

Electrical Power and Machines Program

Program Description

The Electrical Power and Machines Engineering Program is designed to qualify its graduates for both fundamental and modern trends in electrical power systems, design, operation and control. The program is structured in a hierarchical manner based on strong mathematical and physics background while moving gradually up to the fundamental electrical engineering subjects. Then, reaching to the major specialty courses of power systems design, operation, installation, control and economics. The program pays significant attention to the renewable electrical energy resources as well as the smart grid operation and control with the objective of environmental conservation and economical aspects. The program adapts the updated approaches and methodology in teaching and learning activities and assessment with focus on achieving balance between academic background and professional skills of the graduates. Students in the program are centered of focus by implanting self-learning attitude, peer discussions, and courses embedded engineering skills. The assessment techniques are devised in a way to avoid passing the courses unless the student gets the intended learning outcomes.

Career Prospects

The prospect market of the Electrical Power and Machines Engineering Program graduate is widespread. Electrical power networks planning, design, and installation in urban areas, hospitals, touristic, educational and administrative buildings is a sizable market for the graduates in engineering contracting, and manufacturing firms. Industrial control and maintenance of electrical motors, traction, escalators, and elevators are covered within the program profession. Electrical power utilities: distribution, transmission, and generation are as well as major market labor for the graduates.

Required Courses

In order to get a Bachelor of Science Degree in this program, the following set of courses need to be completed.

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	14	17	425	12	6	0	18
	Faculty of Engineering Requirements	42	76	1900	34	23	14	71
	Electrical Engineering Requirements	60	104	2600	48	30	12	90
EPM321	Transformers and DC Machines	3	6	150	2	2	1	5
EPM322	Alternating Current Machines	3	6	150	2	2	1	5
EPM331	Electrical Transmission Systems	3	5	125	2	2	0	4
EPM332	Power Systems Analysis	3	6	150	2	2	1	5
EPM333	Electrical Distribution Systems	3	5	125	2	2	0	4
EPM431	Operation and Control of Power Systems	3	6	150	2	2	1	5
EPM432	Electrical Installations and Energy Utilization	3	6	150	2	2	1	5
EPM341	High Voltage Engineering	3	6	150	2	2	1	5
EPM342	Switchgear Engineering and substations	3	5	125	2	2	0	4
EPM351	Power Electronics (1)	3	6	150	2	2	1	5
EPM352	Power Electronics (2)	3	6	150	2	2	1	5
EPM451	Electrical Drives Systems	3	5	125	2	2	1	5
EPM461	Protection Engineering	3	5	125	2	2	1	5
	Electrical Power and Machines Elective (1)	2	5	125	2	1	0	3
	Electrical Power and Machines Elective (2)	2	5	125	2	1	0	3
	Electrical Power and Machines Elective (3)	3	5	125	2	2	0	4
	Electrical Power and Machines Elective (4)	2	5	125	2	1	0	3
EPM491	Electrical Power and Machines Graduation Project (1)	3	5	125	1	4	0	5
EPM492	Electrical Power and Machines Graduation Project (2)	3	5	125	1	4	0	5
Total		170	300	7500	130	98	36	264
Pool of Electrical Power and Machines Elective (1) Courses								
EPM421	Special Machines	2	5	125	2	1	0	3
EPM433	Power Systems Stability	2	5	125	2	1	0	3
Pool of Electrical Power and Machines Elective (2) Courses								
EPM452	Advanced Applications in Power Electronics	2	5	125	2	1	0	3
EPM453	Power Quality	2	5	125	2	1	0	3
Pool of Electrical Power and Machines Elective (3) Courses								
EPM422	Industrial Automation Systems	3	5	125	2	2	0	4
EPM434	Planning of Electrical Networks	3	5	125	2	2	0	4
Pool of Electrical Power and Machines Elective (4) Courses								
EPM423	Power Generating Stations	2	5	125	2	1	0	3
EPM462	Advanced Protection in Power Systems	2	5	125	2	1	0	3

Proposed Study Plan

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 1									
PHM012	Mathematics (1)	3	5	125	3	2	0	5	Eng/Math
PHM021	Vibration and Waves	3	5	125	3	1	1	5	Eng/Math
PHM031	Statics	3	5	125	2	2	1	5	Eng/Math
MDP011	Engineering Drawing	3	6	150	1	3	2	6	Eng.
PHM041	Engineering Chemistry	3	5	125	2	1	2	5	
CSE031	Computing in Engineering	2	4	100	2	0	0	2	
Total		17	30	750	13	9	6	28	
Semester 2									
PHM013	Mathematics (2)	3	5	125	3	2	0	5	PHM012
PHM022	Electricity and Magnetism	3	5	125	3	1	1	5	Eng/Math
PHM032	Dynamics	3	5	125	2	2	1	5	PHM031
CEP011	Projection and Engineering Graphics	3	6	150	1	3	2	6	Eng.
MDP081	Production Engineering	3	5	125	2	0	3	5	
ENG011	Fundamentals of Engineering	2	4	100	2	1	0	3	
Total		17	30	750	13	9	7	29	
Semester 3									
PHM111	Probability and Statistics	2	4	100	2	2	0	4	PHM013
EPM112	Electromagnetic Fields	3	5	125	3	1	0	4	PHM013 PHM022
PHM121	Modern Physics and Quantum Mechanics	3	5	125	3	1	1	5	PHM013 PHM022
EPM111	Electrical Circuits (1)	4	7	175	3	2	1	6	PHM022
CSE111	Logic Design	3	5	125	3	1	1	5	
ASU112	Report Writing and Communications skills	3	4	100	2	2	0	4	
Total		18	30	750	16	9	3	28	
Semester 4									
PHM122	Physics of Semiconductors and Dielectrics	3	5	125	2	2	0	4	PHM121
MEP112	Thermal Power Engineering	3	5	125	2	2	0	4	PHM041 PHM022
EPM112	Differential and Partial Differential Equations	3	5	125	3	2	0	5	PHM013
EPM113	Electrical Measurements	3	5	125	2	2	1	5	EPM111
EPM119	Engineering Economy and Investments	2	4	100	2	1	0	3	
CSE131	Computer Programming	3	6	150	3	0	2	5	
Total		17	30	750	14	9	3	26	
Semester 5									
EPM211	Properties of Electrical Materials	2	4	100	2	1	1	4	PHM022
EPM212	Electrical Circuits (2)	3	6	150	2	2	1	5	EPM111
ECE211	Electronics	3	5	125	3	1	1	5	PHM122
ECE251	Signals and Systems Fundamentals	4	6	150	3	2	0	5	PHM111 PHM113
CSE271	System Dynamics and Control Components	4	6	150	3	2	1	6	
ASU32x	ASU Elective (1)	2	3	75	2	1	0	3	
Total		18	30	750	15	9	4	28	

Code	Course Title	Credits and SWL			Contact Hours				Pre-requisites
		CH	ECTS	SWL	Lec	Tut	Lab	TT	
Semester 6									
EPM213	Energy and Renewable Energy	3	6	150	3	1	1	5	EPM112
EPM214	Electrical Systems Simulation	3	6	150	2	2	1	5	EPM212
ECE252	Fundamentals of Communication systems	3	6	150	2	2	0	4	ECE251
CSE353	Industrial Networks	3	5	125	2	2	1	5	
CSE211	Introduction to Embedded Systems	3	5	125	2	2	2	6	CSE131
ASU111	Human Rights	2	2	50	2	1	0	3	
Total		17	30	750	13	10	5	28	
Semester 7									
EPM321	Transformers and DC Machines	3	6	150	2	2	1	5	EPM212 EPM112
EPM331	Electrical Transmission Systems	3	5	125	2	2	0	4	EPM212
EPM341	High Voltage Engineering	3	6	150	2	2	1	5	EPM112
EPM351	Power Electronics (1)	3	6	150	2	2	1	5	ECE211
EPM312	Automatic Control Systems Design	3	5	125	2	2	0	4	CSE271
ASU114	Selected Topics in Contemporary issues	2	2	50	2	0	0	2	
Total		17	30	750	12	10	3	25	
Semester 8									
EPM322	Alternating Current Machines	3	6	150	2	2	1	5	EPM321
EPM332	Power System Analysis	3	6	150	2	2	1	5	EPM331
EPM333	Electrical Distribution Systems	3	5	125	2	2	0	4	EPM111
EPM342	Switchgear Engineering and Substations	3	5	125	2	2	0	4	EPM341
EPM352	Power Electronics (2)	3	6	150	2	2	1	5	EPM351
ASU33x	ASU Elective (2)	2	2	50	2	0	0	2	
Total		17	30	750	12	10	3	25	
Semester 9									
EPM431	Operation and Control of Power Systems	3	6	150	2	2	1	5	EPM332 EPM213
EPM461	Protection Engineering	3	5	125	2	2	1	5	EPM332 EPM342
EPM4xx	Electrical Power and Machines Elective (1)	2	5	125	2	1	0	3	
EPM4xx	Electrical Power and Machines Elective (2)	2	5	125	2	1	0	3	
ASU113	Professional Ethics and Legislations	3	4	100	2	2	0	4	
EPM491	Electrical Power & Machines Graduation Project (1)	3	5	125	1	4	0	5	
Total		16	30	750	11	12	2	25	
Semester 10									
EPM432	Electrical Installations and Energy Utilization	3	6	150	2	2	1	5	EPM333
EPM451	Electrical Drives Systems	3	5	125	2	2	1	5	EPM322 EPM352
EPM4xx	Electrical Power and Machines Elective (3)	3	5	125	2	2	0	4	
EPM4xx	Electrical Power and Machines Elective (4)	2	5	125	2	1	0	3	
EPM411	Project Management for Electrical Engineering	2	4	100	2	1	0	3	
EPM492	Electrical Power & Machines Graduation Project (2)	3	5	125	1	4	0	5	EPM491
Total		16	30	750	11	12	2	25	