Course Work Requirements Structure for

Faculty of Engineering (FoE)

Preparatory Courses:

The objectives of the preparatory courses are:

▪ To cover the deficiencies of E-JUST PG applicants in the basic research skills, English languages, 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.

Study System:

36 credit hours for the MSc program: 21 credit hours: courses. 15 credit hours thesis

48 credit hours for the PhD program: 21 credit hours: courses. 27 credit hours thesis

Course Work Requirements Structure:

✓ **Preparatory Courses : University Requirements (4 Courses);** each of 1 credit hour **and Department Courses;** 2 Courses (1 Hr.)

✓ **Program Courses (2 Courses);** each of 1 credit hour

✓ **Research Elective courses (3 Courses);** each course (3) credit hour.

Student has to successfully finish the preparatory courses before the registration of the point of research and the formation of the supervision committee.

In case the student registers PhD after getting MSc from E-JUST, he/she will be exempted from the preparatory courses (6 credits).

Program Compulsory Core Courses:

1. Each program has two core compulsory courses for the program; each course three hours credits. These courses are compulsory courses for the program.
2. The student has to register the program compulsory core courses with the preparatory courses in the first year.
3. In case the student registers PhD after getting MSc from E-JUST, he/she may be exempted from the program compulsory core courses if the PhD and MSc subjects are in the same specialization and track.

Program Research Elective Courses:

1. Each program has three courses related to the research topics; each course is three credit hours.
2. These three courses are elective courses from a group of courses for each program.
3. Two of these courses should be selected from a group of courses of level 500 for MSc students and of level 600 for PhD students, one of these three courses can be selected from another graduate program.
4. The third course is a project-based learning course and should be selected from a group of courses of level 700.
5. The three courses should be selected related to the student research track according to the recommendations of the main supervisor.

Courses for Faculty of Engineering (FoE) Programs

PREPARATORY COURSES LIST

University Requirements Preparatory Course

No	Course Code	Course Name	Cr. Hr.	Conditions
1	PRE 401	English Language	1	Mandatory for students who do not have the English Score requirements for graduation.
	PRE 402	Arabic Language	1	Mandatory for foreign students (non-Arabic nation students).
2	PRE 403	Japanese Language	1	Mandatory for non-Japanese students who did not graduated from EJUST.
3	PRE 404	Japanese Culture	1	Mandatory for all students.
4	PRE 405	Research Skills and method.	1	Mandatory for all students.

Preparatory year Courses with Zero Credit

No	Course Code	Course Name	Cr. Hr.	Conditions
1	PRE 407	Engineering Mathematics	0	
2	PRE 408	Technical Writing and Seminar Skills	0	
3	PRE 409	Advanced English Language	0	

Department Requirements Preparatory Courses

Prog.	Code	Course Name	Cr. Hr	Responsibility
ECE	PRE 411	Introduction to Digital Communications Systems	1	ECE
	PRE 412	Introduction to Digital Signal Processing	1	ECE
	PRE 413	Software Applications for Digital Signal Processing and Communications	1	ECE
	PRE 414	Analog Microelectronics Circuits	1	ECE
	PRE 415	Digital Microelectronics Circuits	1	ECE
	PRE 416	Software Applications for Electronics and Electromagnetic.	1	ECE
CSE	PRE 421	Analysis and Design of Algorithms	1	CSE
	PRE 422	Introduction to Probability and Statistics	1	BAS
EPE	PRE 491	Power System Analysis	1	EPE
	PRE 492	Electrical machines	1	EPE
	PRE 493	Switch Gear and Protection Systems	1	EPE
	PRE 494	Power Electronic Systems	1	EPE
MTR	PRE 431	Introduction to Mechatronics	1	MTR
	PRE 432	Introduction to Mechanical Engineering	1	MTR
	PRE 433	Introduction to Control and Electronic Circuits	1	MTR
IEM	PRE 441	Introduction to Material Removal	1	IEM
	PRE 442	Introduction to Product Design and Development	1	IEM
	PRE 443	Introduction to Mechanical Vibrations	1	IEM
	PRE 444	Introduction to Industrial engineering	1	IEM
	PRE 445	Computer Programming for Industrial Engineering	1	IEM
	PRE 446	Introductory Mathematics for Industrial Engineering	1	IEM
MSE	PRE 451	Introduction to Characterization techniques and measurements	1	MSE
	PRE 452	Introduction to Solid state physics	1	MSE
	PRE 453	Introduction to Materials Science and Engineering	1	MSE
	PRE 454	Computer programing language	1	MSE
	PRE 455	Introduction to material chemistry	1	MSE
ERE	PRE 461	Programming and Computational Methods	1	ERE
	PRE 462	Introduction to Energy Conversions	1	ERE
	PRE 463	Applied Statistical Methods	1	BAS
ENV	PRE 471	Introduction to Hydrology: An Environmental Approach	1	ENV
	PRE 472	Introduction to Thermal engineering	1	ERE
	PRE 473	Introduction to Environmental Engineering	1	ENV
CPE	PRE 481	Computational Methods for Chemical Engineers	1	CPE
	PRE 482	Selected Topics in chemical Engineering	1	CPE

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جامعة مصرية بحثية حكومية
ذات شراكة يابانية وطبيعة خاصة

PROGRAM COURSES:

ELECTRONICS AND COMMUNICATIONS ENGINEERING PROGRAM (ECE)

Code	Course Name	Cr. Hr
Compulsory Core Courses		
ECE 501	Advanced Analog Integrated Circuits	3
ECE 502	Advanced Digital and Data Communications	3
Level 500 Elective Courses		
ECE 503	Advanced Digital Integrated Circuits	3
ECE 504	Computer-Aided Verification of Electronic Circuits and Systems	3
ECE 505	Analyses and Design of VLSI Mixed-Signal Integrated Circuits	3
ECE 506	Advanced IC Processing and Layout	3
ECE 507	Advanced Solid State Devices	3
ECE 508	Advanced Integrated Circuits for Communications	3
ECE 509	VLSI Design: System Approach	3
ECE 510	Advanced Digital Signal Processing	3
ECE 511	Information Theory	3
ECE 512	Error Control Coding	3
ECE 513	Digital Image Processing	3
ECE 514	Sensors and DSP Systems Design	3
ECE 515	Microwave Engineering	3
ECE 516	Linear Algebra and Calculus	3
Level 600 Elective Courses		
ECE 601	Quantum and Optical Electronics	3
ECE 602	Radio Frequency Integrated Circuits Design	3
ECE 603	Nanoscale Fabrication	3
ECE 604	Nano electronic Devices and Circuits	3
ECE 605	High-Speed Signals and Image Processing with VLSI	3
ECE 606	606 Complex Digital Systems Design	3
ECE 607	Mobile Communications	3
ECE 608	High Speed Communications Networks	3
ECE 609	Neural and Nonlinear Information Processing	3
ECE 610	Advanced Antenna Design	3
ECE 611	Advanced Antenna Design	3
ECE 612	Numerical Electromagnetic	3
ECE 613	Advanced Wireless Communications Systems	3
ECE 614	Advanced Optical Communications Systems	3
ECE 615	Advanced Optimization Techniques	3
ECE 616	Statistical Signal Processing	3
ECE 617	Silicon Photonics	3

Level 700 Project-based learning/Advance Research Seminar Courses		
ECE 701	Project-Based Learning in Electronics	3
ECE 702	Project-Based Learning in Communications.	3
ECE 703	Seminars on Advanced Topics in Electronics	3
ECE 704	Seminars on Advanced Topics in Communications	3

COMPUTER SCIENCE AND ENGINEERING PROGRAM (CSE)

Course Code	Course Name	Credit Hours
Compulsory Core Courses		
CSE 501	Advanced Programming Concepts	3
CSE 502	Advanced Computer Architecture	3
Level 500 Elective Courses		
CSE 503	Parallel Computing	3
CSE 504	Advanced Digital Systems	3
CSE 505	Advanced Embedded Systems	3
CSE 506	Distributed Systems t	3
CSE 507	Mobile Computing	3
CSE 508	Advanced Combinatorial Algorithms and Data Structures	3
CSE 509	Computer-Aided Geometric Design and Modeling	3
CSE 510	Advanced Database Systems	3
CSE 511	Advanced System Intelligence	3
CCE 512	Machine Learning	3
CSE 513	Multi-Agent Systems	3
CSE 514	Formal Verification	3
CSE 515	Theory of Computation	3
CSE 516	Complexity	3
CSE 517	Randomized Algorithms	3
CSE 518	Bioinformatics	3
CSE 519	Advanced Topics in Computer Science and Engineering	3
CSE 520	Advanced Topics in Computer Science and Engineering	3
Level 600 Elective Courses		
CSE 601	Parallel Processor Architecture	3
CSE 602	Advanced Compilers	3
CSE 603	Computer Systems Security	3
CSE 604	Queuing Theory	3
CSE 605	Information Theory for Communication Systems	3
CSE 606	Advanced Computer Networks	3
CSE 607	Stochastic Processes	3

Course Code	Course Name	Credit Hours
CSE 608	Computer Vision	3
CSE 609	Cryptography	3
CSE 610	Natural Language Processing	3
CSE 611	Computing in Robotics	3
CSE 612	Advanced Machine Learning.	3
Level 700 Project-based learning/Advance Research Seminar Courses		
CSE 701	Project-Based Learning in Computer Science and Engineering	3
CSE 702	Seminars on Advanced Topics in Computer Science and Engineering.	3

ELECTRICAL POWER ENGINEERING PROGRAM (EPE)

Course Code	Course Name	Credit Hours
Compulsory Courses		
EPE 501	Power System Analysis	3
EPE 502	Power System Operation and Planning	3
EPE 503	Transient and Modeling in Electrical Machines	3
EPE 504	Modern Electric Drives	3
EPE 505	Power Electronics and FACTs	3
EPE 506	Advanced High Voltage Engineering	3
Level 500 Elective Courses		
EPE 507	Artificial Intelligence and its Applications in Power Systems	3
EPE 508	Numerical Methods and Partial Differential Equations	3
EPE 509	Computational Methods in Engineering	3
EPE 510	Statistical Reasoning	3
EPE 511	Power Electronics for Energy Systems	3
EPE 512	Solar Energy and Photovoltaic Systems	3
EPE 513	Energy Storage	3
EPE 514	Power System Reliability	3
EPE 515	Distributed Generation Systems	3
EPE 516	Wind Energy Systems	3
Level 600 Courses		
EPE 601	Advanced Control for Power Engineering	3
EPE 602	Advanced Power System Protection	3
EPE 603	Electrical Power System Transients	3
EPE 604	Data Gathering and Processing	3
EPE 605	Digital Protection System	3
EPE 606	Power Quality	3
EPE 607	Advanced Power System Protection	3
EPE 608	Numerical Methods for Electromagnetic Fields	3
EPE 609	Advanced Analysis of Electrical Machines	3
EPE 610	Power System Modeling and Control	3
EPE 611	Smart Distribution Systems	3
EPE 612	Sustainable Energy Technologies	3

Course Code	Course Name	Credit Hours
EPE 613	Biofuels and Biomass	3
EPE 614	Nuclear Energy	3
Level 700 Project-based learning/Advance Research Seminar Courses		
EPE 701	Project Based Learning on Electrical Power Engineering	3
EPE 702	Advanced Research Seminar on Electrical Power Engineering Resources	3
EPE 703	Research Seminar on Recent Topics in Electrical Power Engineering	3

MECHATRONICS AND ROBOTICS ENGINEERING PROGRAM (MTR)

Course Code	Course Name	Credit Hours
Compulsory Courses		
MTR 501	Advanced Mechatronics Systems Design	3
MTR 502	Optimal Control	3
Level 500 Elective Courses		
MTR 503	Advanced Control Systems	3
MTR 504	Micro Electro-Mechanical Systems (MEMS)	3
MTR 505	Mobile Robots and Vision Systems	3
MTR 506	Advanced Topics in Mechanical Systems Design	3
MTR 507	Intelligent Robots	3
MTR 508	Robot Kinematics, Dynamics and Control	3
Level 600 Elective Courses		
MTR 601	Intelligent Control Systems	3
MTR 602	Advanced Robotics	3
MTR 603	Advanced Bio-Engineering Systems	3
MTR 604	Bio-Mechatronics Systems	3
MTR 605	Smart Sensors and Actuators	3
MTR 606	Nonlinear Control Systems	3
MTR 607	Learning Algorithms and Neural Networks	3
MTR 608	Advanced Micro Electromechanical Systems	3
MTR 609	Fundamental of Microfluidics and Its Applications	3
MTR 610	Natural Language Processing	3
MTR 611	Computing in Robotics	3
MTR 612	Advanced Machine Learning.	3
Level 700 Project-based learning/Advance Research Seminar Courses		
MTR 701	Project Based Learning in Mechatronics and Robotics	3
MTR 702	Seminar on Mechatronics and Robotics Recent Research Topics	3

INDUSTRIAL ENGINEERING AND SYSTEMS MANAGEMENT PROGRAM (IEM)

Course Code	Course Name	Credit Hours
Compulsory Courses for Industrial Engineering Research Tracks		
IEM 501	Project Planning and Management	3
IEM 502	Operations Research	3
Compulsory Courses for Manufacturing Engineering Research Tracks		
IEM 503	Computer-Aided Design (CAD)	3
IEM 504	Computer Numerical Control (CNC) of Machine Tools	3
Level 500 Elective Courses		
IEM 505	Global IE	3
IEM 506	Advanced Ergonomics and Human Factors Engineering	3
IEM 507	Advanced Operations Management	3
IEM 508	Operations and Management in the Process Industry	3
IEM 509	Strategic Planning and Management	3
IEM 510	Contemporary Organizational Theory and Behavior	3
IEM 511	Technology and Innovation Management	3
IEM 512	Accounting for Engineers	3
IEM 513	Marketing for Engineers	3
IEM 514	Applied Simulation Modeling and Analysis	3
IEM 515	Applied Multivariable Data Analysis	3
IEM 516	Advanced Soft Computing	3
IEM 517	Management Information Systems	3
IEM 518	Statistical Design of Experiments	3
IEM 519	Linear and Integer Programming	3
IEM 520	Manufacturing Systems Engineering	3
IEM 521	Computer Aided Engineering (CAE) Methods	3
IEM 522	Advanced Manufacturing Processes	3
IEM 523	Systems Engineering and Analysis	3
IEM 524	Systems Thinking	3
IEM 525	Total Quality Management	3

IEM 526	Business Process Management	3
IEM 527	Introduction and Applications of Petri Nets	3
Level 600 Elective Courses		
IEM 601	Global IE 2	3
IEM 602	Supply Chain Network Design and Logistics	3
IEM 603	Human Computer Interaction	3
IEM 604	Advanced Methods in Quality Design and Control	3
IEM 605	Reliability and Maintainability Engineering	3
IEM 606	Innovation Theory	3
IEM 607	Knowledge Management	3
IEM 608	Financial Engineering	3
IEM 609	International Business for Engineers	3
IEM 610	Advanced Operations Research Methods	3
IEM 611	Applied Multivariate Data Analysis	3
IEM 612	Stochastic Processes and Applications	3
IEM 613	Advanced Biomechanics	3
IEM 614	Composites Engineering	3
IEM 615	Tool Engineering	3
IEM 616	Rapid Prototyping and Product Development	3
IEM 617	Non-traditional Machining Processes	3
IEM 618	Systems Theory	3
IEM 619	Service Systems Engineering	3
IEM 620	Service Operations and Customer Relationship Management	3
IEM 621	Information Technology Services and E-Business Management	3
IEM 622	Computer-Aided Design (CAD)	3
Level 700 Project-based learning/Advance Research Seminar Courses		
IEM 701	Project Based Learning in Industrial Engineering	3
IEM 702	Project Based Learning in Manufacturing Engineering	3
IEM 703	Seminar on Current Trends in Industrial Engineering	3
IEM 704	Seminar on Current Trends in Manufacturing Engineering	3

MATERIALS SCIENCE AND ENGINEERING PROGRAM (MSE)

Course Code	Course Name	Credit Hours
Compulsory Courses		
MSE 501	Materials Properties and Chemical Changes	3
MSE 502	Phase Equilibrium and Transformations	3
Level 500 Elective Courses		
MSE 503	Microstructural Analysis of Solids	3
MSE 504	Electronic and Photonic Properties of Materials	3
MSE 505	Polymer Science and Engineering	3
MSE 506	Recycling and Processing of Engineering Materials	3
MSE 507	Advanced Testing and Characterization Techniques	3
MSE 508	Modeling and Simulation	3
MSE 509	Advanced Mechanics of Materials	3
MSE 510	Finite Element Modeling and Simulation	3
Level 600 Courses		
MSE 601	Composite Materials	3
MSE 602	Surface Science and Corrosion	3
MSE 603	High Performance Ceramics and Glasses	3
MSE 604	Advanced Semiconductors	3
MSE 605	Solid-state and Thin-film Reaction Kinetics	3
MSE 606	Nano-materials and Nanotechnology	3
MSE 607	Biomedical materials	3
MSE 608	Magnetic and Superconducting Materials	3
MSE 609	Materials for Photovoltaic Devices	3
MSE 610	Active and Sensing Materials	3
MSE 611	Fuel Cells, Batteries and Super capacitors	3
MSE 612	Fracture and Fatigue	3
MSE 613	Advanced Mathematics and Statistics II	3
Level 700 Project-based learning/Advance Research Seminar Courses		
MSE 701	Project Based Learning in Materials Development, Characterization and Integration in Engineering Systems.	3
MSE 702	Seminar on Advanced topics of Materials Science and Technology	3

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ENERGY RESOURCES ENGINEERING PROGRAM (ERE)

Course Code	Course Name	Credit Hours
Compulsory Courses		
ERE 501	Energy Resources Engineering	3
ERE 502	Renewable Energy Utilization	3
Level 500 Elective Courses		
ERE 503	Solar Energy Engineering	3
ERE 504	Fuels and Processes	3
ERE 505	Computational Fluid Dynamics	3
ERE 506	Thermal/ Hydraulics in Power Technology	3
ERE 507	Thermal and Cogeneration Systems	3
ERE 508	Hydrogen and Fuel Cells Systems	3
ERE 509	Advanced Heat and Mass Transfer	3
ERE 510	Advanced Thermodynamics	3
ERE 511	Advanced Fluid Mechanics	3
ERE 512	Advanced Combustion and Air Pollution	3
Level 600 Courses		
ERE 601	Sustainable Energy Utilization	3
ERE 602	Advanced Computational Fluid Dynamics	3
ERE 603	Refrigeration and Indoor Environmental Control	3
ERE 604	Turbomachinery	3
ERE 605	Energy Management	3
ERE 606	Energy Systems	3
ERE 607	Advanced Topics in Fuels and Combustion	3
ERE 608	Energy Efficient Buildings	3
ERE 609	Refuse Derived Fuel (RDF)	3
ERE 610	Energy Storage (I)	3
ERE 611	Energy Storage (II)	3
ERE 612	Dynamic Uninterruptible Power Supply System (UPS)	3
ERE 613	Smart Grids	3
ERE 614	Electrical Power Generation	3
ERE 615	Hydrogen and Fuel Cells Systems	3
ERE 616	Advanced Heat and Mass Transfer	3
Project-based learning/Advance Research Seminar Courses		
ERE 701	Project Based Learning on Energy Resources Engineering	3
ERE 702	Advanced Research Seminar on Energy Resources Engineering	3
ERE 703	Research Seminar on Recent Topics in Energy Resources Engineering	3

ENVIRONMENTAL ENGINEERING PROGRAM (ENV)

Course Code	Course Name	Credit Hours
Compulsory Courses		
ENV 501	Environmental Management System	3
ENV 502	Principles of Environmental Engineering	3
Level 500 Elective Courses		
ENV 503	Water Quality and Treatment	3
ENV 504	Advanced Water supply Engineering	3
ENV 505	Ground Water Engineering and Management	3
ENV 506	Advanced Wastewater Treatment	3
ENV 507	Air Pollution and Control Technology	3
ENV 508	Environmental Pollution and Control Engineering	3
ENV 509	Solid Waste Management	3
ENV 510	Global Environment	3
ENV 511	Water Resources Management	3
ENV 512	Transport Phenomena	3
Level 600 Courses		
ENV 601	Seawater and Brackish Water Desalination	3
ENV 602	Environmental Economics	3
ENV 603	Hazardous Waste Management	3
ENV 604	Environmental Processes and Systems	3
ENV 605	Life Cycle Assessment	3
ENV 606	Risk and Hazard Management in Environment and Energy	3
ENV 607	Environmental Performance Measures and Indices	3
ENV 608	Industrial Waste Treatment	3
Project-based learning/Advance Research Seminar Courses		
ENV 701	Project Based Learning on Environmental Engineering	3
ENV 702	Advanced Research Seminar on Environmental Engineering	3
ENV 703	Research Seminar on Recent Topics Environmental Engineering	3

CHEMICAL AND PETROCHEMICALS ENGINEERING (CPE)

Course Code	Course Name	Credit Hours
Compulsory Courses		
CPE 501	Transport Phenomena	3
CPE 502	Advanced Unit Operations	3
Level 500 Elective Courses		
CPE 503	Modeling and Simulation of Chemical and Petrochemical Processes	3
CPE 504	Electrochemical Methods in Chemical and Petrochemical Industries	3
CPE 505	Advanced Separation Technologies	3
CPE 506	Advanced Process Control	3
CPE 507	Nanotechnology in Chemical and Petrochemical Industries	3
CPE 508	Environmental Pollution and Control Engineering	3
CPE 509	Gas handling& Processing Engineering	3
CPE 510	Analytical Instrumentation	3
CPE 511	Petrochemical Industries	3
Level 600 Courses		
CPE 601	Advanced Chemical Reactions and Reactor Design	3
CPE 602	Advanced Polymerization Engineering	3
CPE 603	Catalysis Engineering and Design	3
CPE 604	Process Optimization	3
CPE 605	Particle Science and Handling Engineering	3
CPE 606	Biochemical Engineering	3
CPE 607	Pollution Control in Chemical and Petrochemical Industries	3
CPE 608	Micro-Chemistry and Micro-Chemical Engineering	3
CPE 609	Applied Recycling technologies in Petrochemical Industries	3
CPE 610	Topics on Polymer Processing Processes	3
CPE 611	Topics on Electrochemistry Applications in Industry	3
Level 700 Project-based learning/Advance Research Seminar Courses		
CPE 701	Project Based Learning on Chemical and Petrochemicals Engineering	3
CPE 702	Advanced Research Seminar on Chemical Engineering	3
CPE 703	Research Seminar on Recent Topics in Chemical Engineering	3