

SCOPE- Electrical PE (Building Services)

PART (1)

YEAR 1 & 2 (Minumum 3 to 4 years is required for a graduate to become a PE)

(Total PDP Points for Informal Learning Activities-Private Study Part Time) (Total 10 points per year maximum)(MEB-PE Regulation Appendix 3). Ctrl+Click the link & then allow to download the contents.

The self study learning resources materials for SCOPE – Electrical PE (Building Services)

The tests are based on your general knowledge on the subject. They are not designed to test the limited area of study that the candidate learns one paper & sits one test.

1. Basic Electricity

1. DC Circuit
2. Alternating (sinusoidal) Voltage and current
3. Single phase AC Circuit
4. Phasor Algebra and AC Circuit
5. Resonance in RLC Circuit

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5 = 2 \text{ HR}$

2. Three phase Circuits and System

1. Three phase voltage generation
2. Phasor diagram
3. Star/ Delta connection
4. Balanced Three phase loads
5. Active , Reactive and Apparent Power
6. Power Measurements
7. Power Factor Correction

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5 = 2 \text{ HR}$

3. Magnetism and Magnetic Circuits

1. Magnetic Field
2. Magnetic Materials and Magnetization curves
3. Magnetic Equivalent Circuit

4. Sinusoidal Excitation
5. Magnetic losses

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $2 \text{ HR} \times 0.5 = 1 \text{ HR}$

4.AC/DC Machines

1. DC Machine: operating principle, voltage and torque equations
2. Three phase Induction motors: operating principle, equivalent Circuit, torque-speed, Characteristics, losses and efficiency

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5 = 2 \text{ HR}$

5.Transformers

1. Ideal Transformer
2. Equivalent circuit
3. Phasor Diagrams
4. Determination of Parameters
5. Performance Evaluation
6. Auto-transformers
7. Three phase Transformers

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5 = 2 \text{ HR}$

6.Active Power and Frequency Control

1. Governor Control Systems
2. Transmission Losses , penalty factors and loss coefficients
3. Automatic Generation Control
4. Active power Control Devices

7.Reactive Power and Frequency Control

1. Production and Absorption of Reactive Power

2. Methods of Voltage Control
3. Reactive Power and Voltage Control Devices
4. Application to Transmission and Distribution Systems

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $8 \text{ HR} \times 0.5 = 4\text{HR}$

8.Electric Power Distribution Systems

1. Distribution System Configuration
2. Primary and Secondary Distribution
3. Ring , Radial and Inter-connected Systems
4. Distribution System Layout
5. Planning Criteria and Network Design
6. Fault Diagnosis and Restoration of Supply

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5=2\text{HR}$

9.Building Services Engineering

1. Estimation of Power Demand
2. LV Cable and Bus-way Systems
3. Conductor Sizing Factors
4. Circuit Protective Conductor
5. Earth Leakage and Touch Voltage
6. Inspection and Testing
7. Lightning Protection

ur experience in the work place , write the technical report of 10 pages & submit it.

After you have done the test, the score can be printed out in PDF format The score with at least 50% or more for all tests, it will be record of $4 \text{ HR} \times 0.5 = 2\text{HR}$

10.General Protections

1. Basic Protection Principles
2. Instrument Transformers
3. Co-ordination of Over-current and Earth Protection for Distribution Systems
4. Pilot-wire Differential Protection Feeder

After you have done the test, the score can be printed out in PDF format. The score with at least 50% or more for all tests, it will be record of $2 \text{ HR} \times 0.5 = 1 \text{ HR}$

TOTAL PROFESSIONAL DEVELOPMENT PROGRAM (PDP) HOURS = 20 Hours For Year 1 & SCOPE Electrical PE (Building Services)

PART (2)

YEAR 3 & 4 (Minumum 3 to 4 years is required for a graduate to become a PE)

The practice reports need to write for each topics of the study materials included in Scope Part II.

The reports should include the followings:

- Professional topics----- You need to select the topic such as building electrical wiring or power distribution etc
- Fundamental of Engineering- What knowledge you got from the materials in your selected professional topic..
- Engineering Management--- How will you manage the I project / workforce to implement the engineering tasks by applying those knowledge in actual workplace project or simulated work place and project?.
- Rules Regulations, Standards & Specifications- You need to refer the relevant engineering rules, regulations, standards and specifications in the tasks expressed in your report.
- Safety—How will you safeguard public safety in performing the engineering tasks?
- Ethics--- How will you apply professional code of ethics in performing the engineering tasks?

The candidate should use the following format in the practice exercise reports for each topics of the Scope II that are simulated practice tasks for preparing the Professional Experience and Competency Report to be submitted to Myanmar Engineers Board for Professional Engineer (PE) Registration.

Section (1) Introduction

Section (2) Work experiences in brief and highlight the major important projects

Section 3 to 10 , the following competency should be addressed

- Apply engineering knowledge, methods and techniques
- Use of engineering technology , tools and equipments
- Safeguard public safety
- Recognition the impacts of engineering on the environment , economy and society.
- Manage engineering activities

- Communicate engineering information.
- Work collaboratively
- Main and enhance engineering skills and knowledge. (Ref-MEB PEng Reg)

1. Electrical Power Supply

1. Generation, Transmission and Distribution
2. Application of Electricity
3. Solar Photovoltaic System
4. Design of Electrical Installation
5. Load Estimation
6. Power Factor Correction
7. Power Quality and Power System Harmonics
8. Consumer and Substation Switchboards and Switch Gears
9. Maintenance of Electrical Equipments, Switch Gears and Cables
10. Design of Energy Efficiency and Sustainability

EXERCISE ASSESSMENT (20)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in electrical power supply in above mentioned format & submit it to the assessor.

(Weighted informal

learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

2. Lighting Requirement for Workplace , Indoor and Outdoor

1. Visual Needs for Safety and Security

EXERCISE ASSESSMENT (21)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in workplace lighting in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

3. Energy Efficiency Requirement

1. Minimum Energy Efficiency Requirements for New Installation and Replacement of Systems and Equipments in Buildings
2. Replacement of Components of Systems and Equipments in Buildings
3. Criteria for Determining Compliance with Energy Efficiency in Building with regards to Air conditioning and Heat Rejection Equipments, Water Heater, Motor Drives and Lighting used in Buildings.

EXERCISE ASSESSMENT (22)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in energy efficiency in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

4. Protection for Safety

1. Principle of Operation of Protective Devices
2. Maximum Demand and Diversity Factors
3. Protection against Over Current and Short Circuit Currents
4. Protective Devices and Circuit Conductors
5. Discrimination in Protection of Electrical Circuits

EXERCISE ASSESSMENT (23)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in protection and safety in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

5. Cables, Bus-ways and Distribution Boards

1. Types and Characteristics of Cables
2. Method Installation
3. Sizing of Conduit and Trunking
4. Factors Affecting the Current Carrying Capacities of Cables
5. Sizing of Cables and Bus-ways for use Under Different Types of Conditions
6. Connected Load, Maximum Demand and Circuit Breakers Ratings for an Electrical

EXERCISE ASSESSMENT (24)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in electrical installation in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

6. Earthing

1. Purpose of Earthing

2. Methods of Earthing
3. Earth Fault Loop Impedance and Earth Fault Current
4. Suitable Sizes of Circuit Protective Conductor
5. Testing of Earthing

EXERCISE ASSESSMENT (25)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in site earthing in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

7. Emergency Lighting

1. Exit and Emergency Lighting Requirements for Evaluation of Occupants
2. Types of Back-up Power Supply
3. Exit and Directional Signs

EXERCISE ASSESSMENT (26)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in emergency lighting in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

8. Standby Power Generator System

1. Types of Essential and Critical Loads
2. Sizing of Generator
3. Voltage Regulation and its Effects on Generator Sizing
4. Protection of Alternators and Prime Movers
5. Installation of Standby Generator System Including Day-tank Battery and Charger, Fuel Supply, Engine cooling system, Plant room ventilation and fresh air intake, contend instrumentation plant and automatic transfer switch.

EXERCISE ASSESSMENT (27)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in stand by power system in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

9. Automatic Fire Alarm System

1. Requirement for automatic and manual fire detection system and purpose of compartmentation as required by the fire code.
2. Interaction with other building services as emergency voice communication system, lifts, AHU, pressurization fans and auto-doors during alarm activation.

ADDITIONAL STUDY FOR AUTOMATIC FIRE ALARM SYSTEM

Contact: highlightcomputergroup1@gmail.com to request the URL for download

10. Emergency Voice Communication System

1. Requirement for public address system for building above 24 meters but less than 60 meters.
2. Requirements for emergency voice communication for building above 60 meters.
3. Requirement for fireman intercom.

EXERCISE ASSESSMENT (28)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in emergency voice communication system in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

ADDITIONAL STUDY FOR EMERGENCY VOICE COMMUNICATION

Contact: highlightcomputergroup1@gmail.com to request the URL for download

11. Inspection, Testing and Common Violation in Electrical Installation

1. Mandatory requirements for inspection and testing of electrical prior to energisation of electrical supply
2. Types of test instruments and standard methods of testing.

EXERCISE ASSESSMENT (29)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in electrical safety inspection and testing in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

12. Measuring Instruments

1. Principle of operation of Electrical Measuring Instruments
2. Essential of Indicating Instruments
3. Types of Instruments
4. Errors Common to All Types of Instruments
5. Moving Iron Instruments
6. Moving coil Instruments
7. Comparison Between Moving Iron and Moving Coil Instruments
8. Comparison Between Moving Iron and Dynamometer Type Instrument
9. Extension of Instrument Range
10. Measurement of Power
11. Watt Meter, Dynamometer Type Wattmeter
12. Energy Meter, Multi-meter or AVO Meter, Electronic Multi-meter
13. Digital Multi-meter

STUDY MATERIALS (Electrical Measurement)

[EE 404 Electrical Measurement \(1 pt\)](#)

EXERCISE ASSESSMENT (30)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in electrical measurement and testing in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)

13.Electrical Engineering Codes/ Standards

1. Codes, Standards and Regulations
2. Codes and Standards for building services

Assignment: At the end of each chapter, there are review questions & exercises. You need to do all exercises & submit them as assignment

EXERCISE ASSESSMENT (31)

Based on the study you got from the above resources, write a professional experiences and competency report for engineering tasks in electrical engineering codes and standards used in engineering work in above mentioned format & submit it to the assessor.

(Weighted informal learning time for CPD including study & report= 20Hr x 0.5= 10Hr)