المعهد العالي للطاقة
The Higher Institute Of Energy

The Public Authority for Applied Education and Training		
The Higher Institute of Energy	HIE- TD - QP03 – F621	
Department	Electrical Power	
Major: Electrical Generator Operation	Awarded Certificate: Training Diploma	Program Duration: Two years (4 Semesters)

الهيئة العامة للتعليم التطبيقي والتدريب

FIRST TRAINING SEMESTER

Course Title	Electrical Circuits (1)				
Course Code	EG 101			Credits	4
Lecture Hours	4	Practical Hours	0	Total Hours	4
Course Description					
This course gives the trainer the basic principles of Direct Current Circuits. He studies the definition of voltage, current and resistance. Then he studies the connection of resistance, series, parallel, series unparalleled and the star-delta connection. He studies the concepts of power energy.					

Course Title	General Workshop				
Course Code	EG 103			Credits	3
Lecture Hours	0	Practical Hours	6	Total Hours	6
Course Description					
This workshop course provides the trainee the basic skills on handling mechanical and electrical tools. Such as measuring and planning tools, iron saw, flat file, …etc. In addition to peeling and tying electrical wires to build basic electrical circuits.					

Course Title	Electrical Materials				
Course Code	EG 102			Credits	2
Lecture Hours	2	Practical Hours	0	Total Hours	2
Course Description					
It explains the nature of materials and their classifications in terms of being conductive and insulating materials for electricity and semiconductors. It also deals with the uses of different materials and examples of them, their properties and uses in the field of electricity.					

Course Title	Engineering Drawing				
Course Code	EG 104			Credits	2
Lecture Hours	0	Practical Hours	4	Total Hours	4
Course Description					
This course presents the basic drawing skills of engineering shapes and methods using basic tools such as pencil, T square, protractor, and compass. Also, it underlines the isometric planes by applying exercises.					

Course Title	Computer (1)				
Course Code	CS 101			Credits	1
Lecture Hours	0	Practical Hours	2	Total Hours	2
In this course the students will learn about computer history and its components as a fundamental introduction, which is the theoretical part of the course. Then they will learn how to use Microsoft Windows and Microsoft Word, which is the practical part of the course.					

Course Title	Mathematics (1)				
Course Code	MA110			Credits	4
Lecture Hours	4	Practical Hours	0	Total Hours	4
This course introduces arithmetic skills, including polynomials factoring, polynomials operations, coordinate system, and statistics.					

Course Title	English Language (1)				
Course Code	EN 126			Credits	3
Lecture Hours	2	Practical Hours	2	Total Hours	4
This course introduces a domain of vocabulary items, structural themes, language functions and listening/speaking /writing as well as evaluation. The ultimate goal of teaching such course is enabling the trainees to express themselves in English in a simple way and to create short sentences about their relatives, friends, hobbies and homeland in a sound comprehended language.					

Course Title	Electrical Circuits Lab				
Course Code	EG 111			Credits	1
Lecture Hours	0	Practical Hours	2	Total Hours	2
Course Description					
This course gives the trainer the basic principles of Direct Current Circuits. He studies the definition of voltage, current and resistance in lab. Then he studies the connection of resistance, series, parallel and how to connect it in lab, and short and open circuits, also understanding and solving all experiments above.					

Course Title	Physics Lab				
Course Code	EG 112			Credits	1
Lecture Hours	0	Practical Hours	2	Total Hours	2
Course Description					
Conduct experiments on the electromagnetism phenomenon by experimenting the magnetic field generated by current passing through conductor. apply practical experiments to verify the electromagnetic force to move mechanical lever used on actual electromagnetic induction using two coils, self-induction, and coils. Identify the effect of resistance coils in DC and Ac circuits.					

Course Title	Electrical Circuit (2)				
Course Code	EG 151			Credits	5
Lecture Hours	4	Practical Hours	2	Total Hours	6
Course Description					
Introduction to AC current. Resistance, inductive reactance, capacitive reactance, impedance. Impedance connection in series, parallel, and combined. Admittance connection in series, parallel, and combined. Star and delta connection of impedance. Electromagnetic inductance. Active power, reactive power, apparent power, and power factor. Operations of single-phase transformers. Resonant circuit.					

Course Title	Electrical Drawing				
Course Code	EG 154			Credits	2
Lecture Hours	0	Practical Hours	4	Total Hours	4
Course Description					
Electrical symbols for power station. Single line diagram for Power generation station (Doha West or East or alzoor Power Station), generator, generator transformer, unit transformer, excitation transformer, rectifier circuit, inverter circuit, cross section for synchronous generator, (11KV & 132KV), high voltage motors (11KV, 6.6KV, & 3.3KV).					

Course Title	Electrical Power Plants (1)				
Course Code	EG 153			Credits	3
Lecture Hours	0	Practical Hours	6	Total Hours	6
Course Description					
Introduction on electrical power station. Internal visit to Doha West power station as a model to view thermal stations (steam), seawater station, cooling system of seawater station, feeding water system, simple circuit for boiler structure, boiler, the scheme of feeding water system, steam, combustion, burners, fuels, security and measuring equipment, boiler operation from control room. Drawing for all the above showing the links between systems.					

Course Title	Power Electronics (1)				
Course Code	EG 155			Credits	3
Lecture Hours	2	Practical Hours	2	Total Hours	4
Course Description					
This course covers the semiconductor devices such as diode and thyristor and their applications in creating 1-single phase and 3-phase rectifying circuits to drive DC motors. In addition, it covers voltage regulators to drive AC motors.					

Course Title	Mathematics (2)				
Course Code	MA158			Credits	3
Lecture Hours	3	Practical Hours	0	Total Hours	3
This course introduces arithmetic skills, including trigonometry, vectors, complex numbers and derivatives and integration.					

Course Title	English Language (2)				
Course Code	EN 166			Credits	2
Lecture Hours	3	Practical Hours	0	Total Hours	3
This course introduces different vocabulary items, structures, language functions and listening/ speaking /writing as well as evaluation. It aims at familiarizing the trainees with the forms of (be) (do)&(Have) as auxiliary verbs as well as full verbs. Trainees also learn to make questions, replying with questions, the use of passive forms in the present and in the past. In addition to future tense which is used in expressing decisions and intentions in the future using (will) and (going to).					

Course Title	Electrical Measuring Instruments				
Course Code	EG 156			Credits	3
Lecture Hours	2	Practical Hours	2	Total Hours	4
Course Description					
This course covers the theory of different measuring instruments for voltage, current, resistance, power factor, and KWH. Students learn the function of the clamp ammeter, megger, phase rotation, and cable route locator.					

SECOND TRAINING SEMESTER

THIRD TRAINING SEMESTER

Institute Director

Department Head

Course Title	Electrical Machines (1)				
Course Code	EG 201		Credits	4	
Lecture Hours	2	Practical Hours	4	Total Hours	6
Course Description					
This course examines the basic theory, characteristics, construction operation and application of rotating electrical machines. It includes the study of direct DC machine with separated excitation, DC Machine with series, parallel and combined long, short, and combined DC Machine. Applications on DC generators and motors of power plants.					

Course Title	Electrical Power Plants (2)				
Course Code	EG 203		Credits	3	
Lecture Hours	0	Practical Hours	6	Total Hours	6
Course Description					
Field visit to Doha West Power Station to review: Power Simulator, steam turbine, steam turbine auxiliaries', chlorine station, ECR electrical control room, Electrical mimic boards (switching room), circuit breakers and transformers.					

Course Title	English Language (3)				
Course Code	EN 222		Credits	2	
Lecture Hours	1	Practical Hours	2	Total Hours	3
This course introduces a domain of Technical vocabulary items, structural themes, language functions and listening/speaking /writing as well as evaluation, enables the trainees to identify the technical terms in English in a simple way and to express themselves in their jobs, in a sound comprehended language.					

Course Title	Protection (1)				
Course Code	EG 211		Credits	4	
Lecture Hours	3	Practical Hours	2	Total Hours	5
Introduction to the concepts of power system protection that includes understanding the principle of operation of protection system components such as fuses, relays, circuit breakers, and measuring transformers and their applications and designing protection systems for transmission lines, reactors, transformers, and distribution rails.					

Course Title	High Voltage				
Course Code	EG 206		Credits	4	
Lecture Hours	4	Practical Hours	0	Total Hours	4
Course Description					
Dealing with high tension network, Potential transformers, and Current transformers, Connecting, and disconnecting of Potential transformers and Current transformers, Insulator material properties (oil, gas, rigid material), Collapse limits, Current circuit breakers, Closing and opening the circuit breakers, timing of closing, and opening the circuit breakers, Isolators and earth switches.					

Course Title	Power Electronics (2)				
Course Code	EG 205		Credits	4	
Lecture Hours	1	Practical Hours	2	Total Hours	3
Course Description					
This course covers voltage regulators, single phase and three phase inverters, DC-DC choppers and the cycloconverter.					

FOURTH TRAINING SEMESTER

Course Title	Electrical Machines (2)				
Course Code	EG 251		Credits	4	
Lecture Hours	2	Practical Hours	4	Total Hours	6
Course Description					
This course covers single and three phase transformers, single phase motors.3-phase induction motor and 3-phase synchronous machine.					

Course Title	Electrical Power Plants (3)				
Course Code	EG 253		Credits	3	
Lecture Hours	0	Practical Hours	6	Total Hours	6
Course Description					
This course covers training on the power simulator such as generator with no-load experiment, generator with short circuit experiment, generator with load properties experiment, synchronizing generator with the grid experiment and loading. Study the electrical protection equipment available in the power simulator, the relation between the voltage, active and reactive power, load angle and turbine load. Visit Doha West Power Station to view Electrical mimic boards in the ECR electrical control room.					

Course Title	Diesel Generator				
Course Code	EG 257		Credits	4	
Lecture Hours	2	Practical Hours	4	Total Hours	6
Course Description					
This course provides the trainee with the fundamentals of electrical generators. Main use of electrical generators, applications, and locations. Advantages and disadvantages. Main mechanical components of electrical generator. In addition to type of cycles and systems. Fuel, oil lubrication, injection systems. PE and MW injection. Time based injection.					

Course Title	Power System Stability				
Course Code	EG 263		Credits	3	
Lecture Hours	3	Practical Hours	0	Total Hours	3
Course Description					
Basic concepts of power system stability, The factors causing the un stability of Power System, Symmetrical fault in power system, Un symmetrical Fault in power system, Generated voltage control, Reactive power stability and its effect on power system, Synchronous compensators, Static compensators (shut capacitors , series capacitors ,shunt reactors, series reactors), Static saturated reactor compensators, Induction regulators, Voltage control by transformers, Power system stability ,steady state stability ,transient stability, dynamic stability, Angular motion (angular velocity, angular acceleration, rotational angle), Torque and moment of inertia, Angular momentum, Kinetic energy, Inertia constant, Swing equation, Transfer reactance, Power relations, Steady state stability of the synchronous generator connected to infinite bus, Synchronizing power coefficient and its relation to stability, Effect of excitation and its relation to stability.					

Course Title	Protection (2)				
Course Code	EG 261		Credits	3	
Lecture Hours	2	Practical Hours	2	Total Hours	4
Course Description					
Focus on designing transmission and distribution protection schemes. This will include protection basics, relay design, protection plans for generators, transmission lines, transformers, and distribution rails. In addition, Focus on the settings of the feeder and transformer protection schemes, and the selection of metering transformers for current and voltage for these protection schemes.					

Course Title	Safety Regulation				
Course Code	EG 265		Credits	2	
Lecture Hours	2	Practical Hours	0	Total Hours	2
Course Description					
Safety and security regulations, training on using safety tools and clothes related to work site, Installation and detaching 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 chloride and soda. Using safety clothes. Identify the different places for measuring equipment in the site; identify the colures for different lines as gas, air, chlorine, steam, and services air pipes.					

Course Title	English Language (4)				
Course Code	EN 268		Credits	2	
Lecture Hours	1	Practical Hours	2	Total Hours	3
Course Description					
This course introduces a domain of Technical vocabulary items, structural themes, language functions and listening/speaking /writing as well as evaluation. The ultimate goal of teaching such course is enabling the trainees to identify the technical terms in English in a simple way and to express themselves in their jobs, in a sound comprehended language.					

Course Title	Field Training				
Course Code	EG 300		Credits	15	
Lecture Hours	0	Practical Hours	30	Total Hours	30
Course Description					
Site Training in the field of Training program.					