FIRST TRAINING SEMESTER

### Course Title: DC Circuits
- **Course Code**: EM 101
- **Credits**: 4
- **Lecture Hours**: 3
- **Practical Hours**: 2
- **Total Hours**: 5
- **Course Description**: International system of units, atom structure, electrical charges, electric voltage and potential, electric current and resistance, application on ohms low, resistors in series, parallel and compensation, applications of the resistors connections, power calculations on dc circuits, electrical power sources, batteries on their different connections, star and delta connections of resistors.

### Course Title: Electrical Maintenance Workshop (1)
- **Course Code**: EM 103
- **Credits**: 4
- **Lecture Hours**: 0
- **Practical Hours**: 6
- **Total Hours**: 8
- **Course Description**: Manual tools like hummer, pliers, hack saw, cutter, screw driver and measuring tool. Exercise about using manual tools, measuring tools, hummer and fixed electrical drill, flat and round files, normal and open spans.

### Course Title: Electrical Material Technology
- **Course Code**: EM 102
- **Credits**: 2
- **Lecture Hours**: 2
- **Practical Hours**: 0
- **Total Hours**: 2
- **Course Description**: Specifications of conducting materials, especially metals (copper, aluminum and iron). Specifications of insulating materials especially industrial insulators like PVC, XLPE, Air, Wood, glass, rubber, oil, mica and ceramic. Magnetic materials specifications.

### Course Title: Electrical Drawings (1)
- **Course Code**: EM 104
- **Credits**: 3
- **Lecture Hours**: 0
- **Practical Hours**: 6
- **Total Hours**: 6
- **Course Description**: Introduction to engineering and electric drawings. Engineering tools, types of drawings lines. Electrical symbols, Electronic symbols. Also some mechanical symbols. Vertical projection. Different types of sections geometric drawing. Simple electrical drawing.

### Course Title: Introduction to computer
- **Course Code**: CS 101
- **Credits**: 1
- **Lecture Hours**: 0
- **Practical Hours**: 2
- **Total Hours**: 2
- **Course Description**: Computer components (keyboard - CPU - mouse - monitor etc.). How to operate the computer - menus - programs.

### Course Title: Mathematics (1)
- **Course Code**: MA110
- **Credits**: 4
- **Lecture Hours**: 3
- **Practical Hours**: 0
- **Total Hours**: 4
- **Course Description**: Exponents - Principles of algebra - Basics of trigonometry

### Course Title: English Language(1)
- **Course Code**: EN 126
- **Credits**: 2
- **Lecture Hours**: 1
- **Practical Hours**: 2
- **Total Hours**: 3
- **Course Description**: Technical terms with simple linguistic expressions

SECOND TRAINING SEMESTER

THIRD TRAINING SEMESTER
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<td>D.C. Machines (1)</td>
<td>EM 201</td>
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<tr>
<td>Electrical maintenance workshop (3)</td>
<td>EM 205</td>
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<tr>
<td>A.C. Machines (1)</td>
<td>EM 205</td>
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<tr>
<td>Protective Relays (1)</td>
<td>EM 211</td>
<td>2</td>
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<td>Measuring and Control systems</td>
<td>EM 215</td>
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<td>Power Electronics (1)</td>
<td>EM 215</td>
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<tr>
<td>English Language (3)</td>
<td>EN 222</td>
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</tbody>
</table>

**Course Description**

- Dc machine with separated excitation. Dc motors with series, parallel and combined long, short and combined dc motors. Parallel, long combined and short generators. Applications on DC generators and motors of power plants.
- Air compress special units, natural specification of the air, temperature and pressure affect in the air. Flow speed, compress air as control system, control circuit with compress air, hydraulic control principal, trip hydraulic control elements, hydraulic control system.
- Semiconductors introduction, zinor diode and thyristor construction, rectifier types: half-wave rectifier, full-wave rectifier (single-phase), bridge rectifier (Single-phase), half-wave rectifier, full-wave rectifier (three-phase), using of rectifier bridge to control DC motor, using of the thyristor to control AC motor.
- Technical terms & names and abbreviations of equipment used in Electrical maintenance field.

**FOURTH TRAINING SEMESTER**

<table>
<thead>
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<th>Course Title</th>
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<td>Electrical Maintenance workshop (4)</td>
<td>EM 253</td>
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<tr>
<td>AC Machines (2)</td>
<td>EM 255</td>
<td>5</td>
</tr>
<tr>
<td>Protective Relays (2)</td>
<td>EM 261</td>
<td>2</td>
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<tr>
<td>Safety and Maintenance Systems</td>
<td>EM 265</td>
<td>3</td>
</tr>
<tr>
<td>English Language (4)</td>
<td>EN 268</td>
<td>2</td>
</tr>
</tbody>
</table>

**Course Description**

- Single phase transformer operation theory, three phase transformer theory and construction, three phase transformer connections, single phase transformer connections, open delta connection, synchronous generator construction, single phase induction motor theory, three phase induction motor, shading pole motor.
- Control system compounds. Power transformer fault, differential relay theory, power transformer differential protection, rush current protection, bus bar differential protection, over current relay theory, power transformer over current protection, restricted earth fault protection, direction protection of all network components.
- Hall-wave rectifier using thyristor (single-phase), full-wave rectifier using thyristor (three-phase), thyristor regulation (AC), electronic contactor (AC), basic of electronic variables, and circuits, variables thyristor, wave filter and rectifier.
- Safety and security regulations, training on using safety tools and clothes related to work site, installation and testing for control and measurements devices. Following correct rules in electrically and mechanically isolating. Using tools and materials damping the sparks when dealing with gas. Dealing and arranging in work between control technician and the operator. Discover leaking then discharge and evacuation pipes from dangerous gases as chlorine and steam. Using safety clothes. Identify the different places for measuring equipments in the site: Identify the colors for different lines as gas, air, chlorine, steam and services air pipes.
- Training in power station at Ministry of Energy