

GCC Lab Certified Power System Operator

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This document shall expire after 3 Years from date of last modification as indicated below.

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Name	Ronnie Mapanoo	Omar Ali AlGhamdi	Mohammed AlMuaili
Title	Sr. QHSE Consultant	Director Technical Services	COO

GCC Lab Certified Power System Operator

Section 1: Introduction

Certified Power System Operator Scheme aims to improve the reliability of the Middle East & North Africa (MENA) electric Power grid/system operators' competencies in delivering critical duties and to manage system's challenges and abnormalities through a continued competency development program which is governed by GCC Lab Certification Division.

This certification scheme is designed for system operators, operations support staff, market operators and new engineers who are assigned to power control center and need to understand the basics of high voltage electric system operations. As to ascertain their competency of the fundamental knowledge in operating a power system during normal and emergency situations.

Power System Operator Certification program shall provide:

- Sound knowledge and capabilities of power system operations.
- An improved system reliability and recovery thru highly talented and knowledgeable system operators

Section 2: Scope of Certification

The certification covers the core and fundamental knowledge areas and operation requirements that are applicable for power control center to monitor, operate and control the power network.

The Certification Scheme includes the following:

- Criteria for initial certification and re-certification.
- Assessment methods for initial and re-certification.
- Surveillance methods and criteria.
- Criteria for suspending and withdrawing certification.

The certification scheme cycle is a dynamic process and shall evolve based upon continual improvement and industry demands. Feedback for the Certification Scheme shall be collected thru communication with System Operators and inputs from the Advisory Committee (Steering Committee). This is to ensure that ongoing development reflects the needs and expectations of GCC region utilities market sectors

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Section 3: Job and Task Description

The Certification Scheme is owned, governed, and managed by GCC Lab Certification Division (CD) where GCC Lab is committed to oversee the program by the following personnel:

(Refer to Organizational Roles, Responsibilities & Authorities-PCP-PR-01 for additional info)

Certification Scheme Manager

- Decides on certification application and related issues
- Spearheads the Certification Advisory Committee (Steering Committee).

Examination Committee

- Manages and administrates the exam working group.
- Hosts and provide the written and oral examinations.
- Shall comprise of competent examiner and/or Subject Matter Expert

Certification Surveillance Committee

- Suspends or withdraws system operator's certification.
- Reviews and audits system operator's profile, development, and Continued Education Hours (CEHs).
- Conducts surveillance for Certified Power System Operators.
- Shall comprise of at least Administrator & a member of Examination Committee

Administration

- Manages the certification process for application, fees, and awarding.
- Issues competence certificate to certified power system operators.

Subject Matter Expert

- Conducts technical interview to candidates.
- Shall have at least ten (10) years working experience in the power system operations.

Section 4: Required Competence

Candidate shall possess a bachelor's degree in engineering and/or related field with a minimum of one (1) year work experience in electrical power systems (field operations or maintenance activities) and plans to develop his/her career in electrical power systems operations.

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-or-

Field Electric System Operator (ESO) with a related diploma and with a minimum of six (6) years (including educational years) in electrical power system operations, dispatcher/system operator who operates from a control room for generation, transmission, and distribution.

Section 5: Certification Scheme Process and Description

For a candidate to be certified, he/she must undergo the certification phases as follow:

- Phase 1: Submit application form and complete the preparatory course.
- Phase 2: Document review (credentials and qualifications)
- Phase 3: Attend/pass the written/online examination
- Phase 4: Attend the technical interview
- Phase 5: Awarding the certification
- Phase 6: Maintenance, Renewal, Suspension, Reduction & Withdrawal of Certification

5. 1 Initial Certification (Phase 1 & 2)

If the applicant is applying for the first time, he/she shall accomplish the required application form (**IMS-FO-42**). Then he/she must attend and complete the preparatory course: *(Refer to Appendix A for the complete preparatory course outline)*

The preparatory course should be aligned and covers all the knowledge areas as follows

SN#	Knowledge Areas
1	Resource and Demand Balancing
2	Transmission Lines
3	Emergency Preparedness
4	Emergency Response
5	Contingency Analysis and Reliability
6	Communications and Data
7	Renewable Energy Sources Integration and Operations
8	Switching and Tagging

Table 1: Knowledge Areas

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GCC Lab Certification Committee shall evaluate the effectiveness of the course attended by the applicant. Meeting this minimum requirement allows the applicant to be an eligible candidate to take the Power System Operator examination; otherwise, applicant cannot progress to competency assessment phase yet.

The applicant may re-apply and re-submit the application if he/she has met the minimum requirement within the span of one year after completing the preparatory course.

The Administration may request the applicant to submit pertinent records and documents as proof of eligibility, as needed.

5.2 Certification Test, Criteria and Awarding

The candidate must obtain a General Weighted Average (GWA) of 75% to be a Certified Power System Operator (CPSO).

Each Phase shall be scored as follows:

Phase	Task	Total Scored Questions	Passing Grade	Grade Weight Distribution
3	Written Examination	110	83	85%
4	Technical Interview	10	15	15%

Table 2: Assessment Score Criteria

In case the candidate failed Phase 3, he/she can retake the test one month after the last examination. Two consecutive failures shall require the candidate to take the preparatory course and resubmit his/her application.

Phase 3: Written/Online Examination

The examination is comprised of 110 questions taken from the group of Knowledge Areas as mentioned above. The weight distribution of questions contained on the test are mentioned in Appendix A. Each question is categorized accordingly from Level I (Easy) to Level III (Hard). In this fundamental exam, 70% of the questions shall come from Level I, 20% Level II and 10% from Level III. The questions are comprehensive in nature. The test shall be a closed book examination.

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Formula as follows:

$$\text{Phase\# 3 score} = \frac{\text{Total Correct Answer} \times 85\%}{1.1}$$

Note:

- *The result must be verified by Examination Committee after test completion.*
- *See Annex E: Written Exam-Transmutation Table.*

5.2.1 Taking the Exam

Candidates should arrive and be inside the testing center at least 30 minutes prior to the examination start time for the administration and review of candidate identification and shall allocate at least a total of four hours to accommodate the testing process (**IMS-GL-03**). Exam time is 2 hours. Candidates must show two current valid forms of identification to be admitted into the examination: one primary form of identification and either another primary or a secondary form of identification.

5.2.2 Withdrawal from Examination Process

The eligibility period lasts until one year after the date the candidate pays for the exam. If a candidate wishes to withdraw from the process within the one-year period for any reason, the candidate must request a withdrawal by close of business the day before the last eligibility day by submitting a request via training@gccelab.com

Candidates who submit the request within the time period shall be reimbursed for the fees submitted to GCC Lab except the withdrawal fee. The candidate shall forfeit all submitted fees if the candidate fails to properly withdraw.

Note: If a candidate has already scheduled an appointment to take the exam, the candidate must cancel that appointment with Training Services or forfeit the exam fee.

Special Accommodations for Disabilities

GCC Lab Certification Division shall make allowances for all documented requests for special testing conditions. Applicants must notify the Training Services Manager by email **at least two weeks prior to the scheduled exam appointment.**

Disability requests must be supported by an original letter from a recognized health care provider and be signed by a health professional. GCC Lab Training Department shall review each request and provide appropriate accommodations. The decision shall be included in the notice of eligibility/registration approval sent to the applicant.

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Phase 4: Technical Interview

After the candidate pass the written online exam, a Technical Interview is scheduled for **two (2) hours session**.

The interview can be done by:

- Face to Face either in GCC Lab premises or Candidate's working site
- Online through conferencing software

The Interview Panel shall consist of:

- One member from Certification Surveillance Committee (Administrative) Subject-Matter-Expert (SME) from GCC Lab
- Subject-Matter-Expert (SME) from the field (when required)
- The Administration schedules the interview during working hours and/or as per agreed time of all concern personnel.

The candidate shall be assessed based on his/her rational responses on example scenarios for each attribute.

Interview Content	Total Question Available During Interview Session
Resource & Demand Balancing	3
Transmission Lines	3
Emergency Preparedness	3
Emergency Response	1
Contingency Analysis & Reliability	3
Communications & Data	2
Renewable Energy Sources	2
Switching & Tagging	3
Total	20

Table 3: Technical Interview Content

The questions during the interview could come either or both sources:

- Spontaneous questions from Subject-Matter-Expert (SME)
- From the group of knowledge areas as mentioned in Section 5.1 Knowledge Areas

There are 10 questions to be asked. Eight (8) of ten (10) questions is graded question, with two (2) CREDIT questions. Hence, maximum mark to be awarded is eight (8) only. While passing mark is six (6) correct answers.

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Formula as follows:

$$\text{Phase 4 score} = \text{Total Correct Answer} \times 1.875\%$$

For example, Candidate #1 obtained the following score:

Task	Raw Score	Transmutation Table Equivalent	Weighted Distribution	Total Score (%)
Written Examination	8 3	75	0.85	63.75
Technical Interview	6	1.875	0.15	11.25
General Weighted Average (%)				75.00
Grade Mark				C
Overall Remark				Pass

Table 4: Sample Assessment Computation

After the candidate's interview, the results shall be verified and further evaluated by Examination Committee.

The Examination Committee shall prepare and forward the diagnostic report and recommendation to Administration for Certification preparation and issuance.

The grade obtained by the candidate shall be kept confidential, therefore the diagnostic report and examination result shall show only Pass or Fail for exam overall score.

The results for each topic on the online/written test and technical interview shall show only the grade mark in the diagnostic report.

Where:

Mark	Percentile
A+	95 - 100
A-	90 - 94
B+	85 - 89
B-	80 - 84
C	*75 - 79
D	Below 75

Table 5: Grade Mark Description

Note:

- **Passing Mark*
- *Refer to Appendix D for sample of Diagnostic Report and Test Result*

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Phase 5: Awarding the Certification

The validity start and issue date of the certification shall be based on the last date of examination with provisions on meeting all requirements of the program.

Certification Certificate and ID shall be issued and sent to certified CPO as soft copy to Certified Person's registered email.

Certified Person may request to the Administration for a hard copy of the Certificate and ID and delivered to their registered address via courier paid by the requestor at cost.

Certified Person is required to sign and maintain the Code of Ethics (**IMS-FO-46**) & Behavioural Policy (**IMS-PO-06**) prescribed by GCCLAB all throughout the certification cycle. Initial certificate fee is free of charge, while recertification certificate is with a fee.

5.3. Maintaining the Certification (Phase 6)

After awarding the certificate, the Certified Person (CP) shall accumulate and achieve the required Continued Education Hours (CEH) and complete a Cycle Surveillance.

Continued Education Hours (CEH)

Certified Person shall maintain at least fifteen (15) Credit Score of Continued Education Hours annually. Below table shows different type of credits with corresponding credit score to allow CP to develop his/her competence and earn the required credit score in on certification cycle basis (3 years).

Continued Education Hours (CEH)	Number of Hours Training	Credit Score
Training Courses	8*	2
Simulation (Practical Course)	1	2
Write & share a lesson learn report (For everyone report)	NA	0.5

Table 6: Continued Education Hours (CEH)

Note:

- *Eight (8*) hours duration equivalent to 1-day training.*
- *The credited topics for training and simulation courses are listed in Appendix B.*

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5.2.1 Certification Surveillance (CS)

The Certification Surveillance (CS) date shall be set according to the expiry date of the certificate and in coordination with the Certified Person (CP). The surveillance shall be conducted once in the Certification Cycle (three years).

The Certification Surveillance Committee shall send notification to CP at least three months before the end of certificate validity date.

Certified Person (CP) must submit the copy of all requirements to Certification Surveillance Committee one month before the date of Surveillance.

5.3.1.1 Certification Surveillance Committee shall:

- Conduct review and assessment to CP's competence development in accordance with the continued education hours credits criteria.
- Verify achieved credits and documents submitted by CP.
- Issue validity notification based on maintaining the certification criteria.
- Issue non-conformity notification based on maintaining the certification criteria.
- Interview (structured) the CP and relevant personnel to vouch his/her competency.

5.4 Recertification

The validity of the certification is three (3) years. It is advisable that all Certified Person (CP) for recertification to ensure and maintain or exceed their competency level of knowledge demonstrated during the initial certification.

Certified Person is required to meet the following criteria:

- Complete the verification of Certification Surveillance (on-site assessment).
- Submit required Continued Education Hours (45 Credits in three years).
- Confirmation of continuing satisfactory and experience record.
- Physical capability (medical fitness).
- Pay the corresponding recertification fee.

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5.5 Suspension of Certification

The following condition shall be a cause for suspension of the certification:

- Non-conformity with CEH credits.
- Non-completion of Certification Surveillance.
- Exceeding the given period to complete the required CEH credits and completing the Certification Surveillance.

In this case, the CP shall be given a period of two months from the Certification Surveillance date to complete and submit the missing requirements.

5.6 Withdrawal of Certification

The following conditions shall revoke the certification:

- Exceeding the given period to complete the required CEH credits and completing the Certification Surveillance.
- Any proven unethical behavior of this certification scheme program.
- Any proven misuse of the certification scheme program and/or branding.

Those whose certifications withdrawn due to first condition can be admitted again in the program, but he/she must re-apply as an initial certification.

And, for those whose certification withdrawn due to second and third conditions can apply again in the program after one (1) year from the date of removal. He/she must submit a "Letter of Reconsideration" address to Director of Certification for approval. If approved, he/she needs to apply the program again from initial certification.

5.7 Hardship Request

Hardship is when unforeseen events and extenuating circumstances occur that place excessive burden on a system operator to earn or maintain a credential. To initiate the hardship clause process, the system operator must submit a written request containing a thorough explanation of the circumstance and supporting information to the GCC Lab Certification Scheme Manager **at least one month prior to the published expiry date of the certification.**

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Appendix A: GCC Certified Power System Operator (PSO) Exam Preparation Training Content Requirement

The following describe the topics for examination with weight distribution that a candidate shall go through as a preparation for certification test:

Knowledge Areas		%Weight
1.0	Resource and Demand Balancing	20
1.1	Reserves (spinning and non-spinning)	
1.2	Automatic Generation Control (AGC)	
1.3	Frequency	
1.4	Load Forecasting	
1.5	Generation Equipment	
2.0	Transmission	20
2.1	Protection and Control	
2.2	Voltage and Reactive	
2.3	Electrical Current	
2.4	Reconfiguration and Switching	
2.5	Operating Limits	
3.0	Emergency Preparedness & Preparedness	20
3.1	Current and Next-Day Planning	
3.2	Severe Weather, Natural Disasters, and Geomagnetic Disturbances	
3.3	Anticipated Capacity Deficiency	
3.4	System Restoration	
3.5	Response to System Disturbances	
3.6	Response to Capacity Emergencies	
3.7	Response to Loss of Control Center	
3.8	Response to Loss of Analysis and Monitoring Tools	
4.0	Contingency Analysis and Reliability	15
4.1	Contingency Analysis	
4.2	Network Analysis Tools (e.g., State Estimators)	
4.3	Response to Results of Contingency Analysis	
4.4	System Operating Limits (SOL)	
4.5	Maximum Transferable Limits (MTL)	
5.0	Communications and Data	10
5.1	Reporting Requirements	
5.2	Communication Methods (e.g., Three-Part Communication)	
5.3	Data Validity and Verification	
5.4	Telemetry and Communications Equipment	

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Knowledge Areas		%Weight
6.0	Renewable Energy Sources Integration and Operations	10
6.1	Integration of renewable energy sources to the grid	
6.2	Operating renewable energy sources	
6.3	Forecasting renewable energy sources generation	
7.0	Switching and Tagging	10
7.1	Switching on the electric power system	
7.2	Requirements of a hazardous energy control program	
7.3	Electric power system equipment configuration	
7.4	Electric power system substation control building functions	
7.5	Hazardous energy control (switching) on the electric power system	

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Appendix B: GCCLAB Certified Power System Operator (PSO) Continued Education Hours Training Content Topics

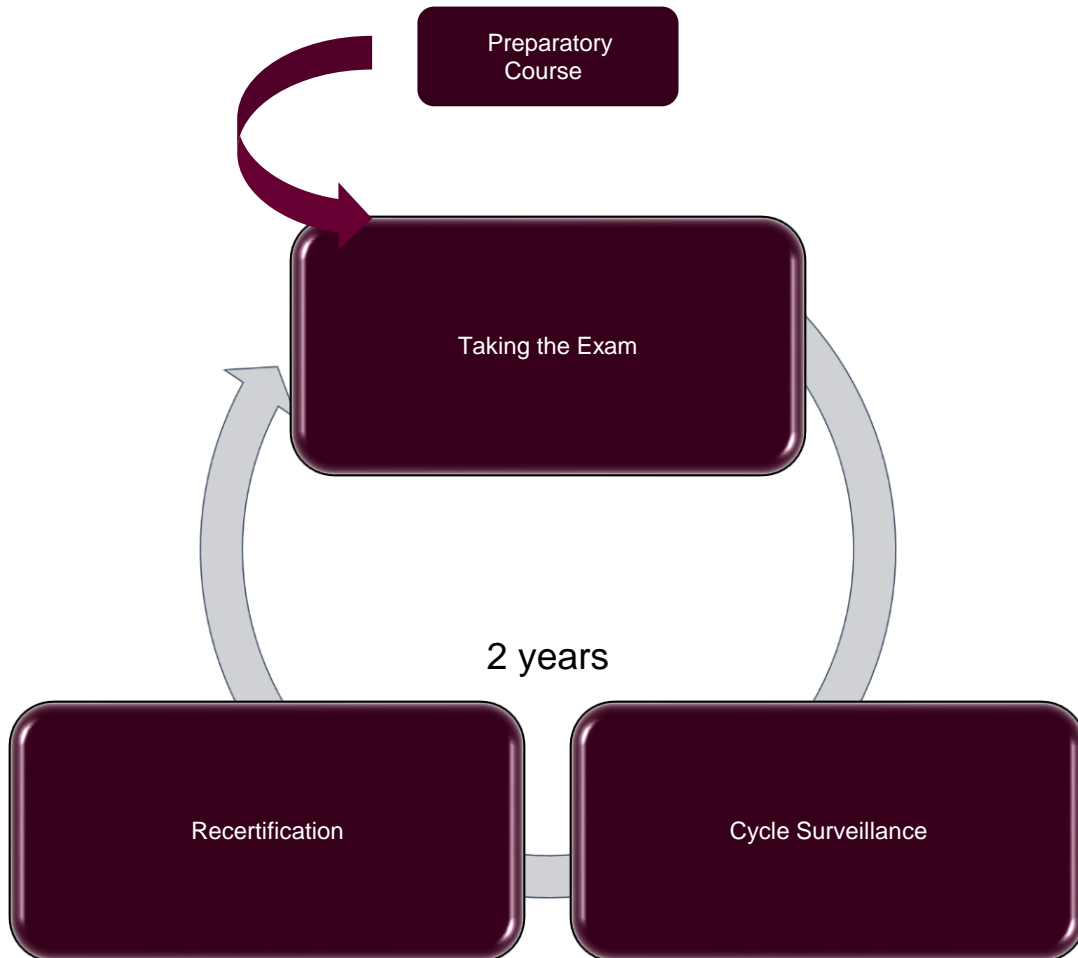
The training development program for CP would be different from one operator to another based on his strength and weakness. The program recommends CP to attend the suggested topics he/she got the lowest score in the diagnostic report.

- Below are the topics for CEH accreditation:
- Resource and Demand Balancing Transmission Line
- Emergency Preparedness
- Emergency Response
- Contingency Analysis and Reliability
- Communications and Data
- Grid Code
- Renewable Energy Sources Integration and Operations
- Switching and Tagging
- Cybersecurity in control room operations
- Market operations
- Renewable energy integration, operations, and forecasting
- Economic dispatch and unit commitment
- Load forecasting & generation planning
- Blackstart and system restoration
- Systems simulator training
- System and equipment Failures and operations matters
- Generation connection
- Psychological training for network operation crisis

Also, the program highly recommends the employer to use the result of the diagnostic report to prepare and plan the competency development map/plan of Certified Person (CP).

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**Appendix C: GCC Certified Power System Operator (PSO)
Certification Process Diagram**



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Appendix D: GCCLAB Certified Power System Operator (PSO) Sample of Diagnostic Report and Test Result

GCCLAB Certification Division
Power System Operator (PSO)
Diagnostic Report and Test Result

Date :
Attention : Candidate Name
Email Address

Dear Candidate,

We are pleased /regret to inform you that you PASS / FAIL the Power System Operator (PSO) Certification with an overall grade mark of ____.

Examination	Topics	Score
Written/Online Test	Resource & Demand Balancing	Pass/Fail
	Transmission Lines	Pass/Fail
	Emergency Preparedness	Pass/Fail
	Emergency Response	Pass/Fail
	Contingency Analysis and Reliability	Pass/Fail
	Communications and Data	Pass/Fail
	Renewable Energy Sources	Pass/Fail
	Switching and Tagging	Pass/Fail
Technical Interview	<i>-Same as Above-</i>	Pass/Fail

With the result above, we recommend attending to the topics you have obtained FAIL mark(s).

Again, congratulations in passing the certification and being one of the Certified Power System Operators in GCC Region.

/ or /

Although you did not make it, we hope you continue pursuing your desire to become a Certified Power System Operator. You are very welcome to re-apply with the program.

Prepared by:

Reviewed by:

Approved by:

Administrator

Certification Committee

Certification Scheme Manager

Best regards,

GCCLAB Certification Committee

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Appendix E: GCC Lab Certified Power System Operator (PSO) Written Examination-Transmutation Table

Score	Equivalent
110	100
109	99
108	98
107	97
106	96
105	95
104	95
103	94
102	93
101	92
100	91
99	90
98	89
97	88
96	87
95	86
94	85
93	85
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89	81
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86	78
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81	74
80	73
79	72
78	71

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5	5
4	4
3	3
2	2
1	1
0	0