



Model No.13
Programme Specifications
Electrical Power and Control Engineering
Academic Year 2017 - 2018

Faculty of Engineering
at benha

Farabi Quality Management of Education and Learning - 23/1/2019 23/1/2019

University : Benha university

Faculty : Faculty of Engineering at benha

A- Basic information :

1. Programme title	Electrical Power and Control Engineering
2. Programme type	Single
3. Adoption program Date	15/06/2012
4- Department responsible for the program	Department 1 - تكنولوجيا الهندسة الكهربائية / Faculty of Engineering at benha

B- Specialized information :

1- General objectives of the program

- 1- Develop in the students a strong understanding of the capabilities and limitations of control, modeling and simulation tools.
- 2- Develop in the student's competence in computing in terms of software engineering and the use of the latest computing technologies.
- 3- Train students in laboratory techniques for the safe and effective construction and testing of electrical power and control systems.
- 4- Develop in the students excellence in communication of technical and non-technical information in written, oral or graphical form and the duties associated with the status of a chartered engineer.
- 5- Provide the students with opportunities for internships in industry to gain career enhancing experience of the application of engineering principles.
- 6- Enhance the active learning by the students and provide them with a well-developed academic base that provides for further learning and professional development
- 7- Give the students a chance to gain knowledge and develop skills in a range of specialized selective courses covering electrical power or control engineering.
- 8- Develop advanced analytical and experimental skills that will allow the successful graduates to design new power and control systems and provide them with the skills to critically analyze existing designs.

2- Intended learning outcomes (ILOS)

a- Knowledge and Understanding

- a1- Basics of electrical power and control systems theory and design
- a2- Basics of electrical engineering, electronics, microprocessor, Logic circuits, machines and low & high voltage power systems
- a3- Basics of electrical power system design concepts and control for insulators, earthing, lighting systems, cable tray and protection related to distribution systems
- a4- Concepts and principles underpinning control system theory and design, including those associated with linear and non-linear deterministic systems, stochastic systems, modeling, optimization, control system design, and on-line control
- a5- Concepts and theories of mathematics and sciences appropriate to electrical and control engineering
- a6- Principles of performing electrical power system analysis and protection
- a7- Principles of Analyzing and design of control systems with performance evaluation

- a8- Practical application of theory using computer software and programming skills as appropriate to electrical power and control engineering
- a9- Sustainable technologies and their applications in the field of electrical power and control engineering
- a10- Listing different energy conversion methods and technologies
- a11- Operation principles of robotics, electrical machines, special machines and their drive tools and control
- a12- Theories and techniques of electrical power, and renewable energy generation and control
- a13- Outlining the concepts of digital control systems
- a14- Have an awareness of the limitations of current knowledge and the changing nature of technologies and society including applications in the field of power and control engineering
- a15- Synthesize and critically analyze information and ideas, and apply creative and original thought in order to propose appropriate new solutions to complex industry related problems
- a16- Characteristics of engineering materials related to electrical and control engineering

b- Intellectual Capacity

- b1- Identify and formulate engineering problems to solve problems in the field of electrical power, machines and control engineering
- b2- Analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical power, machines and control engineering
- b3- Analyze the performance of digital and analog control systems
- b4- Analyze the performance of generators, motors, robots, special machines and machines drive
- b5- Analyze the performance of electric power generation, control and distribution systems
- b6- Organize information innovatively in a form appropriate to decision making process
- b7- Applying and integrating knowledge and understanding of other engineering disciplines to develop innovative solutions for the practical electrical and control problems

c- Professional Skills

- c1- Design and perform experiments, as well as analyze and interpret experimental results related to electrical power. Machines and control systems
- c2- Test and examine components, equipment and systems of electrical power, machines and control
- c3- Specify and evaluate manufacturing of components and equipment related to electrical power, machines and control
- c4- Apply modern techniques, skills and engineering tools to electrical power, machines and control engineering systems in order to achieve desired engineering output
- c5- Designing and controlling components in electric power systems such as: electric machines, transmission and distribution system, power electronic circuits, control systems, measuring instruments, insulators, relays, circuit breakers, ...etc
- c6- Evaluating control system stability
- c7- Design computer programs on professional levels achieving acceptable quality measures in software development
- c8- Apply modern techniques, skills and engineering tools to control systems
- c9- Apply the principles of sustainable design, control, and development

d- General Skills

- d1- Identify and work towards collective goals
- d2- Create, maintain and enhance productive working relationships, and resolve conflicts

- d3- Prepare action plans to meet personal and organizational objectives
d4- Apply critical and creative thought to analyze and systematically solve complex problems

3- Academic standards

1- Reference points defined by an institution comprising the collective knowledge and skills to be gained by the graduates of a particular program..The academic standards should surpass the NARS, and be approved by NAQAAE.

4- External references for standards (Benchmarks)

1- Electrical Power & Control Technology program, Texas State Technical College, Location :TSTC WACO, 3801 CAMPUS DRIVE, WACO, TX 76705.

5- Curriculum structure and contents

a - Programme duration 5

b - Programme Structure

1 - No of hours /No of Units :	Theoretical	0	Practical	0	Total	0
	Compulsory	171	Elective	9	Optional	0
2 - Basic sciences Courses :						
3 - Social sciences and humanities courses :						
4 - Specialized courses :						
5 - Other Courses :						
6 - Practical/field training:						

6- Programme courses

(اللائحة الداخلية لكلية الهندسة ببناها) الفرقة الثالثة / هندسة القوى الكهربيه والتحكم / الهندسة الكهربيه.

a- Compulsory :						
code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
١٣٣١ ك	Electrical Machines 1	3	3	1	2	First Semster
١٣٣٣ م	Environment and Pollution					
١٣٢١ ك	Microprocessor Based Systems A	3	3	1	2	First Semster
١٣٤٣ م	Power Stations	3	3	2	1	First Semster
١٣٣٣ ك	Electrical Power Systems 1	3	3	1	2	First Semster
١٣٣٥ ك	Power Electronics A	3	3	1	2	First Semster
١٣٠٥ ك	Technical Report	0	0	0	2	First Semster
١٣٣٤ ك	Power Electronics B	3	3	1	2	Second Semster
١٣٠٢ ك	Safety in Electrical Environment	1	1	1	1	Second Semster
١٣٢٢ ك	Microprocessor Based Systems B	3	3	1	2	Second Semster
١٣٢٠ ك	Presentation and Communication	2	2			Second Semster
١٣٤٢ ك	Control Engineering 2	6	3	1	2	Second Semster
١٣٣٢ ك	Electrical Power Systems 2	3	3	1	2	Second Semster
١٣٣٨ ك	Electrical Machines 2	3	3	1	2	Second Semster
b- Optional :						

هندسه القوى الكهربيه والتحكم أ / هندسه القوى الكهربيه والتحكم / الهندسه الكهربيه / -Fourth Year /
(الإثحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٤٤٣	Digital Control-Digital Control	3	3	2	1	First Semester
ك ١٤٣٧	Power System Analysis	3	3	1	2	First Semester
ك ١٤٤١	Industrial Control Systems	3	3	2	1	First Semester
ك ١٤٣٥	Power Systems Protection-Power Systems Protection	3	3	1	2	First Semester
ك ١٤٠١	Field Training	1	0	0	2	First Semester
ك ١٤٣٩	Electrical Drive Systems	3	3	1	2	First Semester
ك ١٥٠٠	Project	1	1	0	5	First Semester
ك ١٥٠٠	Project-Project	1	1	0	5	Second Semester
ك ١٤٣٨	Transducers and Special Machines	3	3	1	2	Second Semester
ج ١٤٠٠	Legislation And Contracts	2	2	0	0	Second Semester
ك ١٤٠٨	Engineering Economy	2	2		1	Second Semester

b- Optional :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٥٣٦	Design of Distribution Systems-Design of Distribution Systems	3	3	2	2	Second Semester
ك ١٥٣٤	New and Renewable Energy	3	3	2	1	Second Semester
ك ١٥٣٢	Computer Applications in Power Systems					Second Semester
ك ١٥٣٨	Flexible AC Transmission					Second Semester
ك ١٥٣٠	High Voltage Engineering	3	3	2	1	Second Semester

هندسه القوى الكهربيه والتحكم ب / هندسه القوى الكهربيه والتحكم / الهندسه الكهربيه -Fourth Year /
(الائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
١٤٤٣ ك	Digital Control	3	3	2	1	First Semster
١٤٣٧ ك	Power System Analysis	3	3	1	2	First Semster
١٤٣٩ ك	Electrical Drive Systems	3	3	1	2	First Semster
١٥٠٠ ك	Project	1	1	0	5	First Semster
١٤٠١ ك	Field Training	1	0	0	2	First Semster
١٤٤١ ك	Industrial Control Systems	3	3	2	1	First Semster
١٤٣٥ ك	Power Systems Protection	3	3	1	2	First Semster
١٥٠٠ ك	Project	1	1	0	5	Second Semster
١٤٣٨ ك	Transducers and Special Machines	3	3	1	2	Second Semster
١٤٠٠ ج	Legislation And Contracts	2	2	0	0	Second Semster
١٤٠٨ ك	Engineering Economy	2	2		1	Second Semster

b- Optional :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
١٥٤٤ ك	Modeling of Electrical Machines	3	3	2	1	Second Semster
١٥٤٨ ك	Intelligent Control Systems	3	3	2	1	Second Semster
١٥٤٠ ك	Advanced Industrial Control Systems- Advanced Industrial Control Systems	3	3	2	1	Second Semster
١٥٤٢ ك	Robotics					Second Semster
١٥٤٦ ك	Parameters Estimation and Systems Identification-Parameters Estimation and Systems Identification	3	3	2	1	Second Semster

-Preparatory Year (الائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
١٠٦١ م	Engineering Drawing A-Engineering Drawing A	1			3	First Semster
١٠١١ س	Mathematics 1 A	4	4	2	0	First Semster
١٠٣١ س	Physics A	4	4	-	2	First Semster
١٠٤١ س	Chemistry A	4	4	2	2	First Semster

ك ١٠٢١	Computer Fundamentals and Programming A	1	0	0	2	First Semester
ج ١٠١١	Technical English Language A	1			2	First Semester
م ١٠٧١	Production Engineering and Workshops A- Production Engineering and Workshops A	2	2	0	3	First Semester
س ١٠٢١	Mechanics A	4	4	2		First Semester
م ١٠٠٢	Technology and Society-Technology and Society	2	2			Second Semester
س ١٠٢٢	Mathematics 1 B-Mechanics B	4	4	2		Second Semester
س ١٠٤٢	Chemistry B	4	4	2	2	Second Semester
س ١٠١٢	Mathematics 1 B	4	4	2	0	Second Semester
ك ١٠٢٢	Computer Fundamentals and Programming B	1	0	0	2	Second Semester
ج ١٠١٢	Technical English Language B	1			2	Second Semester
م ١٠٧٢	Production Engineering and Workshops B	2	2	0	3	Second Semester
س ١٠٣٢	Physics B	4	4	0	2	Second Semester
م ١٠٦٢	Engineering Drawing B-Engineering Drawing B	3			3	Second Semester

b- Optional :

(اللائحة الداخلية لكلية الهندسة ببنها) الهندسة الكهربيه / -First Year

a- Compulsory :

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
م ١١٠١	Mechanical Engineering Technology	3	3	1		First Semester
ك ١١٠٣	Electrical Engineering Applications A	1	1	0	3	First Semester
ك ١١٢٣	Computer Programming A	1	1		3	First Semester
ك ١١٠١	Electrical Engineering and Circuit Analysis A- Electrical Engineering and Circuit Analysis A	2	2	2		First Semester
ك ١١٢١	Logic Circuits A	2	2	1	2	First Semester
س ١١١١	Mathematics 2 A	3	3	2	0	First Semester
س ١١٣٣	Modern Physics-Modern Physics	3	3	1	2	First Semester
ج ١١١١	Language	3	3	1		First Semester

ك ١١٢٤	Computer Programming B	1	1		3	Second Semester
ك ١١٠٢	Electrical Engineering and Circuit Analysis B- Electrical Engineering and Circuit Analysis B	3	3	1	2	Second Semester
ج ١١٢٢	Human Rights	2	2	-	-	Second Semester
ك ١١٠٤	Electrical Engineering Applications B- Electrical Engineering Applications B	1	1		3	Second Semester
س ١١١٢	Mathematics 2 B	3	3	2	0	Second Semester
ك ١١٠٦	Electrical Measurements 1	2	2	1	1	Second Semester
ك ١١٢٢	Logic Circuits B	2	2	1	2	Second Semester
د ١١٠٨	Civil Engineering Technology	3	3		1	Second Semester

b- Optional :

(الإثنية الداخلية لكلية الهندسة بينها) الهندسة الكهربية / -Second Year

code	Course Title	No.of Units	No. of hours/week			Semester
			Lect.	Excer.	Lab.	
ك ١٢٠٣	Electronic Circuits A-Electronic Circuits A	2	2	1	2	First Semester
ك ١٢٠٥	Maintenance workshop of Electrical Machines- Maintenance workshop of Electrical Machines	1	1		3	First Semester
م ١٢٨٣	Industrial Safety	2	2	0	0	First Semester
ك ١٢٠٧	Electrical Measurements 2	2	2	1	2	First Semester
ك ١٢٠١	Electromagnetic Field Theory	3	3	2	0	First Semester
ك ١٢١١	Random and Stochastic Processes	3	3	2	0	First Semester
ك ١٢٢٣	Computer Engineering Applications A- Computer Engineering Applications A	1	1		3	First Semester
س ١٢١٥	Mathematics 4 A-Mathematics 4 A	3	3	2		First Semester
ك ١٢٢٤	Computer Engineering Applications B- Computer Engineering Applications B	1	1		3	Second Semester
ك ١٢١٤	Signals and Systems-Signals and Systems	2	2	2		Second Semester
ك ١٢٠٤	Electronic Circuits B-Electronic Circuits B	2	2	1	2	Second Semester
س ١٢١٦	Mathematics 4 B	3	3	2		Second Semester

ك ١٢٢٢	Computer Architecture	3	3	1	2	Second Semester
ك ١٢٣٦	Control Engineering 1	3	3	1	1	Second Semester
ك ١٢٠٦	Maintenance workshop of Electronic Devices	1	1		3	Second Semester
م ١٢٨٤	Psychology in Industry	2	2	0	0	Second Semester
b- Optional :						

7- Programme admission requirements

1- The students from the Egyptian secondary education or equivalent certificate with major in mathematics.

2- Marks of Preparation of Standard Program Selected Form

8- Regulations for progression and programme completion

Benha university|Faculty of Engineering at benha|الهندسة الكهربية|هندسة القوى الكهربية والتحكم|الفرقة الثالثة

1- For Passing : Passing all the second year courses with at most two exam courses for the previous years,For Completion : By passing all the curriculum courses

Benha university|Faculty of Engineering at benha|الهندسة الكهربية|هندسة القوى الكهربية والتحكم|هندسة التحكم أ
الفرقة الرابعة

2- For Passing : Passing all the third year courses with at most two exam courses for the previous years,For Completion : By passing all the curriculum courses

Benha university|Faculty of Engineering at benha|الهندسة الكهربية|هندسة القوى الكهربية والتحكم|الهندسة ب
الفرقة الرابعة

3- For Passing : Passing all the third year courses with at most two exam courses for the previous years,For Completion : By passing all the curriculum courses

Benha university|Faculty of Engineering at benha|Preparatory Year

4- For Passing : Passing all the courses of the curriculum

Benha university|Faculty of Engineering at benha|الهندسة الكهربية|First Year

5- For Passing : Passing all the preparatory year courses with at most two exam courses for the previous year,For Completion : By passing all the curriculum courses

Benha university|Faculty of Engineering at benha|الهندسة الكهربية|Second Year

6- For Passing : Passing all the first year courses with at most two exam courses for the previous years,For Completion : By passing all the curriculum courses

9- Assessment rules enrolled in the program

No	Method	As measured from the intended learning outcomes
1-	Written exams	Knowledge & Understanding skills - Intellectual skills
2-	Oral exams	Knowledge & Understanding, Intellectual, General skills
3-	Practical exams	Knowledge & Understanding skills - Profesional skills - General & transferable skills.
4-	Scientific projects	Practical and professional skills
5-	Reports and essays	General skills
6-	Lecture discussions	Knowledge & Understanding skills - Intellectual skills - Profesional skills - General & transferable skills.

10- Methods of assessment program

No	Evaluator	Tool	Sample
1-	1- Senior Students	Students of last level	Evaluation sheet
2-	2- Alumni	Graduates	Evaluation sheet & Seminars
3-	3- Stakeholders (Employers)	Stakeholders	Evaluation sheet & Seminars
4-	4- External Evaluator	External evaluator or external examiner	Evaluation sheet & Seminars & Visits
5-	5- Others		

11- Matrix of knowledge and skills

-Preparatory Year (الائحة الداخلية لكلية الهندسة ببنها)

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Engineering Drawing A	P0a2,P0a4,P0a8,P0a10	P0b4,P0b12	P0c2,P0c3,P0c4,P0c11	P0d1,P0d2,P0d3,P0d7
2-	Mathematics 1 A	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1	P0d7
3-	Physics A	P0a1,P0a3	P0b2	P0c1,P0c5	P0d1,P0d9
4-	Chemistry A	P0a1,P0a3	P0b1,P0b5	P0c1	P0d1,P0d9
5-	Computer Fundamentals and Programming A- Computer Fundamentals and Programming A	P0a1,P0a2,P0a5,P0a8	P0b1,P0b2,P0b3,P0b4,P0b6,P0b7,P0b8,P0b12	P0c1,P0c3,P0c5,P0c11	P0d4,P0d5,P0d6,P0d7,P0d9
6-	Technical English Language A	Course do not need specification			
7-	Production Engineering and Workshops A	P0a3,P0a6,P0a4,P0a5	P0b2,P0b5	P0c2,P0c8,P0c10	P0d1,P0d3,P0d5
8-	Mechanics A	P0a5,P0a1	P0b2,P0b3,P0b1	P0c1	P0d1
9-	Technology and Society	P0a6,P0a7,P0a9	P0b9,P0b10	P0c10	P0d2
10-	Mathematics 1 B	P0a5,P0a1	P0b2,P0b3,P0b1	P0c1	P0d1
11-	Chemistry B	P0a1,P0a3	P0b1,P0b2,P0b4	P0c1,P0c5,P0c8	P0d1
12-	Mathematics 1 B	P0a1,P0a5	P0b1,P0b2,P0b7	P0c1	P0d7
13-	Computer Fundamentals and Programming B	P0a1,P0a2,P0a5,P0a8,P0a10	P0b1,P0b2,P0b5,P0b7,P0b8,P0b12	P0c1,P0c3,P0c5,P0c10	P0d1,P0d4,P0d7,P0d9
14-	Technical English Language B	Course do not need specification			
15-	Production Engineering and Workshops B	Course do not need specification			
16-	Physics B	P0a1,P0a3	P0b2	P0c1,P0c5	P0d1,P0d9
17-	Engineering Drawing B	P0a2,P0a4,P0a8,P0a10	P0b4,P0b12	P0c2,P0c3,P0c4,P0c11	P0d1,P0d2,P0d3,P0d6

b- Optional :

(اللائحة الداخلية لكلية الهندسة ببناها) الهندسة الكهربيه / -First Year

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Electrical Engineering Applications A	P0a3,P0a4,P0a8,P0a12	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2,P0c3,P0c5	P0d1,P0d2,P0d3,P0d4
2-	Computer Programming A	P0a1,P0a2,P0a5	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2	P0d2,P0d3,P0d4,P0d6
3-	Electrical Engineering and Circuit Analysis A	P0a1,P0a3,P0a4	P0b1,P0b2,P0b6	P0c1,P0c2,P0c5	P0d2,P0d3,P0d9
4-	Logic Circuits A	P0a1,P0a4,P0a5,P0a3	P0b1,P0b2,P0b3	P0c1,P0c3,P0c7,P0c4	P0d1,P0d3,P0d6,P0d9
5-	Mathematics 2 A	Course do not need specification			
6-	Mechanical Engineering Technology	Course do not need specification			
7-	Modern Physics	P0a1,P0a3,P0a8	P0b3	P0c5	P0d7
8-	Language	Course do not need specification			
9-	Computer Programming B	P0a1,P0a2,P0a5	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2	P0d2,P0d3,P0d4,P0d6
10-	Electrical Engineering and Circuit Analysis B	P0a1,P0a3,P0a4	P0b1,P0b2,P0b6	P0c1,P0c2,P0c5	P0d2,P0d3,P0d9
11-	Human Rights	Course do not need specification			
12-	Electrical Engineering Applications B	P0a3,P0a4,P0a8,P0a12	P0b1,P0b2,P0b3,P0b4	P0c1,P0c2,P0c3,P0c5	P0d1,P0d2,P0d3,P0d4
13-	Mathematics 2 B	Course do not need specification			
14-	Electrical Measurements 1	P0a3,P0a4,P0a5,P0a8	P0b2,P0b3,P0b4,P0b6	P0c2,P0c3,P0c4,P0c5	P0d2,P0d6,P0d7
15-	Logic Circuits B	P0a3,P0a4,P0a5,P0a8	P0b1,P0b2,P0b3,P0b4,P0b12	P0c1,P0c5,P0c6,P0c3	P0d6,P0d9,P0d2,P0d3
16-	Civil Engineering Technology	P0a1	P0b4	P0c2	P0d9

b- Optional :

(اللائحة الداخلية لكلية الهندسة ببناها) الفرقة الثالثة / هندسة القوى الكهربيه والتحكم / الهندسة الكهربيه-

a- Compulsory :

No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Electrical Machines 1	a1,a2,a6,a10,a11	b1,b2,b4	c1,c2,c3,c4	d1,d2
2-	Environment and Pollution- Environment and Pollution	P0a1,P0a3,P0a6,P0a8,P0a11	P0b2,P0b3,P0b5,P0b10	P0c1,P0c2,P0c10,P0c11	P0d1,P0d2
3-	Microprocessor Based Systems A	a2,a8	b7	c7,c8	d1,d2,d3,d4
4-	Power Stations	Course do not need specification			
5-	Electrical Power Systems 1	P0a4,a4,a6	P0b3,b2,b5	P0c2,c5	P0d1,P0d5,P0

12-	New and Renewable Energy	a1,a9,a10,a12,P0a11	b1,b2,b5,P0b12	c4,c8,P0c7,P0c11	d1,d2,d4,P0d3
13-	Computer Applications in Power Systems	Course do not need specification			
14-	Flexible AC Transmission	Course do not need specification			
15-	High Voltage Engineering	a3,a6,a9,a12,a14,a15	b1,b2,b5,b7	c1,c2,c3,c4,c5	d1,d2,d4

-Fourth Year / هندسه القوى الكهربيه والتحكم ب / هندسه القوى الكهربيه والتحكم / الهندسه الكهربيه (الائحة الداخلية لكلية الهندسة بينها)

a- Compulsory :					
No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
1-	Digital Control	Course do not need specification			
2-	Power System Analysis	Course do not need specification			
3-	Electrical Drive Systems	Course do not need specification			
4-	Project	Course do not need specification			
5-	Field Training	Course do not need specification			
6-	Industrial Control Systems	a2,a4,a8	b1	c1,c3	d4
7-	Power Systems Protection	Course do not need specification			
8-	Project	Course do not need specification			
9-	Transducers and Special Machines	Course do not need specification			
10-	Legislation And Contracts	Course do not need specification			
11-	Engineering Economy	Course do not need specification			
b- Optional :					
No.	Course Title	Knowledge and Understanding	Intellectual capacity	Professional skills	General Skills
12-	Modeling of Electrical Machines	a11	b4	c4	
13-	Intelligent Control Systems	a4	b6,b7	c4	d4
14-	Advanced Industrial Control Systems	a2,a4	b1,b3	c1,c3,c8	d3
15-	Robotics	a8,a10	b1,b3,b4	c3,c8	d1,d3,d4
16-	Parameters Estimation and Systems Identification	a4,a8	b1,b6	c4	d4

-Second Year / (الائحة الداخلية لكلية الهندسة بينها) الهندسه الكهربيه

a- Compulsory :			
No.	Course Title	Knowledge and Understanding	Intellectual capacity
1-	Electronic Circuits A	P0a1,P0a3,P0a4,P0a5	P0b1,P0b2,P0b3
2-	Maintenance workshop of Electrical Machines	P0a1,P0a4	P0b2,P0b4,P0b5
3-	Industrial Safety	Course do not need specification	
4-	Electrical Measurements 2	P0a1,P0a4,P0a8	P0b4
5-	Electromagnetic Field Theory	P0a1,P0a4	P0b7,P0b1,P0b2
6-	Random and Stochastic Processes	P0a1,P0a2,P0a3,P0a5	P0b1,P0b2,P0b3,P0b4

7-	Computer Engineering Applications A	P0a1,P0a5	P0b1,P0b2
8-	Mathematics 4 A	P0a1,P0a5	P0b1,P0b2,P0b3
9-	Computer Engineering Applications B	P0a1,P0a5,P0a8	P0b1,P0b2,P0b3
10-	Signals and Systems	P0a1,P0a2,P0a5,P0a7	P0b1,P0b2,P0b5,P0b6
11-	Electronic Circuits B	P0a1,P0a3,P0a4,P0a5	P0b1,P0b2,P0b3
12-	Mathematics 4 B	P0a1,P0a5	P0b1,P0b2,P0b3
13-	Computer Architecture	P0a3,P0a4,P0a8,P0a12	P0b1,P0b4,P0b6,P0b7
14-	Control Engineering 1	a1,a3,a4,a5,a7,a8,a9,a11,a12,a13,a16	b1,b2,b3,b5,b6
15-	Maintenance workshop of Electronic Devices	P0a1,P0a2,P0a4	P0b1,P0b4,P0b6
16-	Psychology in Industry		Course do not need
b- Optional :			

Program Coordinators :

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