



# INDUSTRIAL ELECTRICIAN CURRICULUM (LEVEL -1 / G - III)

British Council “Skills for Employability Project”

Coordinated by:  
Engr. Abdul Maqsood  
Link Coordinator  
SFE Project

Submitted By:  
Engr. Syed Qasim Shah  
Team Leader cum  
Assistant Link Coordinator  
“Skills for Employability” Project  
A Joint venture of  
Government College of Technology Nowshera, Pakistan  
& Coleg Llanrillo, Wales, UK  
Sponsored by  
British Council &  
NAVTEC Pakistan



## Definition of Terms

### Assessment Criteria

The specification of the expected performance demonstrated by the student or earner at the conclusion of the learning experiences in a particular module or course. It is used to assess the necessary knowledge, skills and attitudes, reflecting the performance standard in the relevant industry or competency standards.

### Assessment method

Assessment methods may include observation, simulation, questioning, presentation/ demonstration and written assessment. The various methods or techniques used to gather evidence of sufficiency and quality in which to make a sound judgment on the competency student or learner

### Basic Competency

Basic competency is a cluster of related skills, knowledge and attitudes that is simple and fundamental in most jobs, occupation or responsibility in the same level of qualifications and that is expected of the individual in the world of work. For instance, all skilled workers are expected to “perform mensuration and calculation” or to “observe safety rules and practices”; or similarly, a technician is expected to “lead a team” or “prepare the scope of work” responsibilities

### Certification of Competency

This is the culmination of the CBT process in which the student or trainee is awarded a certificate on the level of competency that is usually based on a National Qualification Standard. For instance, after completion of a CBT course and the corresponding assessment conducted by a duly accredited assessor or assessment agency, a National or Federal Certificate of the student’s or candidate’s competency ( e.g.: Electrician – Federal Certificate II) is awarded if has the competency of a skilled Electrician.

### Common Competency

Common competency is a cluster of related skills, knowledge and attitudes that is similarly done across a cluster of jobs in a particular trade or occupation in the same level of qualifications that is expected of the individual in the world of work. While a basic competency is similarly required in most jobs, a common competency is usually restricted in one cluster of occupations. For instance, common competencies in measurements in the area of construction are essentially different from that of mechanical trades, or electronics.



## Competency

Competency is a cluster of related skills, knowledge and attitudes that forms part of one's job or occupation that correlates with and measured by the performance standards set by industry, and that can be developed and improved through training and development. Competency is based on performance of tasks identified by experts in the given occupation.

## Competency-Based Curriculum (CBC)

A competency-based curriculum is a framework or guide in the form of a **course design** for a particular field or occupation and a series of **modules** of instruction that are based on competency standards, with corresponding learning outcomes, assessment criteria, contents, conditions and methodologies of instruction, and assessment method. The competency-based curriculum specifies outcomes, which are consistent with the requirements of the workplace as agreed through the industry or community consultations. *Where competency standard do not exist, curriculum developers need to clearly identify workplace standards and requirements as a basis to identify the outcomes of the competency-based curriculum.*

## Competency-Based Training (CBT)

A training system that organizes instruction based on competency standards and evaluates how well the student performs after instruction according to a set of performance standard. It refers to a systematic approach to organizing instruction that focuses on defining in measurable terms what students are to learn and then evaluating how well they can perform designated tasks after instruction.

## Competency-based Technical Education and Vocational Training (CBTVET)

CBTVET or the application of CBT in TVET is a systematic approach in organizing and providing instruction in measurable terms what the student has to learn in a particular technical or professional skill, trade or occupation, and then evaluating how well the student perform/demonstrate the knowledge or skills that were taught. Performance in terms of technical knowledge and skills by various means is made to determine the mastery or level of competency.

## Competency Standard

The description of what individuals do in the workplace at various levels and the standard set by the workplace or the industry; defines or specifies how well the worker or trainee should perform a job or function. Likewise, it identifies the characteristics possessed by people that enable them to be either assessed or judged competent in a particular job or occupation.

## Course design



This is a major element of the CBC that defines the title of the course and its description, qualification level and units of competency, course outcomes, course structure and competency analysis, assessment and instructional delivery, and the list of resources and qualifications of instructors.

### **Course Title**

This refers to the title or name of the course design of a particular technology, industry, or occupation, reflecting employment needs as outlined in the competency standard.

### **Core Competency**

Core competencies are the main group of skills, knowledge and attitudes that are unique for a particular trade, occupation or technology. These are competencies that are used only on a particular trade, occupation or technology; or allied trades using similar material, such as wood technology or metal technology.

### **Curriculum**

In general, curriculum is a set of courses organized and offered by an educational institution with the purpose of attaining a set of learning objectives or goals or learning a set of knowledge, skills, and attitudes within a specified period. For instance, a TVET curriculum is a course or set of courses on a particular technical field, trade or occupation (e.g. automotive technology; civil or construction technology; electrical technology, or mechanical technology) for the purpose of preparing an individual for employment or promotion on the job.

### **Curriculum Development Team**

This is a group of people representing industry, curriculum developers and teachers or trainers experienced in the field/industry organized to develop a curriculum. The team may work as a group or assign each member a part to accomplish at their own phase and time until the curriculum is completed.

### **DACUM**

It simply means developing a curriculum. A method of occupational (or task) analysis, where occupational experts in a particular trade or technology come to a workshop led by a trained facilitator, to provide input on the specific tasks, knowledge and skills required to perform them.

### **Entry Requirements**

This is a list of requirements that the student must possess to be allowed to participate or attend the teaching-learning session of a particular module of instruction. It is distinct from the institutional requirements that are required of the student upon admission to the school.



## Industry

In this Manual, the term industry is used generally to include all the sectors of the economy or the community such as manufacturing firms, service shops, business establishments, government agencies, and NGOs that employs the mid-level technical manpower that are trained by TVET institutions as well as colleges and universities and other training institutions.

## Learning Conditions

The requirements under which the teaching-learning process and assessment will be performed. These may include a list of tools, equipment and materials, training facilities, learning resources such as books, manuals, multi-media and other resources. It also specifies the scope or range of the equipment and facilities to be assessed.

## Learning Outcomes

These are competencies (technical knowledge, skills and attitudes) learned or acquired by the student or trainee on a particular module, course, or curriculum. They are expected competencies developed under a particular unit or module of instruction.

## Module Contents

These are specific knowledge, skills and attitudes or learning experiences that are covered to be address expected learning outcomes.

## Module Description

This is a statement that describes what the module is all about, its scope and delimitation.

## Module Duration

This refers to the estimated or suggested length of time (in hours) spent teaching learning a particular module.

## Module (of Training)

Also known as *module of instruction*, it refers to the other element of the CBC that defines how the competency or elements of the competency is organized for instructional purposes based on a set of competency standards.

## Module Title

This refers to the competency or elements of the competency that is developed into a module or unit of instruction or training.



## National Qualification Framework

A structure of well defined and nationally accredited or recognized qualifications which are awarded in predetermined levels. It also refers to the structure or path through which formal, non-formal and informal education and training are all recognized and credited towards a particular qualification.

## Qualification

A set or package of standards considered to be worthy of recognition in a certificate issued by a duly recognized institution. It also refers to the possession or accomplishment of acquiring certain skills, knowledge and attitudes or experiences that are considered worthy and essential for entry, promotion or upgrading on the job.

## Semi-Skilled

This refers to the basic level of competency that are mostly routine, predictable, and uncomplicated tasks. Because of his basic level competency, the semi-skilled person usually needs somebody to oversee and direct his work activities. With diligence, hard-work and willingness to learn on-the-job, a semi-skilled person especially a graduate of at least one-year TVET program, can easily advance to the level of a skilled person.

## Skilled

This is the term for a highly trained or experienced person whose competency in a particular occupation or trade is carried out in a significant and broad scope in various context. A skilled person performs some tasks that are complex or that has some autonomy and individual responsibility and that often requires cooperation with other people in the work environment.



# Competency-Based TVET System

## A. Definition of the Competency Based TVET System

As defined earlier, Competency-Based TVET or the application of CBT in TVET sector is a systematic approach in organizing and providing instruction to develop technical knowledge, skills and attitudes based on industry or competency standards, and then evaluating how well the student demonstrate the knowledge or skills that were taught. The student's ability to demonstrate the technical knowledge and skills determines the mastery or level of competency.

As a system, Competency-based TVET (CBTVET) is a complex undertaking from National policy-making to the institutional level implementation of training, assessment, and awarding of appropriate National-level certification of competency. The system starts with the formulation of a National policy to standardized technical qualifications, and correspondingly based from a national standard of competency in various technological occupation. With the on set of globalization and the fast emerging knowledge-based economy coming-up, the competency-based TVET system has become a powerful training strategy for the country.

## B. The Elements of a Competency Based TVET System

The CBTVET system includes six (6) major elements, and each of these elements has to be undertaken and established to serve as the framework of implementation. These elements include the following:

- a) Establishing National Qualification Framework (NQF) for TVET;
- b) Developing competency standards;
- c) Developing competency-based curriculum;
- d) Developing modules of instruction;
- e) Implementing CBT in TVET institutions;
- f) Assessing the learning outcome, and
- g) Awarding appropriate level of Certification.

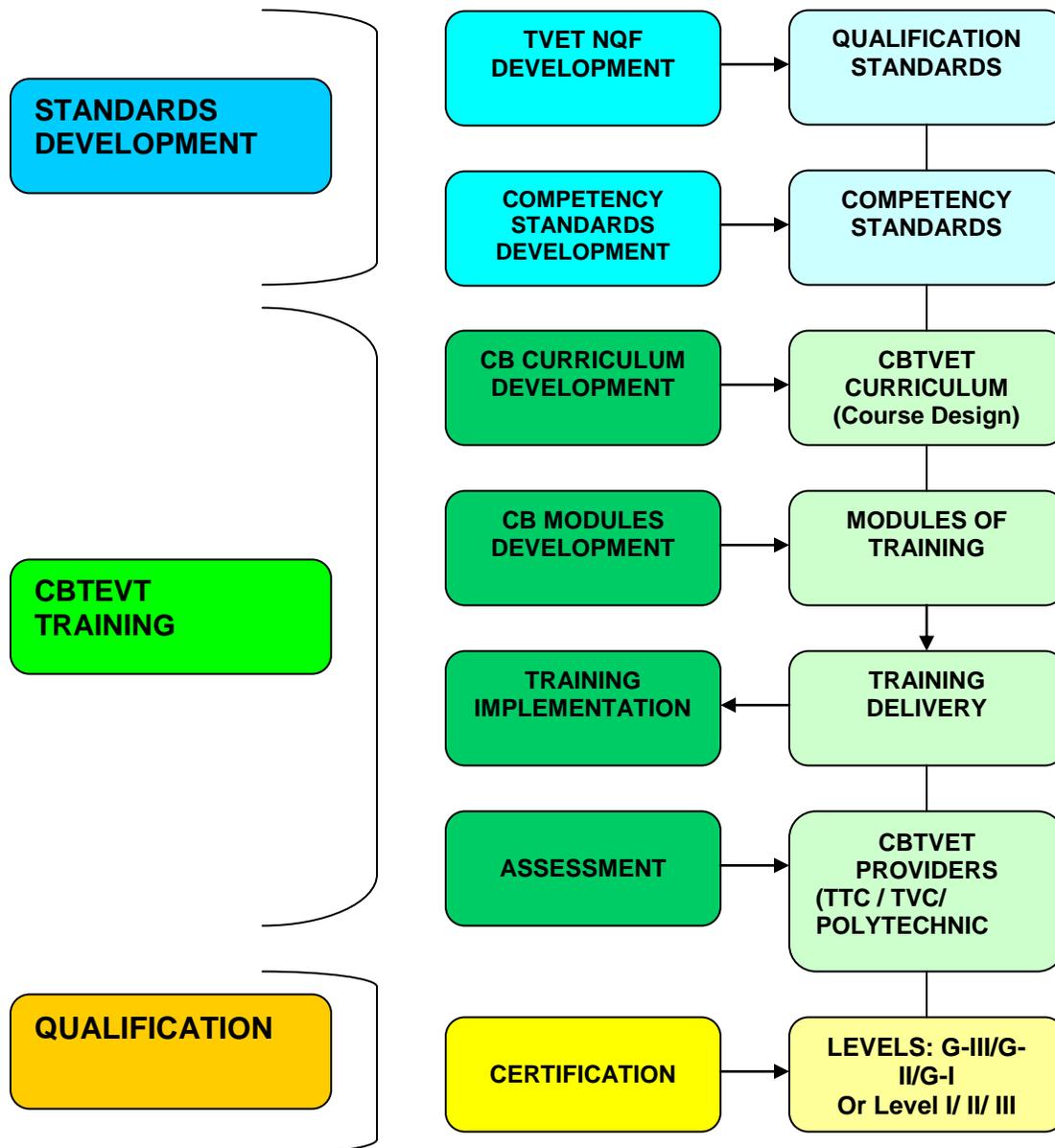
The first three elements are ideally undertaken at the National level since they serve as the bases for the country's policy on the classification and leveling of technical qualifications in the country. The technical or professional qualifications are standardized at the national level to ensure uniformity, stability and integrity of the standard. Likewise, national competency standard is imperative for all technical and professional qualifications to ensure the same characteristics and quality assurance in the country.

Similarly, the development of the CBT curriculum is undertaken at the National level to insure uniformity and common standard of coverage and quality assurance. Together with the curriculum are training regulations in the form of required hours of training; admission



standards; instructional facilities required; suggested approach and methodology of instruction; assessment and certification.

Figure 1 above is a conceptual framework that illustrates the competency-based TVET system.



**Figure 1. Conceptual Framework of Competency-Based TVET System**

Simultaneously considered at this time is the organizational arrangement at the national and regional or provincial levels with respect to the management and control of implementation. The ideal organizational set-up is to organize a new body to carry out the



planning and implementation of CBTVET. But since the provision for TVET has been in place long before the introduction of CBTVET system, it is often more practical to restructure and strengthen the existing National and Regional or provincial organizational structure.

The three other elements are undertaken after the establishment of the National policy on qualification and competency standards mostly at the local and institutional level implementation of the system.



### 1.1 Structure and Levels of Competency in U.K.

As cited in an ILO document, the Levels of Competency as defined in the United Kingdom are as follows:

- Level 1.

“Competency in the performance of a broad scope of labour activities, mostly routine and predictable ones”.

- Level 2

“Competency in a significant and broad scope of Labour activities, carried out in different context. Some of the activities are complex or not routine tasks and there is some autonomy and individual responsibility. It may often require the cooperation with other people, being part of a group or doing team work”.

- Level 3

“Competency in a broad scope of different labour activities developed in a great variety of contexts which are mostly complex and not routine like. There is great responsibility and autonomy and it often requires controlling and providing guidance to other people”.

- Level 4

“Competencies in a broad scope of professional and technically complex labour activities, carried out in a great variety of context and with substantial degree of autonomy and personal responsibility. It may often require being responsible for the work of others and the distribution of resource”.

- Level 5

“Competency which involves applying an important scope of fundamental principles and complex techniques in a broad and sometimes unpredictable variety of contexts. It requires a high degree of personal autonomy and frequently great responsibility regarding the work of others and the distribution of substantial resources. Furthermore, it requires personal responsibility regarding analyses, diagnosis, designing, planning, and implementation and assessment tasks”.

### 1.2 Structure and Levels of Competency in the Philippines

In the Philippines, the Technical Education and Skills Development Authority (TESDA), under the Office of the President, was mandated by law to “formulate a comprehensive development plan for middle-level manpower; ...to ingrate,



coordinate and monitor skills development program; and to restructure efforts to promote and develop middle-level manpower, among others. As part of this mandate, TESDA came up with four (4) levels of competencies for the determination of qualification and certification of technical workers. The four levels of competencies which also serve as National Certificate levels (better known as NC-1, NC-II, NC-III and NC-IV), are operationally defined as follows:

• National Certificate Level I:

- ◇ A worker at this level performs routine and predictable tasks involving little latitude for judgment;
- ◇ Adherence to appropriate standards or specifications are usually involved;
- ◇ Assignments are usually made by supervisors or a worker at a higher level who gives simple instructions and make clarifications or suggestions when necessary.

• National Certificate Level II:

- ◇ A worker at this level performs a prescribed range of functions involving known routines and procedures where clearly identified choices and limited complexities apply;
- ◇ Work involves some accountability for the quality of outputs;
- ◇ Applications at this level may involve individual responsibility or autonomy, or working with others as part of a team or group.

• National Certificate Level III:

- ◇ A worker at this level performs a wide range of skilled operations at a high level competence involving known routines and procedures. The work context involves some complexity in the extent and choice of options available;
- ◇ Work involves understanding the work process, contributing to problem solving, and making decisions to determine the processes, equipment and materials to be used;
- ◇ Applications at this level may involve individual responsibility or autonomy and/or may involve some responsibility for others. Participation in teams including team group coordination may be involved.

• National Certificate Level IV:

- ◇ A worker at this level performs a wide range of applications in a variety of contexts most of which are complex and nonroutine;
- ◇ Work involves some leadership and guidance when organizing activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature. Work at this level also requires evaluation and analysis of current practices and the development of new criteria and procedures;



- ◇ Applications involve responsibility for the organization and performance of others.

### 1.3 Structure and Levels of Competency in New Zealand

The New Zealand Qualifications Authority website presented the following “level descriptors” of competencies adopted in the country’s National Qualifications Framework. The Website described the Level Descriptors as follows: “There are 10 levels involved in the qualification – 1 is the least complex and 10 the most. Levels depend on the complexity of learning. They do not equate to years spent learning, but reflect the content of the qualification”.

LEVEL	PROCESS	LEARNING DEMAND	RESPONSIBILITY
1	<p><b>Carry out processes that:</b></p> <ul style="list-style-type: none"> <li>• are limited in range</li> <li>• are repetitive and familiar</li> <li>• are employed within closely defined contexts</li> </ul>	<p><b>Employing:</b></p> <ul style="list-style-type: none"> <li>• recall</li> <li>• a narrow range of knowledge and cognitive skills</li> <li>• no generation of new ideas</li> </ul>	<p><b>Applied:</b></p> <ul style="list-style-type: none"> <li>• in directed activity</li> <li>• under close supervision</li> <li>• with no responsibility for the work or learning of others</li> </ul>
2	<p><b>Carry out processes that:</b></p> <ul style="list-style-type: none"> <li>• are moderate in range</li> <li>• are established and familiar</li> <li>• offer a clear choice of routine responses</li> </ul>	<p><b>Employing:</b></p> <ul style="list-style-type: none"> <li>• basic operational knowledge</li> <li>• readily available information</li> <li>• known solutions to familiar problems</li> <li>• little generation of new ideas</li> </ul>	<p><b>Applied:</b></p> <ul style="list-style-type: none"> <li>• in directed activity</li> <li>• under general supervision and quality control</li> <li>• with some responsibility for quantity and quality</li> <li>• with possible responsibility for guiding others</li> </ul>
3	<p><b>Carry out processes that:</b></p> <ul style="list-style-type: none"> <li>• require a range of well developed skills</li> <li>• offer a significant choice of procedures</li> <li>• are employed within a range of familiar contexts.</li> <li>• in directed activity with some autonomy</li> </ul>	<p><b>Employing:</b></p> <ul style="list-style-type: none"> <li>• some relevant theoretical knowledge</li> <li>• interpretation of available information</li> <li>• discretion and judgment</li> <li>• a range of known responses to familiar problems</li> </ul>	<p><b>Applied:</b></p> <ul style="list-style-type: none"> <li>• under general supervision and quality checking</li> <li>• with significant responsibility for the quantity and quality of output</li> <li>• with possible responsibility for the output of others</li> </ul>
4	<p><b>Carry out processes that:</b></p> <ul style="list-style-type: none"> <li>• require a wide range of technical or scholastic skills</li> <li>• offer a considerable choice of procedures</li> </ul>	<p><b>Employing:</b></p> <ul style="list-style-type: none"> <li>• a broad knowledge base incorporating some theoretical concepts</li> <li>• analytical interpretation of</li> </ul>	<p><b>Applied:</b></p> <ul style="list-style-type: none"> <li>• with complete responsibility for quantity and quality of output</li> <li>• with possible responsibility for</li> </ul>
LEVEL	PROCESS	LEARNING DEMAND	RESPONSIBILITY
	<ul style="list-style-type: none"> <li>• are employed in a variety of familiar and unfamiliar contexts</li> </ul>	<ul style="list-style-type: none"> <li>information</li> <li>• informed judgment</li> </ul>	the quantity and quality of the output of others



	<ul style="list-style-type: none"> <li>• in self-directed activity</li> <li>• under broad guidance and evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• a range of sometimes innovative responses to concrete but often unfamiliar problems</li> </ul>	
5	<p><i>Carry out processes that:</i></p> <ul style="list-style-type: none"> <li>• require a wide range of specialized technical or scholastic skills</li> <li>• involve a wide choice of standard and nonstandard procedures</li> <li>• are employed in a variety of routine and non-routine contexts</li> </ul>	<p><i>Employing:</i></p> <ul style="list-style-type: none"> <li>• a broad knowledge base with substantial depth in some areas</li> <li>• analytical interpretation of a wide range of data</li> <li>• the determination of appropriate methods and procedures in response to a range of concrete problems with some theoretical elements</li> </ul>	<p><i>Applied:</i></p> <ul style="list-style-type: none"> <li>• in self-directed and sometimes directive activity</li> <li>• within broad general guidelines or functions</li> <li>• with full responsibility for the nature, quantity and quality of outcomes</li> <li>• with possible responsibility for the achievement of group outcome.</li> </ul>
6	<p><i>Carry out processes that:</i></p> <ul style="list-style-type: none"> <li>• require a command of wide-ranging highly specialized technical or scholastic skills</li> <li>• involve a wide choice of standard and nonstandard procedures, often in non-standard combinations</li> <li>• are employed in highly variable routine and non routine contexts</li> </ul>	<p><i>Employing:</i></p> <ul style="list-style-type: none"> <li>• specialized knowledge with depth in more than one area</li> <li>• the analysis, reformatting and evaluation of a wide range of information</li> <li>• the formulation of appropriate responses to resolve both concrete and abstract problems</li> </ul>	<p><i>Applied:</i></p> <ul style="list-style-type: none"> <li>• in managing processes</li> <li>• within broad parameters for defined activities</li> <li>• with complete accountability for determining and achieving personal and/or group outcomes</li> </ul>
7	<p><i>Carry out processes that:</i></p> <ul style="list-style-type: none"> <li>• require a command of highly specialized technical or scholastic and basic research skills across a major discipline</li> <li>• involve the full range of procedures in a major discipline</li> <li>• are applied in complex, variable and specialized contexts</li> </ul>	<p><i>Requiring:</i></p> <ul style="list-style-type: none"> <li>• knowledge of a major discipline with areas of specialization in depth</li> <li>• the analysis, transformation and evaluation of abstract data and concepts</li> <li>• the creation of appropriate responses to resolve given or contextual abstract problems</li> </ul>	<p><i>Applied:</i></p> <ul style="list-style-type: none"> <li>• in planning, resourcing and managing processes</li> <li>• within broad parameters and functions</li> <li>• with complete accountability for determining, achieving and evaluating personal and/or group outcomes</li> </ul>
8	<p><i>Involves skills and knowledge that enable a learner to:</i></p> <ul style="list-style-type: none"> <li>• provide a systematic and coherent account of the key principles of a subject area; and</li> <li>• undertake self-directed study, research and scholarship in a subject area, demonstrating intellectual independence, analytic rigour and sound communication</li> </ul>		
9	<p><i>Involves knowledge and skills that enable a learner to:</i></p> <ul style="list-style-type: none"> <li>• demonstrate mastery of a subject area; and</li> <li>• plan and carry out - to internationally recognized standards - an original scholarship or research</li> </ul>		



LEVEL	PROCESS	LEARNING DEMAND	RESPONSIBILITY
	Project.		
	<ul style="list-style-type: none"> <li>The completion of a substantial research paper, dissertation or in some cases a series of papers.</li> </ul>		
10	<p><i>Involves knowledge and skills that enable a learner to:</i></p> <ul style="list-style-type: none"> <li>Provide an original contribution to knowledge through research or scholarship, as judged by independent experts, applying international standards.</li> </ul>		

#### 1.4 Levels of Competency in Pakistan

In Pakistan, the TVET sector has been using a three-level occupational skill standard for technical workers that is known simply as G-III, G-II, and G-I as the apex level. Developed by the National Training Board in the 1980s, the three-level occupational skills standard for Pakistan is described as follows:

- The Basic Level (Grade-III)

“The Basic level relates to the level of knowledge and skills expected from craftsmen who have undergone training in this trade conducted by a training institution or for those who already have to their credit at least four (4) years of recognized on the job experience”.

- The Intermediate Level (G-II)

“The Intermediate level falls approximately mid-way between the advance level and the basic level”.

- The Advance Level (G-I)

“The Advance level is based on the highest level of knowledge and skills expected from a craftsman in this trade”.

Analyzing the description of this occupational skill standard, it can be noted that the bases of the skill standard (G-III) are the “knowledge and skills expected from craftsmen” and the training provided; or experience in industry for at least four (4) years. The two more advanced levels are described in even more generic terms. In other words, there is a very critical need to review these skill standards in the light of the on-going modernization of the country, and in concert with the on-going restructuring of TVET System. There is a critical need for the skill standards to be operationally defined in terms of competencies that the workers at various levels should be able to perform or demonstrate.



## B. Developing a Competency Standard

### 1. Competency: Types and Elements

**Competency.** As defined earlier, competency is a cluster of related skills, knowledge and attitudes that form part of one's occupation or trade that correlates with and measured by the performance standards set by industry, and that can be developed and improved through training and development. Competencies are tasks performed by workers in industry or world of work in a particular job or occupation. The competency of a person involves his possession and the ability to apply knowledge, skills and attitudes in performing work according to the standard set by industry.

#### 1.1 Types of Competency

Competency experts observe that competencies can be classified into three (3) types, such as basic, common, and core.

**Basic competencies** are related skills, knowledge and attitudes that are simple and fundamental in most jobs, occupation or responsibility in the same level of qualifications. For instance, all G-II craftsmen are expected to “perform simple calculation” or to “prepare all the materials needed for a job”.

Similarly, a G-I worker is expected to “lead a team” or “prepare the scope of work” responsibilities.

**Common competencies** are clusters of related skills, knowledge and attitudes that are similarly performed across a cluster of jobs in a particular trade or occupation and in the same level of qualifications that is expected of the individual in the world of work. While a basic competency is similarly required in most jobs, a common competency is usually restricted in one cluster of occupations. For instance, common competencies in measurements in the area of construction are essentially different from that of mechanical trades, or electronics.

**Core competencies** are the major component of skills, knowledge and attitudes that are mostly applicable for a particular trade, occupation or technology. These are competencies that are applicable only on a particular trade, occupation or technology; or allied trades that are utilizing similar materials.

For CBTVET purposes, the competencies required for a particular technology or occupation and level of qualification are identified and classified into what is termed as “**unit of competencies**”. For each technology, trade or occupation, the unit of competencies are identified and listed under basic, common, and core competencies and each are further analyzed for their major “**elements**”.



## 1.2 The Elements of Competency

The elements of competency are further analyzed to determine the “**performance criteria**” which are useful in the assessment of learning outcomes. The four elements of a competency are as follows:

- **Task skill.** The element of competency that requires performance of the task(s) to the level of standard as prescribed in the unit of competency and expected on the job. In assessing the learning outcome, there is a need to gather evidence that the trainee or student can perform the specific as well as the whole task;
- **Task management skill.** This element captures the skills needed to plan and integrate a number of different tasks to achieve a complete work output. The trainee or student should provide evidence that he can work efficiently to meet deadlines, handle a interrelated tasks, and move on smoothly to complete the whole task;
- **Contingency management skill.** The element of competency that deals with irregularities and breakdowns on the job. The trainee or student must show evidence of managing with contingencies like: breakdowns, irregularities, imperfections, and other unexpected situations;
- **Job environment skills.** The element that deals with the challenges, responsibilities and expectations of the work environment. The trainee or student must demonstrate the ability to work with others and adapt to various situations at the workplace.



# Competency-Based TVET Curriculum for an Industrial Electrician Level 1/ G-III (Semi-Skilled Worker)

<b>Course Title;</b>	<b>Industrial Electrician</b>
<b>Qualification Level:</b>	<b>Level 1/ G-III (Basic Level)</b>
<b>Course Duration:</b>	<b>One School Year</b> <b>(32 Weeks or 224 Days x 5 hours/day = 1120 Hours)<sup>1</sup></b>

## COURSE DESCRIPTION

This course, Industrial Electrician, is a basic level program of instruction that is designed to prepare a Semi-Skilled Electrician needed in various electrical industries including building construction and other civil works. It covers general and specific competencies such as, identifying and preparing electrical supplies; identifying using different type of circuits, drawing and reading wiring circuits, selecting appropriate wiring components, installing surface and conduit wiring installations, installing and reading various electric meters, installing energy meters and installation boards, repairing and servicing household appliances, troubleshooting and repairing house wiring, installing power supply and different types of protection, and installing and operating motors. It also includes workshop rules and regulations, mensuration, using and servicing electrical tools, safety rules and house keeping.

## COURSE OUTCOMES

Upon completion of the course, the students or trainees must be able to:

1. Understand the basic concepts and principles of electricity
2. Observe and practice safety rules and regulations.
3. Identify and prepare electrical supplies and materials
4. Use and service electrical tools
5. Draw and read wiring circuits



6. Select appropriate wiring components
7. Install surface and conduit wiring.
8. Repair wiring installations.
9. Install and read various electric meters,
10. Install energy meters and installation boards.
11. Repair and service household appliances.
12. Install power supply and different types of protection devices
13. Perform workshop keeping

## ENTRY REQUIREMENTS

1. Matriculation Class 10 (Preferably Science)
2. 16 years old and above
3. Good moral character
4. Can communicate efficiently in Urdu

## COURSE STRUCTURE (CONTENTS)

The following course structure is composed of competencies that are transformed into modules of instruction for training delivery. The module contents are also listed from which module developers may refer the same or add other than that which will enrich the content that is consistent with the competency standard.

Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
<b>BASIC COMPETENCIES</b>			
1. Participate in work place communication	1,1 Participating in workplace communication	1.1.1 Obtain and convey workplace information 1.1.2 Participate in workplace meeting and discussion 1.1.3 Complete work related documents	15



Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
<b>BASIC COMPETENCIES</b>			
2. Work in a team environment	2,1 Working in team environment	2.1.1 Identify and describe team role and responsibility 2.1.2 Describe role and work as a Team Leader member 2.1.3 Work as Team Leader 2.1.4 Work as Team member 2.1.5 Effective and appropriate forms of communication 2.1.6 Protocols in reporting and using standard operating procedures	20
3. Practice occupational health and safety	3.1 Practicing occupational health and safety	3.1.1 Safety precautions and practices 3.1.2 Work according to safety rules 3.1.3 Work according to WAPDA and General electrical rules 3.1.4 Identify risks and hazards 3.1.5 Apply basic first aid including artificial respiration in case of electrical shock	30
<b>COMMON COMPETENCIES</b>			
1. Practice general workshop rules and regulations	1.1. Practicing general workshop rules and regulations	1.1.1 Memorize workshop rules and regulations 1.1.2 List correct sequence of operation In the workshop and on- the- job 1.1.3. List tools required for the job 1.1.4 Working to safety regulations 1.1.5 Elementary first aid in electrical shops	30
2. Identify, use and service tools used by Electricians	2.1. Identifying, using and servicing measuring tools	2.1.1 Basic units of measurements 2.1.2 Identify and use measuring tools 2.1.3 Inside and outside calipers 2.1.4 Vernier caliper, and vises 2.1.5 Micrometers and gauges 2.1.6 Drilling, filing, and soldering tools 2.1.7 Digital measuring instruments 2.1.8 Care and maintenance of measuring tools	25
	2.2 Identifying, using and servicing common hand tools	2.2.1 Different kinds of metal cutting tools used by electricians 2.2.2 Carpentry hand tools 2.2.3 Pliers and different types of wrenches 2.2.4 Knives and other cutting tools used in	25



Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
		electrical works 2.2.5 Plumbing tools	
<b>COMMON COMPETENCIES</b>			
		2.2.6 Safety goggles and other protective devices 2.2.7 Using hand tools properly and safely 2.2.8 Care and maintenance of hand tools	
	2.3 Identifying, using and servicing Electrician's hand tools	2.3.1 Identifying and using different types of screw drivers 2.3.2 Identifying and using different types of pliers and wrenches 2.3.3 Using knives, and other insulation removers. 2.3.4 Using and servicing line tester 2-Pole tester 2.3.5 Using and servicing hand drill and electric drill machines 2.3.6 Using and servicing different kinds of soldering iron, blow torch and safety goggles 2.3.7 Using bradawl and mandrel	<b>25</b>
3. Draw circuit diagram of house wiring including alarm, indicator lights, intercom, telephone, and TV Cables.	3.1. Drawing and interpreting circuit diagram of house wiring including alarm, indicator lights, intercom, telephone, and TV cables.	3.1.1 Common electrical symbols used for wiring diagrams and circuits 3.1.2 Basic concept of conductors, resistors, inductor and capacitor. 3.1.3 Drawing electric diagram of lamp controlled by single pole switch 3.1.4 Drawing of combination circuit 3.1.5 Drawing of series and parallel circuits, and power circuit 3.1.6 Drawing of stair case circuit, bell circuit, and alarm circuit 3.1.7 Read simple drawing and sketches of simple layouts	<b>30</b>
4. Determine and prepare standard domestic accessories and components	4.1 Determining and preparing standard domestic accessories and	4.1.1 Open and piano type single pole switches 4.1.2 Intermediate, impulse, clock and time switches 4.1.3 Lamp holders, ceiling rose, and sockets 4.1.4 Determining and preparing needed	<b>15</b>



Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
	components	accessories and components for conduit wiring job 4.1.5 Identify and prepare needed chokes, tube holder, starter for tubes and main switches	
CORE COMPETENCIES			
1. Understand basic electrical concepts and principles	1,1 Understanding basic electrical concepts and principles	1.1.1 Basic concepts of electricity and its sources of generation 1.1.2 What is current, voltage and resistance, and their relationships 1.1.3 Direct and alternating current (AC) 1.1.4 Ohms Law and its relationship with voltage, current, and resistance 1.1.4 Concepts and types of circuits 1.1.5 Magnetism and electro-magnetism 1.1.6 Concepts of generation, transmission, distribution, and consumption, of electrical power 1.1.7 Principles and types of transformers	15
2. Select and measure conductors used in power circuit and domestic installation	2.1 Understanding conductors and insulators	2.1.1 Concept conductors used in wiring 2.1.2 Types and sizes of conductors 2.1.3 Identifying and calculating appropriate size of conductor needed 2.1.4 Concept of electrical insulators 2.1.5 Different types and application of different insulators	10
	2.2 Selecting and measuring wires used in power circuit and domestic installation	2.2.1 Selecting conductors used in various wiring installations. 2.2.2 Identifying and using standard wire gauge 2.2.3 Identifying flexible and stranded wires 2.2.4 Identifying cables and PVC cables 2.2.5 Calculation of wire size for the job	20
3.. Prepare and install metal/PVC conduit pipes	3.1 Cutting, threads on metal conduit pipe	3.1.1 Identifying and using pipe vices 3.1.2 Cutting the pipe to proper size 3.1.3 Identifying and using pipe dies 3.1.4 Chamfering and deburing 3.1.5 Checking and testing the job	15
	3.2 Bending metal conduit pipe	3.2.1 Identifying and using pipe bending machines 3.2.2 Marking the job according to drawing 3.2.3 Cutting the pipe to size	15



		3.2.4 Deburring the pipe 3.2.5 Checking and testing the job	
	3.3 Cutting and joining PVC pipes	3.3.1 Marking according to drawing 3.3.2 Clamping the pipe	30
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
		3.3.3. Cutting the pipe 3.3.4 Deburring the pipe 3.3.5. Filling of sand and heating PVC pipe 3.3.6 Bending the pipe as per drawing 3.3.7 Expanding the pipe ends and making PVC pipe socket 3.3.8 Identifying and using PVC compound 3.3.9 Jointing the pipes 3.3.10 Checking the job	
4. Understand application of mathematics in electrical works	4.1 Understanding applied mathematics in electricity	4.1.1 Review of basic applied mathematics 4.1.2 The importance and application of applied mathematics in electrical works 4.1.3 3 Ohms Law and its application in measuring voltage, current and resistance	25
	4.2 Applying math in electrical installations	4.2.1 Using Ohms Law in calculating voltage, current, and resistance or voltage drop 4.2.2. Calculating sizes and quantify of conducts to be used in simple electrical installation 4.2.3 Calculating and measuring power consumption 4.2.4 Quantity survey of electrical materials needed house wiring installation	25
5 Select and measure wires used in power circuit and domestic installation	5.1.. Selecting and measuring conductors used in power circuit and domestic installation	5.1.1 Selecting conductors used in various wiring installations 5.1.2 Identifying and using standard wire gauge 5.1.3 Identifying flexible and stranded wires 5.1.4 Identifying cables and PVC cables 5.1.5 Calculation of wire size for the job 5.1.6 Calculation of the amount of wires required for the job	15
6. Identify and make different types of	6.1 Identifying and making "married", "T",	6.1.1 Different types of joints and their uses in electric wiring 6.1.2 Concept of conductors in wiring, their	20



joints/splices	and “cross: joint/splices	sizes and insulators 6.1.3 Marking and stripping the wire 6.1.4 Splicing the strands of wire 6.1.5 Binding the spliced wire 6.1.6 Checking the splice/joint 6.1.7 Soldering the joint4 6.1.8 Wrapping the splice with insulation tape	
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
	6.2 Identifying and making Britannica Joint/splice, Western union, cable logs, and other modern splicing technology,	6.2.1 Reading and interpreting drawing of circuit 6.2.2 Marking according to drawing\ 6.2.3 Installing circuit components 6.2.4 Laying of wire 6.2.5 Stripping wire and making electric connection 6.2.6 Soldering the joint 6.2.7 Wrapping the splice with insulation tape	20
7. Install different type of circuits according to function	7.1 Installing a socket and lamp circuits	7.1.1 Reading and interpreting drawing o circuit 7.1.2 Marking according to drawing\ 7.1.3 Installing circuit components 7.1.4 Laying of wire 7.1.5 Stripping wire and making electric connection 7.1.6 Inspecting the newly installed circuit 7.1.7 Checking if the circuit will function	20
	7.2 Installing a single pole switch circuit	7.2.1 Reading and interpreting drawing of circuit 7.2.2 Marking according to drawing 7.2.3 Installing circuit components 7.2.4 Laying of wires 7.2.5. Stripping of wire and making connections 7.2.6 Inspecting the newly installed circuit 7.2.7 Checking if the circuit will function.	20
	7.3 Installing two lamps switch circuit, alarm and bell circuits as well as series and parallel circuits	7.3.1 Reading and interpreting drawing of circuit 7.3.2 Marking according to drawing 7.3.3 Installing circuit components 7.3.4 Laying of wires 7.3.5. Stripping of wire and making connections 7.3.6 Inspecting the newly installed circuit 7.3.7 Checking if the circuit will function.	20
	7.4 Installing two-	7.4.1 Identifying the two-way switch	20



	way switch circuit	7.4.2 Marking according to drawing 7.4.3 Installing circuit components 7.4.4 Laying of wires 7.4.5. Stripping of wire and making connections 7.4.6 Inspecting the newly installed circuit 7.4.7 Checking if the circuit will function	
	7.5 Installing intermediate switch circuit	7.5.1 Identifying the intermediate switch 7.5.2 Marking according to drawing 7.5.3 Installing circuit components	20
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
		7.5.4 Laying of wires 7.5.5. Stripping of wire and making connections 7.5.6 Inspecting the newly installed circuit 7.5.7 Checking if the circuit will function	
	7.6 Installing impulse switch circuit	7.6.1 Identifying the impulse switch 7.6.2 Marking according to drawing 7.6.3 Installing circuit components 7.6.4 Laying of wires 7.6.5. Stripping of wire and making connections 7.6.6 Inspecting the newly installed circuit 7.6.7 Checking if the circuit will function	20
	7.7 Installing time switch circuit	7.7.1 Identifying the time switch 7.7.2 Marking according to drawing 7.7.3 Installing circuit components 7.7.4 Laying of wires 7.7.5. Stripping of wire and making connections 7.7.6 Inspecting the newly installed circuit 7.7.7 Checking if the circuit will function	20
	7.8 Installing the clock switch circuit	7.8.1 Identifying the clock switch 7.8.2 Marking according to drawing 7.8.3 Installing circuit components 7.8.4 Laying of wires 7.8.5. Stripping of wire and making c connections 7.8.6 Inspecting the newly installed circuit 7.8.7 Checking if the circuit will function	20
	7.9 Installing the fluorescent lamp circuit	7.9.1 Identifying the fluorescent switch 7.9.2 Marking according to drawing 7.9.3 Installing circuit components 7.9.4 Laying of wires	20



		7.9.5. Stripping of wire and making connections 7.9.6 Inspecting the newly installed circuit 7.9.7 Checking if the circuit will function	
8. Perform different polarity tests in wiring	8.1. Perform different polarity tests in wiring	8.1.1 Identifying and using test lamp 8.1.2 Identifying and using line tester 8.1.3 Identifying and using voltmeter 8.1.4 Identifying and using Ohm Meter 8.1.5 Identifying and using Multi-tester	15
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
9. Install distribution panel and main switch	9.1 Installing distribution panel and main switch for single phase wiring and meter for single phase wiring and meter	9.1.1 Read and interpret drawing 9.1.2 Marking according to drawing on the wall 9.1.3 Making holes with hand drill machine 9.1.4 Making holes with chisel 9.1.5 Fixing of gatties/ rawl plug on the wall 9.1.6 Fixing the batten on the wall by wooden 9.1.7 Fixing the clip on the batten by nails 9.1.8 Laying or dressing the wire on the batten 9.1.9 Cutting and stripping the wire ends	20
10. Install surface and concealed wiring in domestic and industrial type installation	10.1 Installing surface wiring on building with existing wiring	10.1.1 Reading and interpreting drawing 10.2.2. Marking and making holes with hand drill 10.2.3 Fixing gatties, clips and batten on the wall 10.2.4 Laying the wires 10.2.5 Cutting and stripping the wire ends 10.2.6 Fixing the components 10.2.7 Making the connection with proper joint 10.2.8 Checking the surface wiring installation	25
	10.2 Installing concealed wiring	10.2.1 Reading and interpreting drawing 10.2.2 Preparing casing, porcelain cleats, round block and boxes 10.2.3 Marking and making holes with hand drill 10.2.4 Fixing gatties, casing and round blocks on the wall 10.2.5 Laying of pipes and wires 10.2.6 Making connection in switchboard and accessories 10.2.7 Checking the concealed wiring	30



		installation	
11. Install conduit wiring in domestic and industrial type installation	11.1 Installing conduit wiring	11.1.1 Reading and interpreting drawing 11.1.2 Preparing junction boxes, pulling wire tool 11.1.3 Marking and making channel on the wall 11.1.4 Laying of pipe in the channel 11.1.5 Fixing the pipe with "L" type nails 11.1.6 Making PVC bends and joints 11.1.7 Sealing the pipe joints in the conduit 11.1.8 Laying or drawing wires on the conduit 11.1.9 Making the connections 11.1.10 Checking the conduit wiring	30
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
12. Assemble wire internally in light fittings	12.1 Assembling wire internally in light fittings	12.1.1 Stripping the wire ends 12.1.2 Making the connection with terminals 12.1.3 Testing continuity and polarity of circuit 12.1.4 Testing insulation leakage in the wiring 12.1.5 Checking and testing holders, chokes and starter 12.1.6 Making connection of fluorescent tube 12.1.7 Checking and testing table lamp 12.1.8 Checking and testing lamp holder 12.1.9 Checking and testing of switch	20
13. Install KWH meters and distribution board for domestic and industrial wiring	13.1. Installing KWH meter and distribution board for domestic wiring	13.1.1 Identification and use of KWH/energy and the main switch 13.1.2 Marking on the board as per drawing 13.1.3 Fixing protection switch 13.1.4 Fixing of fuses 13.1.5 Fixing KWH meter 13.1.6 Making the connection 13.1.7 Checking and testing	20
14. Troubleshoot faults in single phase house wiring	14.1 Troubleshooting faults in single phase house wiring	14.1.1 Checking of fuses 14.1.2 Replacing of fuses 14.1.3 Checking and replacing of switches 14.1.4 Checking and replacing of lamps 14.1.5 Checking and replacing of holders 14.1.6 Checking of continuity 14.1.7 Replacing of burnt out wires 14.1.8 Checking of polarity	25
15. Install power	15.1 Installing	15.1.1 Installing main board on the wall	30



supply system , three phase, four wire system	power supply system, three phase, four wire system	15.1.2 Installing three phase energy meter 15.1.3 Installing three phase main switch 15.1.4 Fixing the main distribution box 15.1.5 Identification and fixing of bus bars 15.1.6 Installing sub main switch for power circuit 15.1.7 Installing sub main switch for light circuit 15.1.8 Installing D.F. B for light circuit 15.1.9 Correcting wire from energy meter to main switch 15.1.10 Connecting bus bar to main switch 15.1.11 Connecting bus bar to sub main switch 15.1.12 Testing the power supply system	
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
16. Perform work on different types of protection devices and earthing system	16.1 Performing work on different types of protection devices and	16.1.1 Different types of protection devices 16.1.2. Selecting the protection devices required for the work 16.1.3 Identifying and using fuses 16.1.4 Identifying and using overload relay procedures earthing system procedures 16.1.5 Identifying and using circuit breaker 16.1.6 Identifying and using bi-metals over load; load protector 16.1.7 Fixing earth wire to main board and in power plugs circuits	30
17. Check the load on low voltage lines using tong tester	17.1 Checking the load on low voltage lines using tong tester	17.1.1 Identifying and using tong tester 17.1.2 Energize the circuit 17.1.3 Reading the amperes on tong tester 17.1.4 Checking of different loads by tong tester 17.1.5 Recommending appropriate remedial action	10
18. Select and use. different types of transformers	18.1 Selecting and using different types of transformers	18.1.1. Transformer: what it is 18.1.2 Basic principles and construction of transformers 18.1.3 Household and industrial uses of transformers 18.1.4 Power transformers 18.1.5 Care and maintenance of transformers	20



19. Identify, check and service or change batteries	19.1 Identifying, checking and servicing or changing batteries	19.1.1 Dry cell and batteries 19.1.2 Different types and uses of batteries 19.1.3 Connecting cells and series/parallel 19.1.4 Charging batteries 19.1.5 Safety measures in handling storage batteries	20
20. Understand basic principles and workings of generators	20.1 Understanding basic principles and workings of generators	20.1.1 Basic concept of generators 20.1.2 Different types of generators 20.1.3 Basic principles on how generator works 20.1.4 The parts and functions of D.C. and A.C generators	20
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
22. Repair household appliances	22.1 Repairing Electric Iron	22.1.1 Checking electric iron for open wire 22.1.2 Checking and repairing open wire, or lose connection 22.1.3 Dismantling of iron and checking or testing heating element 22.1.4 Checking or fixing heating element 22.1.5 Checking of thermostat and repair or replace if necessary 22.1.6 Assembling and testing.	20
	22.2 Repairing Electric Fan	22.2.1 Checking and replacing burnt out cable 22.2.3 Checking capacitor 22.2.4 Checking motor winding for open circuit 22.2.5 Dismantling electric fan for servicing 22.2.6 Oiling and greasing bearings 22.2.7 Replacing bearings or brushes 22.2.8 Assembling and testing fan	20
	22.3 Repairing Toaster	22.3.1 Checking for open circuit 22.3.2 Replacing burnt out cable 22.3.3 Dismantling of toaster and checking and testing of heating element	20
		22.3.4 Removing or fixing heater elements 22.3.5 Checking of thermostat	



		22.3.6 Tracing and removing fault 22.3.7 Assembling toaster 22.3.8 Checking and testing of toaster	
	22.4 Repairing Fan Heater	22.4.1 Checking for open circuit 22.4.2 Replacing burnt out cable 22.4.3 Dismantling fan heater 22.4.4 Checking of control switch 22.4.5 Removing and fixing or replacing heater element 22.4.6 Checking of fan 22.4.7 Oiling or greasing of fan 22.4.8 Assembling of fan heater 22.4.9 Checking and testing of fan heater	20
Units of Competency	Module Title (Elements of Competency)	Module Contents	No Hrs.2
CORE COMPETENCIES			
	22.5 Repairing a Table Lamp	22.5.1 Checking and repairing loose wiring 22.5.2 Checking of 2-pin shoe 22.5.3 Checking and repair switch 22.5.4 Testing of table lamp	15
	22.6 Repairing Electric Mixer	22.6.1 Identifying and using mixer 22.6.2 Checking of 2 pin shoe 22.6.3. Checking and repairing of wire, loose connection 22.6.4 Dismantling of mixer 22.6.5 Removing and fixing carbon brushes 22.6.7 Checking of wiring for open circuit 22.6.8 Oiling and greasing of brushes 22.6.9 Assembling mixer 22.6.10 Checking and testing mixer	20
23. Solder, cramp and braze electrical cable lugs	23.1 Soldering, cramping, and brazing cable lugs	23.1.1 Identifying and using lug presser 23.1.2 Identifying and using soldering iron 23.1.3 Identifying and using soldering wire 23.1.4 Identifying and using soldering paste/flux 23.1.5 Removing insulation 23.1.6 Tinning of wire ends 23.1.7 Cleaning of cable lug 23.1.8 Cleaning of cable lug	20



		23.1.9 Soldering of cable lug	
--	--	-------------------------------	--

<sup>2</sup> No. of Hours is the estimated time spent to teach the module (competency), allow students or trainees to practice or master it, and to assess the learning outcomes.

## COMPETENCY ANALYSIS

Competency analysis summarizes the number of Units of Competency and the total number of modules of instruction that composes the coverage of the course

Units of Competency	Number of Modules	Total
<b>BASIC COMPETENCIES</b>		<b>3</b>
1..Participate in workplace communication	1	
2. Work in a Team environment	1	
3. Practice occupational health and safety	1	
<b>COMMON COMPETENCIES</b>		<b>5</b>
1. Practice general workshop rules and regulations	1	
2. Identify, service and used by Electricians	3	
3. Draw circuit diagram of house wiring including alarm and indicator lights	1	
4. Determine and prepare standard domestic accessories and components	1	
<b>CORE COMPETENCIES</b>		<b>43</b>
1. Understand basic electrical concepts and principles	1	
2.. Select and measure conductors used in power circuit and domestic installation	1	
3 Prepare and install metal/PVC conduits	3	
4 Understand application of mathematics in electrical works	2	
5. Select and measure wires used in power circuit and	1	



domestic installations		
6. Identify and make different types of joints/splices.	2	
7. Install different types of circuits according to function	9	
8. Perform different polarity tests in wiring	1	
9. Install distribution panel and main switch for single phase wiring	1	
10 Install surface and concealed wiring in domestic and industrial type installation.	2	
11 Install conduit wiring in domestic and industrial installation type installation	1	
12 Assemble wire internally, trace faults and replace defective fitting	1	
13 Install KWH meter and distribution board for domestic and industrial wiring Install KWH meter and distribution board for domestic and industrial wiring	1	
<b>Units of Competency</b>	<b>Number of Modules</b>	<b>Total</b>
14 Troubleshoot faults in single phase wiring	1	
15 Install power supply system, three phase, four wire system	1	
16 Perform work on different types of protection devices	1	
17 Check the load on low voltage lines using tong tester	1	
18 Select and use. different types of transformers	1	
19.. Identify, check and service or change batteries	1	
20. Understand the basic principles and workings of generators	1	
21. Install and operate motors with drum switch	3	
22. Repair household appliances	6	
23. Solder, cramp and braze electrical cable lugs	1	
<b>TOTAL</b>		<b>51</b>



## METHODOLOGY OF COURSE DELIVERY

**1. Modular approach.** The course contains a series of modules of instruction that requires a combination of student-focused and teacher-centered approaches, and that culminates with assessment of learning outcomes.

**2. Demonstration method.** New skills lessons must be demonstrated to show the right way or procedure of doing things that will be followed by repeated practice to develop mastery of the skills.

**3. Lecture method.** Lecture method combined with questioning and discussion will be used in teaching the theories and principles or the technical knowledge portion of each module.

**4. Discussion method.** The lecture method should be extensively used to develop the ability to articulate one's ideas and to explain theories and principles clearly.

**5. Project method.** It will be used to develop mastery of skills by giving assignment to students to make a useful project that will require the execution of practical lessons and problem solving.

**6. Assignment method.** This will be used to give opportunity for students to carry out additional study the Learning Resource Center, and through on-line search.

**7. On-site practice.** Whenever possible students will be assigned to work on-site to develop competency on domestic or industrial wiring installation.

**8. Industry visit.** Industry visit will be used also to give students the opportunity to see and have a feel of the actual work environment.

## ASSESSMENT METHOD

**1. Written examination.** A written test will be administered at the end of every module and at the end of the course, to evaluate learning outcomes on the theoretical aspects of the course.

**2. Demonstration of practical skills.** This assessment method will be used to determine whether or not the student can perform the competencies according to industry standard. This will be used also to check if remedial or additional inputs are required for the student to develop a mastery of the lesson taught.

**3. Direct observation.** Observation is an important approach in assessing the attitude of the students toward work, observance of safety rules and regulations, and how they interact and relate with other students and teachers.



**4. Interview.** Interview may be also used to verify their knowledge of principles and theories; or to check if they could explain the working principles of some job processes or equipment or machines.

## QUALIFICATION OF INSTRUCTORS

- Bachelor's degree in Electrical Engineering or Bachelor of Technology in Electrical
- 3 Years of TVET teaching experience with G-1 Certificate of Competency

## TRAINING RESOURCES

### A. List of Hand Tools (for a Class of 20)

QTY	UNIT	NAME/DESCRIPTION
20	Pcs.	Pliers, Electrician Insulated 8"
20	Pcs	Pliers, Long Nose Insulated, 8"
20	Pcs.	Pliers, Diagonal Cutting, Insulated 8"
20	Pcs	Pliers, Multigrips/ slip joint 8"
20	Pcs.	Pliers, End cutters *
20	Pcs	Screw Driver Assorted
20	Pcs.	Wire Scrapper 8"
8	Pcs	Cutters, PVC Conduit 8"
8	Pcs.	Tape Measure, Pull-push type, 3 meters
16	Pcs	Hammer, Claw
16	Pcs.	Hammer, Ball Pen
20	Pcs	Electrician Knife
8	Pcs.	Hacksaw 300 mm
5	Pcs	Drill, Electric 12 mm
5	Pcs.	Drill, Battery 8 mm
5	Pcs	Drill, Hand
16	Pcs.	Ruler, Steel 300 mm
5	Pcs	Bender, Conduit Hickey 20 mm
5	Pcs.	Bender, Conduit Hickey 25 mm
5	Pcs	Gun, Heat for PVC 2000 Watts
5	Sets	Drill Twist Set, 12 mm
5	Sets	Drill, Masonry
5	Pcs.	Reamer, Pipe ½ to 2" dia



5	Pcs	Saw. Cross Cut 20"
5	Pcs.	Tin Snips, Right 12"
5	Pcs	Tin Snips, Left 12"
5	Pcs.	Tin Snips, Straight
5	Pcs	File, Large
5	Pcs.	File, Small
5	Pcs	Chisel, Wood, 1/4", 1/2", 1", 1-1/2"
5	Pcs.	Chisel, Cold, 1/4", 1/2", 3/4" and 1"
5	Pcs	Blind Rivet Gun, Hand Riveter, 10"
5	Pcs.	Bench Vise & Jaw Holders, 75 mm
5	Sets	Drift Punch Set
5	Sets	Spin Tight Set
8	Sets	Soldering Iron
8	Pcs	Magnifier Light
8	Pcs	Solder Dispenser
8	Pcs	Pipe Vise with Tripod

### B. List of Testing Instruments

QTY	UNIT	NAME/DESCRIPTION
20	Sets	Multi-meter VOM Analog
5	Sets	Megger, (Insulation Tester) Hand Crank
5	Sets	Wattmeter 1-Phase AC – DC 110-220 Volts, 1000 Watt max
5	Sets	Wattmeter 3-phase AC –DC 110 -220 Volts 1000 Watt max
5	Pcs	Voltmeter AC – DC 0 –1000 V
5	Pcs	Ammeter AC – DC, 0 -30 Amp
5	Pcs	Frequency Meter, Vibrating type
20	Pcs	Neon Lamp Tester
5	Pcs	Cell Tester
5	Pcs	Hydrometer
10	Pcs	Kilowatt-hour Meter, 1-Phase

### C. List of Equipment

QTY	UNIT	NAME/DESCRIPTION
5	Sets	Electric Wiring Cubicle, Standard size
5	Sets	Work Bench, 3 x 6 ft
5	Sets	Bench Drill, 12 Speed 1/2 capacity
5	Sets	Bench Grinder, 3/4 HP
5	Sets	Hand Guillotine
5	Sets	Panel Board, 250 mm x 350 mm x 120 mm deep with 60 Amp. Main Circuit Breaker, single phase, 1-20 Amp., 1-30 Amp. Branch Circuit, Plug-in type.



## **MEMBERS OF THE REVIEW COMMITTEE**

Grateful acknowledgement is hereby extended to the following members of the Committee of Experts created by the Skills For Employability SFE Project, for converting GCT Nowshera into Centre of Vocational Excellence & Restructuring of Technical Education and Vocational Training Systems, Ministry of Industries, Labor and Manpower, Government of K.P.K., who reviewed and suggested improvements of the contents (competency elements) of this Model CBT curriculum during a Project held at the Government College of Technology Nowshera, K.P.K. Pakistan:

**Engr. Syed Qasim Shah**

Assistant Professor, GCT – Nowshera

**Engr. Abdul Maqsood**

Associate Professor, GCT – Nowshera

**PIR MUHAMMAD**

Associate Professor, GCT – Nowshera

**RAHIM BAKSH**

Senior Instructor, GATTC (Boys) – Hayatabad Peshawar

Reviewed & Vetted by:

**MR. GARRY HILLS**

Coleg Llandrillo Wales, UK

