412 Operating Systems & CSE 413 Operating Systems lab

CSE 424 Parallel and Distributed Computing & CSE 425 Parallel and Distributed Computing lab.

CSE 426 Theory of Computation

CSE Electives: (each course (possibly with its lab) weights three credit hours):

CSE 421 Advanced Computer Networks
CSE 422 Programming Languages and Compilers
CSE 423 Computer Graphics and Visualization
CSE 424 Advanced Embedded Systems
CSE 425 Intelligent Systems
ECE 432 Digital VLSI Modeling and Design
ECE 324 Digital Signal Processing & ECE 325 Digital Signal Processing Lab
CSE 426 Human Computer Interaction
CSE 427 Computer and Network Security
CSE 428 Data Engineering
CSE 429 Computer Vision and Pattern Recognition
CSE 431 Advanced Computer Architecture
CSE 432 Robotics
CSE 433 Emerging Topics in Computer Science and Engineering
CSE 434 Machine Learning
CSE 435 Performance Evaluation

Graduation Project:

CSE 420 Graduation Project (3 Credits)
CSE 500 Graduation Project (7 Credits)

Industrial Training:

CSE 599 (Four credit hours)

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