

**Electrical Engineering Education Study Program, Faculty of Engineering,  
Universitas Negeri Surabaya**

**Table 1 Course Structure for Freshman**

1 <sup>st</sup> Semester				2 <sup>nd</sup> Semester						
Code	Course Title	CU		Code	Course Title	CU				
1000002003	Core Personality Development Courses	Indonesian	2	1000002024	Core Personality Development Courses	Buddhist	2			
1000002018	Core Personality Development Courses	Pancasila Education	2		1000002025		Hindu Religious			
1000003042	Personality Development Courses	Basics of Education	3			1000002026		Islamic		
	Basic Skills Courses	Learning Theory	2				1000002027		Catholic Religious	
8320103059	Scientific and Skills Courses	Basic Engineering Mathematics	3					1000002028		Confucius Religious
8320103037	Scientific and Skills Courses	Engineering Physics	2						1000002029	
	Scientific and Skills Courses	Practical Physics Engineering	1	1000002033	Core Personality Development Courses	Civic education	2			
8320102087	Scientific and Skills Courses	Vocational Education	2	8320103013	Personality Development Courses	English	3			
8320102156	Scientific and Skills Courses	Basic Electric Circuit	2	1000002039	Personality Development Courses	Educational Psychology	2			
					Personality Development Courses	Digital Literacy	2			
				8320102067	Basic Skills Courses	Learning Media	2			
				8320103060	Scientific and Skills Courses	Advanced Engineering Mathematics	3			
				8320102159	Scientific and Skills Courses	Advanced Electrical Circuits	2			
				8320102061	Scientific and Skills Courses	Basic Electromagnetic Field	2			
				8320102030	Scientific and Skills Courses	Basic Digital Electronics	2			
<b>TOTAL</b>			<b>19</b>	<b>TOTAL</b>			<b>22</b>			

**Table 2 Course Structure for Strong Foundation**

3 <sup>rd</sup> Semester				4 <sup>th</sup> Semester			
Code		Course Title	CU	Code		Course Title	CU
1000002011	Personality Development Courses	Basic socio-cultural / basic natural sciences	2	8320102178	Basic Skills Courses	Statistics	3
	Personality Development Courses	Physical Education and Fitness	2	8320103106	Basic Skills Courses	Innovative Learning Planning	2
8320103180	Scientific and Skills Courses	Learning strategies	2	8320102206	Basic Skills Courses	Educational Philosophy	2
8320102039	Scientific and Skills Courses	Computer programming	2	<b>Communication Electronics Expertise Program</b>			
8320102062	Scientific and Skills Courses	Advanced Electromagnetic Fields	2	8320102152	Scientific and Skills Courses	Basic Electronics Circuit	2
8320102031	Scientific and Skills Courses	Advanced Digital Electronics	2	8320103094	Scientific and Skills Courses	Digital Signal Processing	2
<b>Communication Electronics Expertise Program</b>				8320102010	Scientific and Skills Courses	Computer Applications in Electronic Studies	2
8320102123	Scientific and Skills Courses	Digital Electronics Practicum	1		Scientific and Skills Courses	Basic Telecommunications Systems	2
	Scientific and Skills Courses	Electronic image	2	8320103182	Scientific and Skills Courses	Audio Video Techniques	3
8320103025	Scientific and Skills Courses	Electronics	2	8320102049	Scientific and Skills Courses	Data communication	2
8320102164	Scientific and Skills Courses	Sensors and Actuators	2	<b>Electric Power Engineering Expertise Program</b>			
8320102184	Scientific and Skills Courses	Laser technique	2	8320103189	Scientific and Skills Courses	Refrigeration and Air Conditioning Engineering	2
8320102097	Scientific and Skills Courses	Electronic Measurement	2	8320102027	Scientific and Skills Courses	Power Electronics	2
<b>Electric Power Engineering Expertise Program</b>				8320102071	Scientific and Skills Courses	AC Electric Machine	2
8320102012	Scientific and Skills Courses	Electricity Materials	2	8320103172	Scientific and Skills Courses	Control and Control System	2

8320102039	Scientific and Skills Courses	Electrical Instrumentation and Measurement	2		Scientific and Skills Courses	Digital Electronics Practicum	2
8320102067	Scientific and Skills Courses	Engineering drawings	3	8320102017	Scientific and Skills Courses	Electric Repair Shop	2
8320102202	Scientific and Skills Courses	Transformer	2				
8320102120	Scientific and Skills Courses	Electromechanical Basic Practicum	2				

**Table 3 Course Structure for Advanced Concept**

5 <sup>th</sup> Semester				6 <sup>th</sup> Semester			
Code	Course Title	CU		Code	Course Title	CU	
8320103032	Basic Skills Courses	Learning Evaluation and Learning	2	8320103075	Basic Skills Courses	Research methodology	4
8320103044	Basic Skills Courses	School Curriculum	2		Creative Work Course	Micro Teaching	2
	Scientific and Skills Courses	Education Management	2				
<b>Communication Electronics Expertise Program</b>				8320103052	Subjects for Social Life	Community Service Program	3
8320102153	Scientific and Skills Courses	Advanced Electronic Circuit	2	<b>Communication Electronics Expertise Program</b>			
8320102122	Scientific and Skills Courses	Electronics Practicum	1	8320103147	Scientific and Skills Courses	Electronics Design	3
8320103041	Scientific and Skills Courses	Telecommunications Network	2	8320102006	Scientific and Skills Courses	Antennas and Propagation of Waves	2
8320103175	Scientific and Skills Courses	Telecommunication System	2		Scientific and Skills Courses	Antenna Practices and Wave Propagation	1
8320102133	Scientific and Skills Courses	Telecommunications Practicum	1	8320103064	Scientific and Skills Courses (selective)	Mechatronics	2
8320102170	Scientific	Fiber Optic	2	8320102193	Scientific	Switching	2

	and Skills Courses	Communication System			and Skills Courses (selective)	Techniques	
8320103077	Scientific and Skills Courses	Microcontroller	3	<b>Electric Power Engineering Expertise Program</b>			
	Scientific and Skills Courses	Microcontroller Practicum	1	8320102095	Scientific and Skills Courses	Optimization and Operation of the Electric Power System	3
<b>Electric Power Engineering Expertise Program</b>				8320102004	Scientific and Skills Courses	Electric Power System Analysis	2
8320102130	Scientific and Skills Courses	Electrical Engineering Practicum	2	8320102084	Scientific and Skills Courses	Maintenance and Repair of Electrical Machines	2
8320103102	Scientific and Skills Courses	Electric Power Planning and Installation	3	8320102165	Scientific and Skills Courses	Electric Power System Simulation	2
8320103072	Scientific and Skills Courses	DC Electric Machine	2	8320103144	Scientific and Skills Courses	Electric Power System Protection	3
8320102126	Scientific and Skills Courses	Electrical Installation Practicum	2				
8320103139	Scientific and Skills Courses	Programmable Logic Controller (PLC)	2				
8320102128	Scientific and Skills Courses	Full Practice and Automation	2				

**Table 4 Course Structure for Thesis**

7 <sup>th</sup> Semester				8 <sup>th</sup> Semester			
Code	Course Title	CU		Code	Course Title	CU	
8320102115	Scientific and Skills Courses	Internship	2	8320102207	Personality Development Courses	Entrepreneurship	2
	Creative Work Course	Introduction to School Field I	1	8320106177	Creative Work Course	Bachelor Thesis	6
	Creative Work Course	Introduction to School Field II	3	<b>Communication Electronics Expertise Program</b>			
<b>Communication Electronics Expertise</b>					Scientific and Skills	IoT	2

Program				Courses (selective)			
8320102162	Scientific and Skills Courses	Industrial Robot	2	<b>Electric Power Engineering Expertise Program</b>			
8320102146	Scientific and Skills Courses (selective)	Radar and Navigation	2	8320102194	Scientific and Skills Courses (selective)	High Voltage Engineering	2
	Scientific and Skills Courses (selective)	Embedded System	2	8320102019	Scientific and Skills Courses (selective)	Scada Basics	2
	Scientific and Skills Courses (selective)	Industrial Automation	2				
<b>Electric Power Engineering Expertise Program</b>							
8320103176	Scientific and Skills Courses	Electric Power Transmission System	3				
8320102168	Scientific and Skills Courses	Electric Power Distribution System	2				
	Scientific and Skills Courses	Electric Energy Generation	2				
8320102085	Scientific and Skills Courses (selective)	Selection and Use of Electric Motors	2				
8320102104	Scientific and Skills Courses (selective)	Electric Power Network Planning	2				
8320102105	Scientific and Skills Courses (selective)	Electrical Engine Planning	2				

**Table 5 Mapping of the courses that support the program learning outcomes (PLO)**

	Code		Course Title	CU	PLO											
					1	2	3	4	5	6	7	8	9	10	11	
1	100002024	Core Personality Development Courses	Buddhist	2				√		√						
	100002025		Hindu Religious													
	100002026		Islamic													
	100002027		Catholic Religious													
	100002028		Confucius Religious													
	100002029		Protestant Religious													
2	100002033	Core Personality Development Courses	Civic education	2				√		√						
3	100002018	Core Personality Development Courses	Pancasila Education	2				√		√						
4	100002003	Core Personality Development Courses	Indonesian	2				√	√	√						
5	8320103013	Personality Development Courses	English	3				√	√	√						
6	100002011	Personality Development Courses	Basic socio-cultural / basic natural sciences	2				√		√						
7	8320102207	Personality Development Courses	Entrepreneurship	2					√	√		√				√
8		Personality Development Courses	Digital Literacy	2				√	√	√						
9		Personality Development Courses	Physical Education and Fitness	2				√		√						
10	100003042	Personality Development Courses	Basics of Education	3	√	√	√			√						
11	100002039	Personality Development Courses	Educational Psychology	2	√	√	√			√						
12	8320103075	Basic Skills Courses	Research methodology	4			√			√		√	√			
13	8320102178	Basic Skills Courses	Statistics	3			√			√		√	√			
14	8320102206	Basic Skills Courses	Educational Philosophy	2	√	√	√			√						
15		Basic Skills Courses	Learning Theory	2	√	√	√			√						
16	8320103044	Basic Skills Courses	School Curriculum	2	√	√	√			√						
17	8320103106	Basic Skills Courses	Innovative Learning Planning	2	√	√	√			√						
18	8320102067	Basic Skills Courses	Learning Media	2	√	√	√			√						
19	8320103032	Basic Skills Courses	Learning Evaluation and Learning	2	√	√	√			√						
20		Creative Work Course	Micro Teaching	2	√	√	√			√		√				
21		Creative Work Course	Introduction to School Field I	1	√	√	√			√		√				
22		Creative Work Course	Introduction to School Field II	3	√	√	√			√		√				

23	8320106177	Creative Work Course	Bachelor of Thesis	6	√	√	√	√	√	√	√	√	√	√	√
24	8320103052	Subjects for Social Life	Community Service Program	3				√	√	√		√			√
25	8320103059	Scientific and Skills Courses	Basic Engineering Mathematics	3						√	√				
26	8320103037	Scientific and Skills Courses	Engineering Physics	2						√	√				
27		Scientific and Skills Courses	Practical Physics Engineering	1						√			√	√	
28	8320102087	Scientific and Skills Courses	Vocational Education	2	√	√	√			√					
29	8320102156	Scientific and Skills Courses	Basic Electric Circuit	2						√	√				
30	8320103060	Scientific and Skills Courses	Advanced Engineering Mathematics	3						√	√				
31	8320102159	Scientific and Skills Courses	Advanced Electrical Circuits	2						√	√				
32	8320102061	Scientific and Skills Courses	Basic Electromagnetic Field	2						√	√				
33	8320102030	Scientific and Skills Courses	Basic Digital Electronics	2						√	√				
34	8320103180	Scientific and Skills Courses	Learning strategies	2	√	√	√			√					
35	8320102039	Scientific and Skills Courses	Computer programming	2						√	√				
		<b>Code</b>	<b>Course Title</b>	<b>CU</b>	<b>PLO</b>										
					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
36	8320102062	Scientific and Skills Courses	Advanced Electromagnetic Fields	2						√	√				
37	8320102031	Scientific and Skills Courses	Advanced Digital Electronics	2						√	√				
38		Scientific and Skills Courses	Education Management	2	√	√	√			√					
39	8320102115	Scientific and Skills Courses	Industry practice	2					√	√				√	√
<b>Communication Electronics Expertise Program</b>															
40	8320102123	Scientific and Skills Courses	Digital Electronics Practicum	1						√			√	√	
41	8320103025	Scientific and Skills Courses	Electronics	2						√	√				
42	8320102164	Scientific and Skills Courses	Sensors and Actuators	2						√	√				
43	8320102184	Scientific and Skills Courses	Laser technique	2						√	√				
44	8320102097	Scientific and Skills Courses	Electronic Measurement	2						√	√		√	√	
45	8320102152	Scientific and Skills Courses	Basic Electronics Circuit	2						√	√				

46	8320103094	Scientific and Skills Courses	Digital Signal Processing	2							√	√				
47		Scientific and Skills Courses	Electronic image	2							√	√		√	√	
48	8320102010	Scientific and Skills Courses	Computer Applications in Electronic Studies	2							√			√	√	
49		Scientific and Skills Courses	Basic Telecommunication s Systems	2							√	√				
50	8320103182	Scientific and Skills Courses	Audio Video Techniques	3							√	√				
51	8320102049	Scientific and Skills Courses	Data communication	2							√	√				
52	8320102153	Scientific and Skills Courses	Advanced Electronic Circuit	2							√	√				
53	8320102122	Scientific and Skills Courses	Electronics Practicum	1							√			√	√	
54	8320103041	Scientific and Skills Courses	Telecommunication s Network	2							√	√				
55	8320103175	Scientific and Skills Courses	Telecommunication System	2							√	√				
56	8320102133	Scientific and Skills Courses	Telecommunication s Practicum	1							√			√	√	
57	8320102170	Scientific and Skills Courses	Fiber Optic Communication System	2							√	√				
58	8320103077	Scientific and Skills Courses	Microcontroller	3							√	√				
59		Scientific and Skills Courses	Microcontroller Practicum	1							√			√	√	
60	8320103147	Scientific and Skills Courses	Electronics Design	3							√			√	√	
61	8320102006	Scientific and Skills Courses	Antennas and Propagation of Waves	2							√	√				
62		Scientific and Skills Courses	Antenna Practices and Wave Propagation	1							√			√	√	
63	8320102162	Scientific and Skills Courses	Industrial Robot	2							√	√				
64	8320103064	Scientific and Skills Courses (selective)	Mechatronics	2							√	√				
65	8320102193	Scientific and Skills Courses (selective)	Switching Techniques	2							√	√				
66	8320102146	Scientific and Skills Courses (selective)	Radar and Navigation	2							√	√				
67		Scientific and Skills Courses (selective)	Embedded System	2							√	√				
68		Scientific and Skills Courses (selective)	IoT	2							√	√				



69		Scientific and Skills Courses (selective)	Industrial Automation	2							√	√				
<b>Electric Power Engineering Expertise Program</b>																
40	8320102012	Scientific and Skills Courses	Electricity Materials	2							√	√				
41	8320102039	Scientific and Skills Courses	Electrical Instrumentation and Measurement	2							√	√		√		
42	8320102067	Scientific and Skills Courses	Engineering drawings	3							√	√		√		
43	8320102202	Scientific and Skills Courses	Transformer	2							√	√				
44	8320102120	Scientific and Skills Courses	Electromechanical Basic Practicum	2							√			√	√	
45	8320102004	Scientific and Skills Courses	Electric Power System Analysis	2							√	√				
46	8320102027	Scientific and Skills Courses	Power Electronics	2							√	√			√	
47	8320102071	Scientific and Skills Courses	AC Electric Machine	2							√	√			√	
48	8320102168	Scientific and Skills Courses	Electric Power Distribution System	2							√	√		√	√	
49	8320103172	Scientific and Skills Courses	Control and Control System	2							√	√			√	
		<b>Code</b>	<b>Course Title</b>	<b>CU</b>	<b>PLO</b>											
					<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	
50	8320103189	Scientific and Skills Courses	Refrigeration and Air Conditioning Engineering	2						√	√		√	√		
51	8320102130	Scientific and Skills Courses	Electrical Engineering Practicum	2						√			√	√		
52	8320102084	Scientific and Skills Courses	Maintenance and Repair of Electrical Machines	2						√	√		√	√		
53	8320103101	Scientific and Skills Courses	Electric Lighting Planning and Installation	2						√	√			√		
54	8320103102	Scientific and Skills Courses	Electric Power Planning and Installation	3						√	√			√		
55	8320103072	Scientific and Skills Courses	DC Electric Machine	2						√	√					
56	8320102126	Scientific and Skills Courses	Electrical Installation Practicum	2						√			√	√		
57	8320103139	Scientific and Skills Courses	Programmable Logic Controller (PLC)	2						√	√		√	√		
58	8320102128	Scientific and Skills Courses	Full Practice and Automation	2						√			√	√		
59	8320102017	Scientific and Skills Courses	Bengkel Listrik	2						√			√	√		

		Courses													
60	8320103144	Scientific and Skills Courses	Electric Power System Protection	3						√	√		√	√	
61	8320103176	Scientific and Skills Courses	Electric Power Transmission System	3						√	√		√	√	
62		Scientific and Skills Courses	Electric Energy Generation	2						√	√				
63	8320102095	Scientific and Skills Courses	Optimization and Operation of the Electric Power System	3						√	√				
64	8320102165	Scientific and Skills Courses	Electric Power System Simulation	2						√	√				
65	8320102085	Scientific and Skills Courses (selective)	Selection and Use of Electric Motors	2						√	√		√	√	
66	8320102104	Scientific and Skills Courses (selective)	Electric Power Network Planning	2						√			√	√	
67	8320102105	Scientific and Skills Courses (selective)	Electrical Engine Planning	2						√			√	√	
68	8320102194	Scientific and Skills Courses (selective)	High Voltage Engineering	2						√	√				
69	8320102019	Scientific and Skills Courses (selective)	Scada Basics	2						√	√		√	√	