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Boiler Operator

(A Competency Based Short-term Curriculum)

Council for Technical Education and Vocational Training

Curriculum Development Division

Sanothimi, Bhaktapur

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Introduction

This curriculum has been developed with a purpose of preparing Boiler Operator as a lower level technical workforce able to get employment in the country. The technical skills incorporated in this curriculum come from the boiler operation technology. Its contents are organized in the form of modules. So it is a tailor made curriculum with a special purpose to be implemented in a modular form.

It is a competency based curriculum. It is also designed to produce lower level technical workforce in the field of boiler operation technology equipped with skills and knowledge related to boiler operation technology in order to meet the demand of such workforce in the country so as to contribute in the national streamline of poverty reduction.

Aims

The main aim of this curricular program is to produce skilled workforce in the field of boiler operation technology by providing training to the potential citizen of the country and link them to employment opportunities in the country. The aims of this curriculum are:

- To produce lower level technical workforce in the area of boiler operation technology
- To produce such technical workforce who will be able to provide serves related to boiler operation to the needy through the application of the techniques /skills of boiler operation technology being an entrepreneur

Objectives

After the completion or this training program, the trainees will be able:

- To enforce safety measures
- To handle tools /equipments /materials
- To perform identification of components/devices/accessories
- To control/maintain fuel system
- To control /maintain water system
- To inspect operating system
- To perform standard operation procedures (SOP)
- To conduct efficiency tests
- To perform preventive maintenance
- To perform servicing
- To perform troubleshooting
- To maintain/repair/replace components/devices/accessories
- To keep records
- To communicate with others
- To develop professionally
- To develop entrepreneurial skills

Description

This curriculum provides skills and knowledge necessary for boiler operator as a technical worker. There will be both demonstration by trainers/instructors and opportunity by trainees to carry out the skills/tasks necessary for this level of technical workforce. Trainees will practice and learn skills by using typical tools, materials and equipment necessary for this curricular program.

On successful completion of this training, the trainees will be able to enforce safety measures, handle tools/equipments/materials, perform identification of components /devices/accessories, control/maintain fuel system, control /maintain water system, inspect operating system, perform standard operation procedures (SOP), conduct efficiency tests, perform preventive maintenance, perform servicing, troubleshoot problems, maintain/repair/replace components/devices/accessories, keep records, communicate with others, develop professionally and develop entrepreneurial skills.

Course structure

	Modules/sub modules	Nature	Th.	Pr.	Tot.	Th.	Pr.	Tot.
1.Boiler introduction		**T + P**	**21**	**27**	**48**	**10**	**40**	**50**
	1. Boiler fundamentals, operation and safety	T + P	6	6	12			
	2. Boiler maintenance, inspection, testing & efficiency	T + P	5	5	10			
	3. Enforcing safety measures	T + P	2	4	6			
	4. Tools, materials & equipments	T + P	4	6	10			
	5. Components/devices/accessories	T + P	4	6	10			
2.Controlling / maintaining / inspecting systems		**T + P**	**11**	**44**	**55**	**10**	**40**	**50**
	1. Fuel system	T + P	2	8	10			
	2. Water system	T + P	2	8	10			
	3. Inspecting operating system	T + P	7	28	35			
3.Standard operation procedures (SOP)		**T + P**	**16**	**66**	**82**	**15**	**60**	**75**
4.Efficiency tests		**T + P**	**4**	**12**	**16**	**5**	**20**	**25**
5.Servicing, repair and maintenance		**T + P**	**33**	**156**	**189**	**20**	**80**	**100**
	1. Preventive maintenance	T + P	6	24	30			
	2. Servicing	T + P	8	32	40			
	3. Troubleshooting	T + P	4	20	24			
	4. Repair, replacement and maintenance	T + P	15	80	95			
	Sub total:		**85**	**305**	**390**	**60**	**240**	**300**
6.Common module			14	56	70	**10**	**40**	**50**
	1. Applied math	T + P	4	16	20			
	2. Occupational health and safety	T + P	2	8	10			
	3. First aid	T + P	1	4	5			
	4. HIV/AIDS	T + P	1	4	5			
	5. Communication	T + P	2	8	10			
	6. Small enterprise development	T + P	4	16	20			
	Total:		**99**	**361**	**460**	**70**	**280**	**350**

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	Duration	
	The total duration of this curricular program will be **390** hours [three months] plus 70 hours of common module	
	Target group	
	The target group for this training will be all the interested individuals of the country with academic qualification of grade eight pass	
	Group size	
	The group size of this training program will be not more than 20	
	Target location	
	The target location of this training program will be all over Nepal.	
	Medium of Instruction	
	The medium of instruction for this training program will be Nepali or English or both.	
	Pattern of attendance	
	The trainees should have 80% attendance in theory classes and 90% in practical (Performance) to be eligible for internal assessment and final examinations	
	Focus of the program	
	This is a competency based curriculum. This curriculum emphasizes on competent performance of the task specified in it. Not less than 80% time is allotted to the competencies and not more than 20% to the related technical knowledge. So, the main focus will be on the performance of the specified competencies/tasks /skills included in this curriculum	
	Entry criteria	
	Individuals who meet the following criteria will be allowed to enter in this curricular program	
	• Eight grade pass • Physically and mentally fit • Age : minimum of 16 years old • Preference will be given to female, Dalit, Janjati, and Conflict affected people	
	Follow up suggestion	
	This is not a training program only for training sake. The ultimate success of this program will rest on the proficiency of the graduates of this training program in providing services in the community either by wage employment or by self-employment. To assess the success of this program and collect feedbacks/inputs for the revision of the program, a schedule of follow up is suggested as follows:- • First follow up: - Six months after the completion of the training program. • Second follow up: - Six months after the completion of the first follow up. • Follow up cycle: - In a cycle of one year after the completion of second follow up for five years	
	Certificate requirement	
	The related training institute will provide the certificate of "Boiler Operator" to those individuals who successfully complete all the tasks with their related technical knowledge specified in this curriculum.	
	Student evaluation details	
	• Continuous evaluation of the trainees' performance is to be done by the related instructor/trainer to ensure the proficiency over each competency. • Related technical knowledge learnt by the trainees will be evaluated through written or oral tests as per the nature of the content	

- Trainees must secure minimum marks of 60% in an average of both theory and practical evaluations

Trainers' qualification

- Diploma in electrical engineering plus trainings in boiler operation technology
- Good communicative & instructional skills.
- Experience in the related field.\

Trainer: trainee's ratio

- 1:10 for practical classes
- Depends on the nature of subject matter and class room situation for theory classes.

Suggestion for instruction

1. Demonstrate task performance
   - Demonstrate task performance in normal speed
   - Demonstrate slowly with verbal description of each and every steps in the sequence of activity flow of the task performance using question and answer techniques
   - Repeat the above step for the clarification on trainees demand if necessary.
   - Perform fast demonstration of the task performance.

2. Provide trainees the opportunity to practice the task performance demonstrated.
   - Provide trainees to have guided practice:- create environment for practicing the demonstrated task performance and guide the trainees in each and every step of task performance
   - Provide trainees the opportunity to repeat & re-repeat as per the need to be proficient on the given task performance
   - Switch to another task demonstration if and only if the trainees developed proficiency in the given task performance

3. Evaluation performance of the trainees/ student
   - Perform task analysis
   - Develop a detail task performance check list
   - Perform continuous performance evaluation of the trainees / students by applying the performance check list.

List of modules and sub modules

Module: 1: Boiler introduction
Sub module: 1: Boiler fundamentals, operation and safety
Sub module: 2: Boiler maintenance, inspection, testing & efficiency
Sub module: 3: Enforcing safety measures
Sub module: 4: Tools, materials & equipments
Sub module: 5: Components/devices/accessories
Module: 2: Controlling / maintaining / inspecting systems
Sub module: 1: Fuel system
Sub module: 2: Water system
Sub module: 3: Inspecting operating system
Module: 3: Standard operation procedures (SOP)
Module: 4: Efficiency tests
Module: 5: Servicing, repair and maintenance
Sub module: 1: Preventive maintenance
Sub module: 2: Servicing
Sub module: 3: Troubleshooting
Sub module: 4: Repair, replacement and maintenance

	Module: 6: Common module Sub module: 1: Applied math Sub module: 2: Occupational health and safety Sub module: 3: First aid Sub module: 4: HIV/AIDS Sub module: 5: Communication Sub module: 6: Small enterprise development	

Details of modules and sub modules

	Module: 1: Boiler introduction		
	Description: It includes the knowledge and skills related to boiler fundamentals, operation and safety; boiler maintenance, inspection, testing & efficiency; enforcing safety measures; tools, materials & equipments; and components, devices, and accessories.		
	Objectives:		
	▪ To provide introduction to boilers including every day operation and important safety practices ▪ To provide information about important inspection, maintenance and burner efficiency practices for boiler systems	▪ To enforcing safety measures ▪ To identify/handle tools, materials & equipments ▪ To identify components, devices & accessories	
	Sub modules:		
	1. Boiler fundamentals, operation and safety 2. Boiler maintenance, inspection, testing & efficiency	3. Enforcing safety measures 4. Tools, materials & equipments 5. Components/devices/accessories	
	Sub module: 1: Boiler fundamentals, operation and safety		
	Description: It includes the knowledge and skills related to boiler fundamentals, operation and safety.		
	Objectives:		
	▪ To be familiar with boiler fundamentals ▪ To be familiar with fundamentals of combustion and heat transfer ▪ To be familiar with burner operation and control	▪ To be familiar with boiler operation and testing ▪ To be familiar with boiler room safety ▪ To be familiar with cause and effect case study	
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.		

	6 hrs. (Th.) + 6 hrs. (Pr.) = 12 hrs. (Tot.)		Time (hrs.)		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Be familiar with boiler fundamentals	**Boiler fundamentals**: ▪ Fundamentals of fire tube boilers ▪ Fundamentals of water tube boilers ▪ Fundamentals of cast iron boilers ▪ Fundamentals of high pressure boilers ▪ Fundamentals of low pressure boilers ▪ Fundamentals of steam boilers ▪ Fundamentals of hydronic boilers	1	1	2
2.	Be familiar with fundamentals of combustion and heat transfer	**Fundamentals of combustion and heat transfer:** ▪ Theory of combustion ▪ Thermodynamics ▪ Steam tables	1	1	2
3.	Be familiar with burner operation and control	**Burner operation and control**: ▪ Gas train ▪ Oil train ▪ Standard burner ▪ High turndown burner ▪ Burner controls	1	1	2
4.	Be familiar with boiler operation and testing	**Boiler operation and testing**: ▪ Operator licensing and certification ▪ Start-up and shut-down ▪ Normal operation ▪ Valve types ▪ Safety valves ▪ Low water cutoff controls	1	1	2
5.	Be familiar with boiler room safety	**Boiler room safety**: ▪ Boiler accidents ▪ Cause and effect	1	1	2
6.	Be familiar with cause and effect case study	**Cause and effect case study**: ▪ Safety valves ▪ Confined spaces ▪ Lockout / tag out	1	1	2
	Sub total:		**6**	**6**	**12**
	Sub module: 2: Boiler maintenance, inspection, testing & efficiency				
	Description: It includes the knowledge and skills related to boiler maintenance, inspection, testing & efficiency.				
	Objectives:				

	▪ To be familiar with construction and design standards ▪ To be familiar with controls/safety devices for automatically fired boilers	▪ To be familiar with inspection/maintenance of commercial/industrial boilers ▪ To be familiar with boiler/burner efficiency ▪ To be familiar with trouble shooting			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	5 hrs. (Th.) + 5 hrs. (Pr.) = 10 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Be familiar with construction and design standards	**Construction and design standards**: ▪ ASME codes ▪ NFPA codes ▪ NBIC codes	1	1	2
2.	Be familiar with controls/safety devices for automatically fired boilers	**Controls/safety devices for automatically fired boilers:** ▪ Water level control ▪ Temperature control ▪ Pressure control ▪ Fuel trains	1	1	2
3.	Be familiar with inspection/maintenance of commercial/industrial boilers	**Inspection/maintenance of commercial/industrial boilers:** ▪ Fireside ▪ Waterside ▪ Burner ▪ Auxiliary equipment	1	1	2
4.	Be familiar with boiler/burner efficiency	**Boiler and burner efficiency**: ▪ Heat exchanger efficiency ▪ Combustion efficiency ▪ Efficiency tests ▪ Condensate return ▪ Steam traps	1	1	2
5.	Be familiar with trouble shooting	**Trouble shooting**: ▪ Burner ▪ Controls	1	1	2
	Sub total:		**5**	**5**	**10**
	Sub module: 2: Enforcing safety measures				
	Description: It includes the knowledge and skills related to enforcing safety measures; tools, materials & equipments.				
	Objectives:				
	▪ To ensure personal safety ▪ To ensure fuel valve for safety to fuel pump ▪ To ensure setting point	▪ To ensure buzzer (Hotter) functioning ▪ To ensure blower setting ▪ To ensure to the pipe line checking (fuel/water) ▪ To ensure safety valve conditioning			

	of fuel ▪ To ensure point water level ▪ To ensure sensor functioning ▪ To ensure boiler room cleanliness	▪ To ensure trap valve functioning ▪ To minimize pollution ▪ To ensure setting temperature			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	2 hrs. (Th.) + 4 hrs. (Pr.) = 6 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Ensure personal safety	**Ensuring personal safety:** ▪ Concept, need, importance and application of personal safety ▪ Procedures for personal safety ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.4	0.6
2.	Ensure fuel valve for safety to fuel pump	**Ensuring fuel valve for safety to fuel pump:** ▪ Concept of ensuring fuel valve for safety to fuel pump ▪ "Why" and "how" of ensuring fuel valve for safety to fuel pump ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.3	0.5
3.	Ensure setting point of fuel	**Ensuring setting point of fuel:** ▪ Concept of ensuring setting point of fuel ▪ "Why" and "how" of ensuring setting point of fuel ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.3	0.5
4.	Ensure point water level	**Ensuring point water level:** ▪ Concept of ensuring point water level ▪ "Why" and "how" of ensuring point water level ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.3	0.5
5.	Ensure sensor functioning	**Ensuring sensor functioning:** ▪ Concept of ensuring sensor functioning ▪ "Why" and "how" of ensuring sensor functioning ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.3	0.5
6.	Ensure boiler room cleanliness	**Ensuring boiler room cleanliness:**	0.2	0.3	0.5

		▪ Concept of ensuring boiler room cleanliness ▪ "Why" and "how" of ensuring boiler room cleanliness ▪ Related precautions to be taken ▪ Related records to be kept			
7.	Ensure buzzer (Hotter) functioning	**Ensuring buzzer (Hotter) functioning:** ▪ Concept of ensuring buzzer (Hotter) functioning ▪ "Why" and "how" of ensuring buzzer (Hotter) functioning ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.3	0.5
8.	Ensure blower setting	**Ensuring blower setting:** ▪ Concept of ensuring blower setting ▪ "Why" and "how" of ensuring blower setting ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.3	0.4
9.	Ensure the pipe line checking (fuel/water)	**Ensuring the pipe line checking (fuel/water):** ▪ Concept of ensuring the pipe line checking (fuel/water) ▪ "Why" and "how" of ensuring the pipe line checking (fuel/water) ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.3	0.4
10.	Ensure safety valve conditioning	**Ensuring safety valve conditioning:** ▪ Concept of ensuring safety valve conditioning ▪ "Why" and "how" of ensuring safety valve conditioning ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.3	0.4
11.	Ensure trap valve functioning	**Ensuring trap valve functioning:** ▪ Concept of ensuring trap valve functioning ▪ "Why" and "how" of ensuring trap valve functioning ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.3	0.4
12.	Minimize pollution	**Minimizing pollution**: ▪ Concept of minimizing pollution ▪ "Why" and "how" of minimizing pollution	0.1	0.3	0.4

		▪ Related precautions to be taken ▪ Related records to be kept			
13.	Ensure setting temperature	**<u>Ensuring setting temperature</u>**: ▪ Concept of ensuring setting temperature ▪ "Why" and "how" of ensuring setting temperature ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.3	0.4
	Sub total:		**2**	**4**	**6**
	Sub module: 3: Tools, materials & equipments				
	Description: It includes the knowledge and skills related to tools, materials & equipments.				
	Objectives:				
	▪ To handle wrench set ▪ To handle pliers ▪ To handle line/phase tester ▪ To handle multimeter ▪ To handle pipe/slide wrench ▪ To handle hammer ▪ To handle Allen key ▪ To handle pin punch ▪ To handle screw driver ▪ To handle hacksaw frame ▪ To handle chisel ▪ To handle sprit level ▪ To handle venire caliper ▪ To handle die set ▪ To handle file ▪ To handle vice ▪ To handle drill machine ▪ To handle nozzle brush ▪ To handle flat brush and round brush	▪ To handle thermometer ▪ To handle taco meter ▪ To handle grease gun ▪ To handle oil-can ▪ To handle holder ▪ To handle welding machine ▪ To handle safety goggles ▪ To handle hand seal ▪ To handle lather apron ▪ To handle chipping hammer ▪ To handle PH meter ▪ To handle gauge meter ▪ To handle arc welding rod ▪ To handle water test kit ▪ To handle anometer ▪ To handle fuel (kerosene/furnace oil/husu) ▪ To handle pressure gauge			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	5 hrs.(Th.) + 5 hrs.(Pr.) = 10 hrs.(Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Handle wrench set	**<u>Handling wrench set:</u>** ▪ Identification of wrench set ▪ Applications and uses of wrench set ▪ Handling and care of wrench set ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.1	0.3

2.	Handle pliers	**Handling pliers:** ▪ Identification of pliers ▪ Applications and uses of pliers ▪ Handling and care of pliers ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.1	0.3
3.	Handle line/phase tester	**Handling line/phase tester:** ▪ Identification of line/phase tester ▪ Applications and uses of line/phase tester ▪ Handling and care of line/phase tester ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.1	0.3
4.	Handle multimeter	**Handling multimeter:** ▪ Identification of multimeter ▪ Applications and uses of multimeter ▪ Handling and care of multimeter ▪ Related precautions to be taken ▪ Related records to be kept	0.2	0.1	0.3
5.	Handle pipe/slide wrench	**Handling pipe/slide wrench:** ▪ Identification of pipe/slide wrench ▪ Applications and uses of pipe/slide wrench ▪ Handling and care of pipe/slide wrench ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
6.	Handle hammer	**Handling hammer:** ▪ Identification of hammer ▪ Applications and uses of hammer ▪ Handling and care of hammer ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
7.	Handle Allen key	**Handling Allen key:** ▪ Identification of Allen key ▪ Applications and uses of Allen key ▪ Handling and care of Allen key ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
8.	Handle pin punch	**Handling pin punch:** ▪ Identification of pin punch ▪ Applications and uses of pin punch	0.1	0.1	0.2

		▪ Handling and care of pin punch ▪ Related precautions to be taken ▪ Related records to be kept			
9.	Handle screw driver	**Handling screw driver:** ▪ Identification of screw driver ▪ Applications and uses of screw driver ▪ Handling and care of screw driver ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
10.	Handle hacksaw frame	**Handling hacksaw frame**: ▪ Identification of hacksaw frame ▪ Applications and uses of hacksaw frame ▪ Handling and care of hacksaw frame ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
11.	Handle chisel	**Handling chisel:** ▪ Identification of chisel ▪ Applications and uses of chisel ▪ Handling and care of chisel ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
12.	Handle sprit level	**Handling sprit level:** ▪ Identification of sprit level ▪ Applications and uses of sprit level ▪ Handling and care of sprit level ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.1	0.2
13.	Handle venire caliper	**Handling venire caliper**: ▪ Identification of venire caliper ▪ Applications and uses of venire caliper ▪ Handling and care of venire caliper ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
14.	Handle die set	**Handling die set:** ▪ Identification of die set ▪ Applications and uses of die set ▪ Handling and care of die set ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
15.	Handle file	**Handling file:** ▪ Identification of file ▪ Applications and uses of file	0.1	0.2	0.3

		▪ Handling and care of file ▪ Related precautions to be taken ▪ Related records to be kept			
16.	Handle vice	**Handling vice:** ▪ Identification of vice ▪ Applications and uses of vice ▪ Handling and care of vice ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
17.	Handle drill machine	**Handling drill machine:** ▪ Identification of drill machine ▪ Applications and uses of drill machine ▪ Handling and care of drill machine ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
18.	Handle nozzle brush	**Handling nozzle brush:** ▪ Identification of nozzle brush ▪ Applications and uses of nozzle brush ▪ Handling and care of nozzle brush ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
19.	Handle flat brush and round brush	**Handling flat brush and round brush:** ▪ Identification of flat brush and round brush ▪ Applications and uses of flat brush and round brush ▪ Handling and care of flat brush and round brush ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
20.	Handle thermometer	**Handling thermometer:** ▪ Identification of thermometer ▪ Applications and uses of thermometer ▪ Handling and care of thermometer ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
21.	Handle taco meter	**Handling taco meter:** ▪ Identification of taco meter ▪ Applications and uses of taco meter ▪ Handling and care of taco meter ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3

22.	Handle grease gun	**Handling grease gun**: ▪ Identification of grease gun ▪ Applications and uses of grease gun ▪ Handling and care of grease gun ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
23.	Handle oil-can	**Handling oil-can:** ▪ Identification of oil-can ▪ Applications and uses of oil-can ▪ Handling and care of oil-can ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
24.	Handle holder	**Handling holder:** ▪ Identification of holder ▪ Applications and uses of holder ▪ Handling and care of holder ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
25.	Handle welding machine	**Handling welding machine:** ▪ Identification of welding machine ▪ Applications and uses of welding machine ▪ Handling and care of welding machine ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
26.	Handle safety goggles	**Handling safety goggles**: ▪ Identification of safety goggles ▪ Applications and uses of safety goggles ▪ Handling and care of safety goggles ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
27.	Handle hand seal	**Handling hand seal:** ▪ Identification of hand seal ▪ Applications and uses of hand seal ▪ Handling and care of hand seal ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
28.	Handle lather apron	**Handling lather apron:** ▪ Identification of lather apron ▪ Applications and uses of lather apron ▪ Handling and care of lather apron ▪ Related precautions to be taken	0.1	0.2	0.3

		▪ Related records to be kept			
29.	Handle chipping hammer	**Handling chipping hammer**: ▪ Identification of chipping hammer ▪ Applications and uses of chipping hammer ▪ Handling and care of chipping hammer ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
30.	Handle PH meter	**Handling PH meter:** ▪ Identification of PH meter ▪ Applications and uses of PH meter ▪ Handling and care of PH meter ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
31.	Handle gauge meter	**Handling gauge meter:** ▪ Identification of gauge meter ▪ Applications and uses of gauge meter ▪ Handling and care of gauge meter ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
32.	Handle arc welding rod	**Handling arc welding rod:** ▪ Identification of arc welding rod ▪ Applications and uses of arc welding rod ▪ Handling and care of arc welding rod ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
33.	Handle water test kit	**Handling water test kit:** ▪ Identification of water test kit ▪ Applications and uses of water test kit ▪ Handling and care of water test kit ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
34.	Handle anometer	**Handling anometer:** ▪ Identification of anometer ▪ Applications and uses of anometer ▪ Handling and care of anometer ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
35.	Handle fuel (kerosene/furnace oil/husu)	**Handling fuel (kerosene/ furnace oil/husu):**	0.1	0.2	0.3

		▪ Identification of fuel (kerosene/furnace oil/husu) ▪ Applications and uses of fuel (kerosene/furnace oil/husu) ▪ Handling and care of fuel (kerosene/furnace oil/husu) ▪ Related precautions to be taken ▪ Related records to be kept			
36.	Handle pressure gauge	**<u>Handling pressure gauge:</u>** ▪ Identification of pressure gauge ▪ Applications and uses of pressure gauge ▪ Handling and care of pressure gauge ▪ Related precautions to be taken ▪ Related records to be kept	0.1	0.2	0.3
	Sub total:		**4**	**6**	**10**
	Sub module: 4: Components/devices/accessories				
	Description: It includes the knowledge and skills related to boiler components, devices, and accessories.				
	Objectives:				
	▪ To identify burner ▪ To identify decider plate ▪ To identify y-Steiner ▪ To identify non-return valve ▪ To identify safety valve ▪ To identify level switch/pipe/glass ▪ To identify nozzle ▪ To identify fuel pump ▪ To identify ball valve ▪ To identify gate valve ▪ To identify water pump ▪ To identify firing looking glass ▪ To identify release valve ▪ To identify coil ▪ To identify safety head ▪ To identify electronic rod ▪ To identify pressure switch ▪ To identify butterfly valve ▪ To identify inner jacket ▪ To identify economizer	▪ To identify fuel filter/hose pipes ▪ To identify cap-robber ▪ To identify cupper pipe ▪ To identify flinch ▪ To identify air blower ▪ To identify external (over) head ▪ To identify external body ▪ To identify flexible pipes ▪ To identify pressure gauge ▪ To identify photocell/sensors ▪ To identify heat proof cement (concrete) ▪ To identify foundation bolts ▪ To identify gaskets (heat proof) ▪ To identify V-belt ▪ To identify water tank/ fuel tank ▪ To identify hooter ▪ To identify burner ignition transformer ▪ To identify metal pipes/ water tank ▪ To identify heat proof gland ▪ To identify oil heater			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and				

	practical aspects of the task.				
	4 hrs. (Th.) + 6 hrs. (Pr.) = 10 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Identify burner	**Identifying burner:** ▪ Concept of burner ▪ Identification of burner ▪ Function and application / uses of burner ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
2.	Identify decider plate	**Identifying decider plate:** ▪ Concept of decider plate ▪ Identification of decider plate ▪ Function and application / uses of decider plate ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
3.	Identify y-Steiner	**Identifying y-Steiner:** ▪ Concept of y-Steiner ▪ Identification of y-Steiner ▪ Function and application / uses of y-Steiner ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
4.	Identify non-return valve	**Identifying non-return valve:** ▪ Concept of non-return valve ▪ Identification of non-return valve ▪ Function and application / uses of non-return valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
5.	Identify safety valve	**Identifying safety valve:** ▪ Concept of safety valve ▪ Identification of safety valve ▪ Function and application / uses of safety valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
6.	Identify level switch/pipe/glass	**Identifying level switch/pipe/glass:** ▪ Concept of level switch/pipe/glass ▪ Identification of level switch/pipe/glass ▪ Function and application / uses of level switch/pipe/glass ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
7.	Identify nozzle	**Identifying nozzle:**	0.1	0.2	0.3

		▪ Concept of nozzle ▪ Identification of nozzle ▪ Function and application / uses of nozzle ▪ Related precautions/safety ▪ Related records to be kept			
8.	Identify fuel pump	**Identifying fuel pump:** ▪ Concept of fuel pump ▪ Identification of fuel pump ▪ Function and application / uses of fuel pump ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
9.	Identify ball valve	**Identifying ball valve**: ▪ Concept of ball valve ▪ Identification of ball valve ▪ Function and application / uses of ball valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
10.	Identify gate valve	**Identifying gate valve:** ▪ Concept of gate valve ▪ Identification of gate valve ▪ Function and application / uses of gate valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
11.	Identify water pump	**Identifying water pump**: ▪ Concept of water pump ▪ Identification of water pump ▪ Function and application / uses of water pump ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
12.	Identify firing looking glass	**Identifying firing looking glass:** ▪ Concept of firing looking glass ▪ Identification of firing looking glass ▪ Function and application / uses of firing looking glass ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
13.	Identify release valve	**Identifying release valve:** ▪ Concept of release valve ▪ Identification of release valve ▪ Function and application / uses of release valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
14.	Identify coil	**Identifying coil:**	0.1	0.2	0.3

		▪ Concept of coil ▪ Identification of coil ▪ Function and application / uses of coil ▪ Related precautions/safety ▪ Related records to be kept			
15.	Identify safety head	**Identifying safety head:** ▪ Concept of safety head ▪ Identification of safety head ▪ Function and application / uses of safety head ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
16.	Identify electronic rod	**Identifying electronic rod:** ▪ Concept of electronic rod ▪ Identification of electronic rod ▪ Function and application / uses of electronic rod ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
17.	Identify pressure switch	**Identifying pressure switch**: ▪ Concept of pressure switch ▪ Identification of pressure switch ▪ Function and application / uses of pressure switch ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
18.	Identify butterfly valve	**Identifying butterfly valve**: ▪ Concept of butterfly valve ▪ Identification of butterfly valve ▪ Function and application / uses of butterfly valve ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
19.	Identify inner jacket	**Identifying inner jacket:** ▪ Concept of inner jacket ▪ Identification of inner jacket ▪ Function and application / uses of inner jacket ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
20.	Identify economizer	**Identifying economizer**: ▪ Concept of economizer ▪ Identification of economizer ▪ Function and application / uses of economizer ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.2	0.3
21.	Identify fuel filter/hose pipes	**Identifying fuel filter/hose pipes**: ▪ Concept of fuel filter/hose pipes	0.1	0.1	0.2

		▪ Identification of fuel filter/hose pipes ▪ Function and application / uses of fuel filter/hose pipes ▪ Related precautions/safety ▪ Related records to be kept			
22.	Identify cap-robber	**Identifying cap-robber**: ▪ Concept of cap-robber ▪ Identification of cap-robber ▪ Function and application / uses of cap-robber ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
23.	Identify cupper pipe	**Identifying cupper pipe**: ▪ Concept of cupper pipe ▪ Identification of cupper pipe ▪ Function and application / uses of cupper pipe ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
24.	Identify flinch	**Identifying flinch:** ▪ Concept of flinch ▪ Identification of flinch ▪ Function and application / uses of flinch ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
25.	Identify air blower	**Identifying air blower**: ▪ Concept of air blower ▪ Identification of air blower ▪ Function and application / uses of air blower ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
26.	Identify external (over) head	**Identifying external (over) head:** ▪ Concept of external (over) head ▪ Identification of external (over) head ▪ Function and application / uses of external (over) head ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
27.	Identify external body	**Identifying external body**: ▪ Concept of external body ▪ Identification of external body ▪ Function and application / uses of external body ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
28.	Identify flexible pipes	**Identifying flexible pipes:**	0.1	0.1	0.2

		▪ Concept of flexible pipes ▪ Identification of flexible pipes ▪ Function and application / uses of flexible pipes ▪ Related precautions/safety ▪ Related records to be kept			
29.	Identify pressure gauge	**Identifying pressure gauge:** ▪ Concept of pressure gauge ▪ Identification of pressure gauge ▪ Function and application / uses of pressure gauge ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
30.	Identify photocell/sensors	**Identifying photocell/sensors**: ▪ Concept of photocell/sensors ▪ Identification of photocell/sensors ▪ Function and application / uses of photocell/sensors ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
31.	Identify heat proof cement (concrete)	**Identifying heat proof cement (concrete):** ▪ Concept of heat proof cement (concrete) ▪ Identification of heat proof cement (concrete) ▪ Function and application / uses of heat proof cement (concrete) ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
32.	Identify foundation bolts	**Identifying foundation bolts:** ▪ Concept of foundation bolts ▪ Identification of foundation bolts ▪ Function and application / uses of foundation bolts ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
33.	Identify gaskets (heat proof)	**Identifying gaskets (heat proof):** ▪ Concept of gaskets (heat proof) ▪ Identification of gaskets (heat proof) ▪ Function and application / uses of gaskets (heat proof) ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
34.	Identify V-belt	**Identifying V-belt:** ▪ Concept of V-belt ▪ Identification of V-belt	0.1	0.1	0.2

		▪ Function and application / uses of V-belt ▪ Related precautions/safety ▪ Related records to be kept			
35.	Identify water tank/ fuel tank	**Identifying water tank/ fuel tank:** ▪ Concept of water tank/ fuel tank ▪ Identification of water tank/ fuel tank ▪ Function and application / uses of water tank/ fuel tank ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
36.	Identify hooter	**Identifying hooter:** ▪ Concept of hooter ▪ Identification of hooter ▪ Function and application / uses of hooter ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
37.	Identify burner ignition transformer	**Identifying burner ignition transformer:** ▪ Concept of burner ignition transformer ▪ Identification of burner ignition transformer ▪ Function and application / uses of burner ignition transformer ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
38.	Identify metal pipes/ water tank	**Identifying metal pipes/ water tank:** ▪ Concept of metal pipes/ water tank ▪ Identification of metal pipes/ water tank ▪ Function and application / uses of metal pipes/ water tank ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
39.	Identify heat proof gland	**Identifying heat proof gland:** ▪ Concept of heat proof gland ▪ Identification of heat proof gland ▪ Function and application / uses of heat proof gland ▪ Related precautions/safety ▪ Related records to be kept	0.1	0.1	0.2
40.	Identify oil heater	**Identifying oil heater**: ▪ Concept of oil heater ▪ Identification of oil heater	0.1	0.1	0.2

		▪ Function and application / uses of oil heater ▪ Related precautions/safety ▪ Related records to be kept			
	Sub total:		**4**	**6**	**10**
	Module: 2: Controlling / maintaining / inspecting systems				
	Description: It includes the knowledge and skills related to maintaining fuel system; maintaining water system; and inspecting operating system.				
	Objectives:				
	To maintain fuel system To maintain water system	To inspect operating system			
	Sub modules:				
	1. Fuel system	2. Water system 3. Inspect operating system			
	Sub module: 1: Fuel system				
	Description: It includes the knowledge and skills related to maintaining fuel system of boiler.				
	Objectives:				
	▪ To read/Interpret fuel system design ▪ To control/maintain fuel level ▪ To control /maintain fuel temperature	▪ To control /maintain fuel quality ▪ To control /maintain fuel pressure ▪ To control /maintain fuel quantity			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	2 hrs. (Th.) + 8 hrs. (Pr.) = 10 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Read/Interpret fuel system design	**<u>Reading/Interpreting fuel system design</u>**: ▪ Concept of fuel system / system design ▪ Function and application of fuel system/ system design ▪ Reading/interpreting fuel system design ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.4	1.7
2.	Control/maintain fuel level	**<u>Controlling/maintaining fuel level:</u>** ▪ Concept of fuel level ▪ Function and application of fuel level ▪ "Why" and "how" of controlling and maintaining fuel level ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.4	1.7

3.	Control/maintain fuel temperature	**Controlling/maintaining fuel temperature:** ▪ Concept of fuel temperature ▪ Function and application of fuel temperature ▪ "Why" and "how" of controlling and maintaining fuel temperature ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.3	1.6
4.	Control/maintain fuel quality	**Controlling/maintaining fuel quality:** ▪ Concept of fuel quality ▪ Function and application of fuel quality ▪ "Why" and "how" of controlling and maintaining fuel quality ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.3	1.6
5.	Control/maintain fuel pressure	**Controlling/maintaining fuel pressure:** ▪ Concept of fuel pressure ▪ Function and application of fuel pressure ▪ "Why" and "how" of controlling and maintaining fuel pressure ▪ Related precautions/safety ▪ Related records to be kept	0.4	1.3	1.7
6.	Control/maintain fuel quantity	**Controlling/maintaining fuel quantity**: ▪ Concept of fuel quantity ▪ Function and application of fuel quantity ▪ "Why" and "how" of controlling and maintaining fuel quantity ▪ Related precautions/safety ▪ Related records to be kept	0.4	1.3	1.7
	Sub total:		**2**	**8**	**10**
	Sub module: 2: Water system				
	Description: It includes the knowledge and skills related to maintaining water system of boiler.				
	Objectives:				
	▪ To read/Interpret water system design ▪ To control/maintain water level	▪ To control/maintain water PH ▪ To control/maintain TDS ▪ To control/maintain water pressure ▪ To maintain water quantity			

	▪ To control/maintain water temperature ▪ To control hardness				
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	2 hrs. (Th.) + 8 hrs. (Pr.) = 10 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Read/Interpret water system design	Reading/Interpreting water system design: ▪ Concept of water system / system design ▪ Function and application of water system/ system design ▪ Reading/interpreting water system design ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.0	1.3
2.	Control/maintain water level	**Controlling/maintaining water level:** ▪ Concept of water level ▪ Function and application of water level ▪ "Why" and "how" of controlling and maintaining water level ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.0	1.3
3.	Control/maintain water temperature	**Controlling/maintaining water temperature:** ▪ Concept of water temperature ▪ Function and application of water temperature ▪ "Why" and "how" of controlling and maintaining water temperature ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.0	1.3
4.	Control hardness of water	**Controlling hardness:** ▪ Concept of hardness of water ▪ Function and application of hardness of water ▪ "Why" and "how" of controlling and maintaining hardness of water ▪ Related precautions/safety ▪ Related records to be kept	0.3	1.0	1.3
5.	Control/maintain water PH	**Controlling/maintaining water PH:** ▪ Concept of water PH	0.2	1.0	1.2

		▪ Function and application of water PH ▪ "Why" and "how" of controlling and maintaining water PH ▪ Related precautions/safety ▪ Related records to be kept			
6.	Control/maintain TDS	**Controlling/maintaining TDS:** ▪ Concept of TDS ▪ Function and application of TDS ▪ "Why" and "how" of controlling and maintaining TDS ▪ Related precautions/safety ▪ Related records to be kept	0.2	1.0	1.2
7.	Control/maintain water pressure	**Controlling/maintaining water pressure:** ▪ Concept of water pressure ▪ Function and application of water pressure ▪ "Why" and "how" of controlling and maintaining water pressure ▪ Related precautions/safety ▪ Related records to be kept	0.2	1.0	1.2
8.	Maintain water quantity	**Maintaining water quantity:** ▪ Concept of water quantity ▪ Function and application of water quantity ▪ "Why" and "how" of controlling and maintaining water quantity ▪ Related precautions/safety ▪ Related records to be kept	0.2	1.0	1.2
	Sub total:		**2**	**8**	**10**
	Sub module: 3: Inspecting operating system				
	Description: It includes the knowledge and skills related to inspecting operating system of boiler.				
	Objectives:				
	▪ To inspect fuel system ▪ To inspect electric system ▪ To inspect water system ▪ To inspect safety devices ▪ To inspect steam distribution system ▪ To inspect steam pipe line drain water	▪ To inspect sensors ▪ To inspect emergency switches ▪ To inspect traps and NRV/PRV ▪ To inspect current consumption indicator ▪ To inspect leakage of electricity ▪ To inspect reset bottom ▪ To inspect electric wiring ▪ To inspect water temperature ▪ To inspect fuel pipe line			

	▪ To inspect steam drainage ▪ To inspect steam pipe line and valves ▪ To inspect steam pressure ▪ To inspect steam temperature ▪ To inspect water tank ▪ To inspect water pipe line and valves ▪ To inspect y-Steiner ▪ To inspect water level ▪ To inspect non return valve ▪ To inspect water level indicator ▪ To inspect case fire	▪ To inspect level of fuel indicator ▪ To inspect fuel release valve ▪ To inspect fuel valve ▪ To inspect fuel pressure ▪ To inspect fuel pump ▪ To inspect RYB voltage indicator ▪ To inspect blow down valves ▪ To inspect safety valves ▪ To inspect indicators and hooters			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	7 hrs. (Th.) + 28 hrs. (Pr.) = 35 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Inspect fuel system	**Inspecting fuel system:** ▪ Concept, function and application of fuel system ▪ Principles and procedures for inspecting fuel system ▪ Inspecting the fuel system ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
2.	Inspect electric system	**Inspecting electric system:** ▪ Concept, function and application of electric system ▪ Principles and procedures for inspecting electric system ▪ Inspecting the electric system ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
3.	Inspect water system	**Inspecting water system:** ▪ Concept, function and application of water system ▪ Principles and procedures for inspecting water system ▪ Inspecting the water system ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
4.	Inspect safety devices	**Inspecting safety devices:** ▪ Concept, function and application of safety devices	0.2	0.8	1.0

		▪ Principles and procedures for inspecting safety devices ▪ Inspecting the safety devices ▪ Related precautions/safety ▪ Related records to be kept			
5.	Inspect steam distribution system	**Inspecting steam distribution system:** ▪ Concept, function and application of steam distribution system ▪ Principles and procedures for inspecting steam distribution system ▪ Inspecting the steam distribution system ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
6.	Inspect steam pipe line drain water	**Inspecting steam pipe line drain water:** ▪ Concept, function and application of steam pipe line drain water ▪ Principles and procedures for inspecting steam pipe line drain water ▪ Inspecting the steam pipe line drain water ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
7.	Inspect steam drainage	**Inspecting steam drainage:** ▪ Concept, function and application of steam drainage ▪ Principles and procedures for inspecting steam drainage ▪ Inspecting the steam drainage ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
8.	Inspect steam pipe line and valves	**Inspecting steam pipe line and valves:** ▪ Concept, function and application of steam pipe line and valves ▪ Principles and procedures for inspecting steam pipe line and valves ▪ Inspecting the steam pipe line and valves ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
9.	Inspect steam pressure	**Inspecting steam pressure:**	0.2	0.8	1.0

		▪ Concept, function and application of steam pressure ▪ Principles and procedures for inspecting steam pressure ▪ Inspecting the steam pressure ▪ Related precautions/safety ▪ Related records to be kept			
10.	Inspect steam temperature	**Inspecting steam temperature:** ▪ Concept, function and application of steam temperature ▪ Principles and procedures for inspecting steam temperature ▪ Inspecting the steam temperature ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
11.	Inspect water tank	**Inspecting water tank:** ▪ Concept, function and application of water tank ▪ Principles and procedures for inspecting water tank ▪ Inspecting the water tank ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
12.	Inspect water pipe line and valves	**Inspecting water pipe line and valves:** ▪ Concept, function and application of water pipe line and valves ▪ Principles and procedures for inspecting water pipe line and valves ▪ Inspecting the water pipe line and valves ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
13.	Inspect y-Steiner	**Inspecting y-Steiner:** ▪ Concept, function and application of y-Steiner ▪ Principles and procedures for inspecting y-Steiner ▪ Inspecting the y-Steiner ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
14.	Inspect water level	**Inspecting water level:** ▪ Concept, function and application of water level ▪ Principles and procedures for inspecting water level	0.2	0.8	1.0

		▪ Inspecting the water level ▪ Related precautions/safety ▪ Related records to be kept			
15.	Inspect non return valve	**Inspecting non return valve**: ▪ Concept, function and application of ▪ Principles and procedures for inspecting ▪ Inspecting the ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
16.	Inspect water level indicator	**Inspecting water level indicator:** ▪ Concept, function and application of non return valve ▪ Principles and procedures for inspecting non return valve ▪ Inspecting the non return valve ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
17.	Inspect case fire	**Inspecting case fire:** ▪ Concept, function and application of case fire ▪ Principles and procedures for inspecting case fire ▪ Inspecting the case fire ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
18.	Inspect sensors	**Inspecting sensors:** ▪ Concept, function and application of sensors ▪ Principles and procedures for inspecting sensors ▪ Inspecting the sensors ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
19.	Inspect emergency switches	**Inspecting emergency switches**: ▪ Concept, function and application of emergency switches ▪ Principles and procedures for inspecting emergency switches ▪ Inspecting the emergency switches ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
20.	Inspect traps and NRV/PRV	**Inspecting traps and NRV/PRV:** ▪ Concept, function and application of traps and NRV/PRV ▪ Principles and procedures for	0.2	0.8	1.0

		inspecting traps and NRV/PRV ▪ Inspecting the traps and NRV/PRV ▪ Related precautions/safety ▪ Related records to be kept			
21.	Inspect current consumption indicator	**Inspecting current consumption indicator:** ▪ Concept, function and application of current consumption indicator ▪ Principles and procedures for inspecting current consumption indicator ▪ Inspecting the current consumption indicator ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
22.	Inspect leakage of electricity	**Inspecting leakage of electricity:** ▪ Concept, function and application of leakage of electricity ▪ Principles and procedures for inspecting leakage of electricity ▪ Inspecting the leakage of electricity ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
23.	Inspect reset bottom	**Inspecting reset bottom:** ▪ Concept, function and application of reset bottom ▪ Principles and procedures for inspecting reset bottom ▪ Inspecting the reset bottom ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
24.	Inspect electric wiring	**Inspecting electric wiring:** ▪ Concept, function and application of electric wiring ▪ Principles and procedures for inspecting electric wiring ▪ Inspecting the electric wiring ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
25.	Inspect water temperature	**Inspecting water temperature:** ▪ Concept, function and application of water temperature ▪ Principles and procedures for inspecting water temperature ▪ Inspecting the water temperature	0.2	0.8	1.0

		▪ Related precautions/safety ▪ Related records to be kept			
26.	Inspect fuel pipe line	**Inspecting fuel pipe line:** ▪ Concept, function and application of fuel pipe line ▪ Principles and procedures for inspecting fuel pipe line ▪ Inspecting the fuel pipe line ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
27.	Inspect level of fuel indicator	**Inspecting level of fuel indicator:** ▪ Concept, function and application of level of fuel indicator ▪ Principles and procedures for inspecting level of fuel indicator ▪ Inspecting the level of fuel indicator ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
28.	Inspect fuel release valve	**Inspecting fuel release valve:** ▪ Concept, function and application of fuel release valve ▪ Principles and procedures for inspecting fuel release valve ▪ Inspecting the fuel release valve ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
29.	Inspect fuel valve	**Inspecting fuel valve:** ▪ Concept, function and application of fuel valve ▪ Principles and procedures for inspecting fuel valve ▪ Inspecting the fuel valve ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
30.	Inspect fuel pressure	**Inspecting fuel pressure:** ▪ Concept, function and application of fuel pressure ▪ Principles and procedures for inspecting fuel pressure ▪ Inspecting the fuel pressure ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
31.	Inspect fuel pump	**Inspecting fuel pump:** ▪ Concept, function and application of fuel pump ▪ Principles and procedures for inspecting fuel pump ▪ Inspecting the fuel pump	0.2	0.8	1.0

		▪ Related precautions/safety ▪ Related records to be kept			
32.	Inspect RYB voltage indicator	**Inspecting RYB voltage indicator**: ▪ Concept, function and application of RYB voltage indicator ▪ Principles and procedures for inspecting RYB voltage indicator ▪ Inspecting the RYB voltage indicator ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
33.	Inspect blow down valves	**Inspecting blow down valves:** ▪ Concept, function and application of blow down valves ▪ Principles and procedures for inspecting blow down valves ▪ Inspecting the blow down valves ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
34.	Inspect safety valves	**Inspecting safety valves:** ▪ Concept, function and application of safety valves ▪ Principles and procedures for inspecting safety valves ▪ Inspecting the safety valves ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
35.	Inspect indicators and hooters	**Inspecting indicators and hooters:** ▪ Concept, function and application of indicators and hooters ▪ Principles and procedures for inspecting indicators and hooters ▪ Inspecting the indicators and hooters ▪ Related precautions/safety ▪ Related records to be kept	0.2	0.8	1.0
	Sub total:		**7**	**28**	**35**
	Module: 3: Standard operation procedures (SOP)				
	Description: It includes the knowledge and skills related to carrying out standard operation procedures (SOP) of boiler.				
	Objectives:				
	▪ To read/interpret boiler	▪ To check the temperature			

	manuals/ guidelines/ books /instructions/ drawing/ panel diagram ▪ To check fuel ▪ To check valve of fuel ▪ To check valve of water ▪ To check electricity ▪ To switch on the fill position ▪ To switch on the boiler ▪ To check drain water ▪ To switch on the fire position	▪ To close valve of drain ▪ To open the supply valve ▪ To turn off boiler ▪ To close the supply valve ▪ To open the blow down valve ▪ To check supply pressure ▪ To close the blow down valve ▪ To re-switch on fill position ▪ To check the temperature display ▪ To shunt down boiler equipment			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	16 hrs. (Th.) + 66 hrs. (Pr.) = 82 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Read/interpret boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram	**Reading/interpreting boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram:** ▪ Concept and application or uses of boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram ▪ Reading/interpreting boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram ▪ Related precautions ▪ Related records to be kept	0.8	3.3	4.1
2.	Check fuel	**Checking fuel:** ▪ Concept and application/uses of fuel ▪ Principle and procedures for checking fuel ▪ Checking fuel ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
3.	Check valve of fuel	**Checking valve of fuel:** ▪ Concept and application/uses of valve of fuel ▪ Principle and procedures for checking valve of fuel ▪ Checking valve of fuel ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
4.	Check valve of water	**Checking valve of water:** ▪ Concept and application/uses of	0.8	3.3	4.1

		valve of water ▪ Principle and procedures for checking valve of water ▪ Checking valve of water ▪ Related precautions/safety ▪ Related records to be kept			
5.	Check electricity	**Checking electricity:** ▪ Concept and application/uses of electricity ▪ Principle and procedures for checking electricity ▪ Checking electricity ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
6.	Switch on the fill position	**Switching on the fill position**: ▪ Concept of switching on the fill position ▪ "Why" and "how" of switching on the fill position ▪ Switching on the fill position ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
7.	Switch on the boiler	**Switching on the boiler:** ▪ Concept of switching on the boiler ▪ "Why" and "how" of switching on the boiler ▪ Switching on the boiler ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
8.	Check drain water	**Checking drain water:** ▪ Concept and application/uses of drain water ▪ Principle and procedures for checking drain water ▪ Checking drain water ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
9.	Switch on the fire position	**Switching on the fire position:** ▪ Concept of switching on the fire position ▪ "Why" and "how" of switching on the fire position ▪ Switching on the fill position ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
10.	Check the temperature	**Checking the temperature**: ▪ Concept and application/uses of temperature ▪ Principle and procedures for	0.8	3.3	4.1

		checking temperature ▪ Checking temperature ▪ Related precautions/safety ▪ Related records to be kept			
11.	Close valve of drain	**Closing valve of drain:** ▪ Concept of closing valve of drain ▪ "Why" and "how" of closing valve of drain ▪ Closing valve of drain ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
12.	Open the supply valve	**Opening the supply valve**: ▪ Concept of opening the supply valve ▪ "Why" and "how" of opening the supply valve ▪ Opening the supply valve ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
13.	Turn off boiler	**Turning off boiler:** ▪ Concept of turning off boiler ▪ "Why" and "how" of turning off boiler ▪ Turning off boiler ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
14.	Close the supply valve	**Closing the supply valve:** ▪ Concept of closing the supply valve ▪ "Why" and "how" of closing the supply valve ▪ Closing the supply valve ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
15.	Open the blow down valve	**Opening the blow down valve:** ▪ Concept of opening the blow down valve ▪ "Why" and "how" of opening the blow down valve ▪ Opening the blow down valve ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
16.	Check supply pressure	**Checking supply pressure:** ▪ Concept and application/uses of supply pressure ▪ Principle and procedures for checking supply pressure ▪ Checking supply pressure ▪ Related precautions/safety	0.8	3.3	4.1

		▪ Related records to be kept			
17.	Close the blow down valve	**Closing the blow down valve**: ▪ Concept of closing the blow down valve ▪ "Why" and "how" of closing the blow down valve ▪ Closing the blow down valve ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
18.	Re-switch on fill position	**Re-switching on fill position**: ▪ Concept of re-switching on fill position ▪ "Why" and "how" of re-switching on fill position ▪ Re-switching on fill position ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
19.	Check the temperature display	**Checking the temperature display:** ▪ Concept and application/uses of temperature display ▪ Principle and procedures for checking temperature display ▪ Checking temperature display ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
20.	Shunt down boiler equipment	**Shunting down boiler equipment**: ▪ Concept of shunting down boiler equipment ▪ "Why" and "how" of shunting down boiler equipment ▪ Shunting down boiler equipment ▪ Related precautions/safety ▪ Related records to be kept	0.8	3.3	4.1
	Sub total:		**16**	**66**	**82**
	Module: 4: Efficiency tests				
	Description: It includes the knowledge and skills related to carrying out efficiency tests related to boilers.				
	Objectives:				
	▪ To conduct air pressure test ▪ To conduct fuel pressure test ▪ To conduct steam pressure test ▪ To conduct steam temperature test	▪ To conduct fuel temperature test ▪ To conduct air temperature test ▪ To conduct voltage ▪ To conduct current			
	Tasks: Each task consists of a task statement, related technical knowledge				

	necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	4 hrs. (Th.) + 12 hrs. (Pr.) = 16 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Conduct air pressure test	**Conducting air pressure test:** ▪ Concept of air pressure test ▪ Application/uses of air pressure test ▪ Principle and procedures for conducting air pressure test ▪ Conducting air pressure test ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
2.	Conduct fuel pressure test	**Conducting fuel pressure test:** ▪ Concept of fuel pressure test ▪ Application/uses of fuel pressure test ▪ Principle and procedures for conducting fuel pressure test ▪ Conducting fuel pressure test ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
3.	Conduct steam pressure test	**Conducting steam pressure test:** ▪ Concept of steam pressure test ▪ Application/uses of steam pressure test ▪ Principle and procedures for conducting steam pressure test ▪ Conducting steam pressure test ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
4.	Conduct steam temperature test	**Conducting steam temperature test:** ▪ Concept of steam temperature test ▪ Application/uses of steam temperature test ▪ Principle and procedures for conducting steam temperature test ▪ Conducting steam temperature test ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
5.	Conduct fuel temperature test	**Conducting fuel temperature test:** ▪ Concept of fuel temperature test ▪ Application/uses of fuel temperature test ▪ Principle and procedures for conducting fuel temperature test	0.5	1.5	2

		▪ Conducting fuel temperature test ▪ Related precautions/safety ▪ Related records to be kept			
6.	Conduct air temperature test	**Conducting air temperature test:** ▪ Concept of air temperature test ▪ Application/uses of air temperature test ▪ Principle and procedures for conducting air temperature test ▪ Conducting air temperature test ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
7.	Check voltage	**Checking voltage:** ▪ Concept and application/uses of voltage ▪ Principle and procedures for checking voltage ▪ Checking voltage ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
8.	Check current	**Checking current**: ▪ Concept and application/uses of current ▪ Principle and procedures for checking current ▪ Checking current ▪ Related precautions/safety ▪ Related records to be kept	0.5	1.5	2
	Sub total:		**4**	**12**	**16**
	Module: 5: Servicing, repair and maintenance				
	Description: It includes the knowledge and skills related to carrying out preventive maintenance; servicing; troubleshooting; and repair, replacement and maintenance of boilers.				
	Objectives:				
	▪ To carry out preventive maintenance of boiler ▪ To carry out servicing of boiler	▪ To carry out troubleshooting of boiler ▪ To carry out repair, replacement and maintenance of boiler			
	Sub modules:				
	1. Preventive maintenance 2. Servicing	3. Troubleshooting 4. Repair, replacement and maintenance			
	Sub module: 1: Preventive maintenance				
	Description: It includes the knowledge and skills related to carrying out preventive maintenance of boilers.				
	Objectives:				
	▪ To tighten loosen nut and bolts ▪ To perform preventive	▪ To perform preventive maintenance of economizer ▪ To clean water tank			

	maintenance of pipe lines ▪ To perform lubrication ▪ To perform preventive maintenance of motor belts ▪ To perform preventive maintenance of fuel filter	▪ To clean fuel tank ▪ To clean furnace ▪ To remove dust/corrosion from panel board			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	6 hrs. (Th.) + 24 hrs. (Pr.) = 30 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Tighten loosen nut and bolts	**Tightening loosen nut and bolts**: ▪ Functions of nut and bolts ▪ Identification of nut and bolts /loosen nut and bolts ▪ "Why" and "how" of tightening loosen nut and bolts ▪ Tightening loosen nut and bolts ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
2.	Perform preventive maintenance of pipe lines	**Performing preventive maintenance of pipe lines:** ▪ Concept and need of preventive maintenance of pipe lines ▪ Principles and procedures of preventive maintenance of pipe lines ▪ Performing preventive maintenance of pipe lines ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
3.	Perform lubrication	**Performing lubrication:** ▪ Concept and need of lubrication ▪ Principles and procedures of lubrication ▪ Performing lubrication ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
4.	Perform preventive maintenance of motor belts	**Performing preventive maintenance of motor belts:** ▪ Concept and need of preventive maintenance of motor belts ▪ Principles and procedures of preventive maintenance of motor belts ▪ Performing preventive maintenance of motor belts	0.6	2.4	3

		▪ Related precautions/safety ▪ Related records to be kept			
5.	Perform preventive maintenance of fuel filter	**Performing preventive maintenance of fuel filter:** ▪ Concept and need of preventive maintenance of fuel filter ▪ Principles and procedures of preventive maintenance of fuel filter ▪ Performing preventive maintenance of fuel filter ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
6.	Perform preventive maintenance of economizer	**Performing preventive maintenance of economizer:** ▪ Concept and need of preventive maintenance of economizer ▪ Principles and procedures of preventive maintenance of economizer ▪ Performing preventive maintenance of economizer ▪ Related precautions/safety Related records to be kept	0.6	2.4	3
7.	Clean water tank	**Cleaning water tank:** ▪ Functions of water tank ▪ Identification of water tank to be cleaned ▪ "Why" and "how" of cleaning water tank ▪ Cleaning water tank ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
8.	Clean fuel tank	**Cleaning fuel tank:** ▪ Functions of fuel tank ▪ Identification of fuel tank to be cleaned ▪ "Why" and "how" of cleaning fuel tank ▪ Cleaning fuel tank ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
9.	Clean furnace	**Cleaning furnace:** ▪ Functions of furnace ▪ Identification of furnace to be cleaned ▪ "Why" and "how" of cleaning furnace ▪ Cleaning furnace ▪ Related precautions/safety	0.6	2.4	3

		▪ Related records to be kept			
10.	Remove dust/corrosion from panel board	**Removing dust/corrosion from panel board:** ▪ Identification of dust/corrosion of panel board ▪ "Why" and "how" of removing dust/corrosion from panel board ▪ Removing dust/corrosion from panel board ▪ Related precautions/safety ▪ Related records to be kept	0.6	2.4	3
	Sub total:		**6**	**24**	**30**
	Sub module: 2: Servicing				
	Description: It includes the knowledge and skills related to carrying out servicing of boilers.				
	Objectives:				
	▪ To perform servicing of tank(oil and water) ▪ To perform servicing of water pump ▪ To perform Servicing of sensor ▪ To perform servicing of contactor and relay ▪ To perform servicing of chimney ▪ To perform servicing of pressure release valve (PRV) ▪ To perform servicing of NRV ▪ To perform servicing of steam trap ▪ To perform servicing of safety valve	▪ To perform servicing of economizer ▪ To perform servicing of panel board wire and cables ▪ To perform servicing of float valve ▪ To perform servicing of vessel descaling ▪ To perform servicing of strainer (fuel and water) ▪ To perform servicing of tube/coil ▪ To perform servicing of looking glass ▪ To perform servicing of photo cell ▪ To perform servicing of nozzle ▪ To perform servicing of electric rods ▪ To perform Servicing of limit switch			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	8 hrs. (Th.) + 32 hrs. (Pr.) = 40 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Perform servicing of tank(oil and water)	**Performing servicing of tank(oil and water):** ▪ Concept and need for the servicing of the tank(oil and water) ▪ Principles and procedures for the servicing of the tank(oil and water) ▪ Servicing of the tank(oil and	0.4	1.6	2

		water) ▪ Related precautions/safety to be taken ▪ Related records to be kept			
2.	Perform servicing of water pump	**Performing servicing of water pump:** ▪ Concept and need for the servicing of the water pump ▪ Principles and procedures for the servicing of the water pump ▪ Servicing of the water pump ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
3.	Perform Servicing of sensor	**Performing Servicing of sensor**: ▪ Concept and need for the servicing of the sensor ▪ Principles and procedures for the servicing of the sensor ▪ Servicing of the sensor ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
4.	Perform servicing of contactor and relay	**Performing servicing of contactor and relay:** ▪ Concept and need for the servicing of the contactor and relay ▪ Principles and procedures for the servicing of the contactor and relay ▪ Servicing of the contactor and relay ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
5.	Perform servicing of chimney	**Performing servicing of chimney:** ▪ Concept and need for the servicing of the chimney ▪ Principles and procedures for the servicing of the chimney ▪ Servicing of the chimney ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
6.	Perform servicing of pressure release valve (PRV)	**Performing servicing of pressure release valve (PRV):** ▪ Concept and need for the servicing of the pressure release valve (PRV)	0.4	1.6	2

		▪ Principles and procedures for the servicing of the pressure release valve (PRV) ▪ Servicing of the pressure release valve (PRV) ▪ Related precautions/safety to be taken ▪ Related records to be kept			
7.	Perform servicing of NRV	**Performing servicing of NRV:** ▪ Concept and need for the servicing of the NRV ▪ Principles and procedures for the servicing of the NRV ▪ Servicing of the NRV ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
8.	Perform servicing of steam trap	**Performing servicing of steam trap:** ▪ Concept and need for the servicing of the steam trap ▪ Principles and procedures for the servicing of the steam trap ▪ Servicing of the steam trap ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
9.	Perform servicing of safety valve	**Performing servicing of safety valve:** ▪ Concept and need for the servicing of the safety valve ▪ Principles and procedures for the servicing of the safety valve ▪ Servicing of the safety valve ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
10.	Perform servicing of economizer	**Performing servicing of economizer:** ▪ Concept and need for the servicing of the economizer ▪ Principles and procedures for the servicing of the economizer ▪ Servicing of the economizer ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
11.	Perform servicing of panel board wire and cables	**Performing servicing of panel board wire and cables:** ▪ Concept and need for the	0.4	1.6	2

		servicing of the panel board wire and cables ▪ Principles and procedures for the servicing of the panel board wire and cables ▪ Servicing of the panel board wire and cables ▪ Related precautions/safety to be taken ▪ Related records to be kept			
12.	Perform servicing of float valve	**Performing servicing of float valve:** ▪ Concept and need for the servicing of the float valve ▪ Principles and procedures for the servicing of the float valve ▪ Servicing of the float valve ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
13.	Perform servicing of vessel descaling	**Performing servicing of vessel descaling:** ▪ Concept and need for the servicing of the vessel descaling ▪ Principles and procedures for the servicing of the vessel descaling ▪ Servicing of the vessel descaling ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
14.	Perform servicing of strainer (fuel and water)	**Performing servicing of strainer (fuel and water):** ▪ Concept and need for the servicing of the strainer (fuel and water) ▪ Principles and procedures for the servicing of the strainer (fuel and water) ▪ Servicing of the strainer (fuel and water) ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
15.	Perform servicing of tube/coil	**Performing servicing of tube/coil:** ▪ Concept and need for the servicing of the tube/coil ▪ Principles and procedures for the servicing of the tube/coil	0.4	1.6	2

		▪ Servicing of the tube/coil ▪ Related precautions/safety to be taken ▪ Related records to be kept			
16.	Perform servicing of looking glass	**Performing servicing of looking glass:** ▪ Concept and need for the servicing of the looking glass ▪ Principles and procedures for the servicing of the looking glass ▪ Servicing of the looking glass ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
17.	Perform servicing of photo cell	**Performing servicing of photo cell:** ▪ Concept and need for the servicing of the photo cell ▪ Principles and procedures for the servicing of the photo cell ▪ Servicing of the photo cell ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
18.	Perform servicing of nozzle	**Performing servicing of nozzle:** ▪ Concept and need for the servicing of the nozzle ▪ Principles and procedures for the servicing of the nozzle ▪ Servicing of the nozzle ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
19.	Perform servicing of electric rods	**Performing servicing of electric rods:** ▪ Concept and need for the servicing of the electric rods ▪ Principles and procedures for the servicing of the electric rods ▪ Servicing of the electric rods ▪ Related precautions/safety to be taken ▪ Related records to be kept	0.4	1.6	2
20.	Perform Servicing of limit switch	**Performing servicing of limit switch:** ▪ Concept and need for the servicing of the limit switch ▪ Principles and procedures for the servicing of the limit switch	0.4	1.6	2

		▪ Servicing of the limit switch ▪ Related precautions/safety to be taken ▪ Related records to be kept			
	Sub total:		**8**	**32**	**40**
	Sub module: 3: Troubleshooting				
	Description: It includes the knowledge and skills related to carrying out troubleshooting of boilers.				
	Objectives:				
	▪ To troubleshoot burner ▪ To troubleshoot water coil ▪ To troubleshoot electric circuit	▪ To troubleshoot steam pass ▪ To troubleshoot fuel supply ▪ To apply hooter for trouble shooting			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	4 hrs. (Th.) + 20 hrs. (Pr.) = 24 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Troubleshoot the burner	**<u>Troubleshooting of the burner</u>**: ▪ Identification and uses of burner ▪ Concept and need for troubleshooting of the burner ▪ Principles and procedures for troubleshooting of the burner ▪ Troubleshooting of the burner ▪ Related safety/precautions ▪ Related records to be kept	0.7	4	4.7
2.	Troubleshoot water coil	**<u>Troubleshooting of the water coil:</u>** ▪ Identification and uses of water coil ▪ Concept and need for troubleshooting of water coil ▪ Principles and procedures for troubleshooting of water coil ▪ Troubleshooting of ▪ Related safety/precautions ▪ Related records to be kept	0.7	4	4.7
3.	Troubleshoot electric circuit	**<u>Troubleshooting electric circuit:</u>** ▪ Identification and uses of electric circuit ▪ Concept and need for troubleshooting of electric circuit ▪ Principles and procedures for troubleshooting of electric circuit ▪ Troubleshooting of electric circuit	0.7	3	3.7

		▪ Related safety/precautions ▪ Related records to be kept			
4.	Troubleshoot steam pass	**Troubleshooting of the steam pass:** ▪ Identification and uses of steam pass ▪ Concept and need for troubleshooting of steam pass ▪ Principles and procedures for troubleshooting of steam pass ▪ Troubleshooting of steam pass ▪ Related safety/precautions ▪ Related records to be kept	0.7	3	3.7
5.	Troubleshoot fuel supply	**Troubleshooting of the fuel supply**: ▪ Identification and uses of fuel supply ▪ Concept and need for troubleshooting of fuel supply ▪ Principles and procedures for troubleshooting of fuel supply ▪ Troubleshooting of fuel supply ▪ Related safety/precautions ▪ Related records to be kept	0.6	3	3.6
6.	Apply hooter for trouble shooting	**Applying hooter for trouble shooting:** ▪ Identification and uses of hooter ▪ Concept and need for applying hooter for trouble shooting ▪ Procedures for applying hooter for trouble shooting ▪ Applying hooter for trouble shooting ▪ Related safety/precautions ▪ Related records to be kept	0.6	3	3.6
	Sub total:		**4**	**20**	**24**
	Sub module: 4: Repair, replacement and maintenance				
	Description: It includes the knowledge and skills related to carrying out repair, replacement and maintenance of boiler components/parts as appropriate.				
	Objectives:				
	▪ To maintain fuel level indicator ▪ To maintain air vent ▪ To maintain /repair fuel pump ▪ To maintain fuel filter ▪ To maintain /repair fuel tank ▪ To maintain /repair	▪ To maintain /repair oil heater ▪ To maintain /repair burner ignition transformer ▪ To maintain /repair hooter ▪ To maintain /repair inner jacket ▪ To maintain /repair/replace V-belt ▪ To maintain /repair air blower ▪ To replace gland ▪ To replace relay			

	/replace nozzle ▪ To maintain /repair valves ▪ To maintain /repair fuel pipe line ▪ To maintain /repair burner ▪ To maintain /repair water tank ▪ To maintain fuel Steiner ▪ To maintain /repair pressure gauge ▪ To maintain /repair level switch/pipe/glass	▪ To replace photo cell sensor ▪ To replace pump bearing ▪ To replace oil seal ▪ To replace bulb indicator / switches			
	Tasks: Each task consists of a task statement, related technical knowledge necessary to perform the task and time necessary for both the theory and practical aspects of the task.				
	15 hrs. (Th.) + 80 hrs. (Pr.) = 95 hrs. (Tot.)		**Time (hrs.)**		
SN	**Tasks**	**Related technical knowledge**	**Th.**	**Pr.**	**Tot.**
1.	Maintain fuel level indicator	**Maintaining fuel level indicator**: ▪ Concept and function of fuel level indicator ▪ Identification of fuel level indicator ▪ Identification of the need for maintenance of fuel level indicator ▪ Maintenance procedure for fuel level indicator ▪ Maintaining fuel level indicator ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
2.	Maintain air vent	**Maintaining air vent:** ▪ Concept and function of air vent ▪ Identification of air vent ▪ Identification of the need for maintenance of air vent ▪ Maintenance procedure for air vent ▪ Maintaining air vent ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
3.	Maintain/repair fuel pump	**Maintaining/repairing fuel pump:** ▪ Concept and function of fuel pump ▪ Identification of fuel pump ▪ Identification of the need for maintenance /repairing of fuel pump ▪ Maintenance/repairing	0.6	3.2	3.8

		procedure for fuel pump ▪ Maintaining /repairing fuel pump ▪ Related safety/precautions ▪ Related records to be kept			
4.	Maintain fuel filter	**Maintaining fuel filter:** ▪ Concept and function of fuel filter ▪ Identification of fuel filter ▪ Identification of the need for maintenance of fuel filter ▪ Maintenance procedure for fuel filter ▪ Maintaining fuel filter ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
5.	Maintain/repair fuel tank	**Maintaining/repairing fuel tank**: ▪ Concept and function of fuel tank ▪ Identification of fuel tank ▪ Identification of the need for maintenance /repairing of fuel tank ▪ Maintenance/repairing procedure fuel tank ▪ Maintaining /repairing fuel tank ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
6.	Maintain/repair /replace nozzle	**Maintaining/repairing /replacing nozzle**: ▪ Concept and function of nozzle ▪ Identification of nozzle ▪ Identification of the need for maintenance /repairing /replacing of nozzle ▪ Maintenance/repairing/replacing procedure for nozzle ▪ Maintaining /repairing/replacing nozzle ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
7.	Maintain/repair valves	**Maintaining/repairing valves:** ▪ Concept and function of valves ▪ Identification of valves ▪ Identification of the need for maintenance /repairing of valves ▪ Maintenance/repairing procedure for valves ▪ Maintaining /repairing valves	0.6	3.2	3.8

		▪ Related safety/precautions ▪ Related records to be kept			
8.	Maintain/repair fuel pipe line	**Maintaining/repairing fuel pipe line:** ▪ Concept and function of fuel pipe line ▪ Identification of fuel pipe line ▪ Identification of the need for maintenance /repairing of fuel pipe line ▪ Maintenance/repairing procedure for fuel pipe line ▪ Maintaining /repairing fuel pipe line ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
9.	Maintain/repair burner	**Maintaining/repairing burner:** ▪ Concept and function of burner ▪ Identification of burner ▪ Identification of the need for maintenance /repairing of burner ▪ Maintenance/repairing procedure for burner ▪ Maintaining /repairing burner ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
10.	Maintain/repair water tank	**Maintaining/repairing water tank:** ▪ Concept and function of water tank ▪ Identification of water tank ▪ Identification of the need for maintenance /repairing of water tank ▪ Maintenance/repairing procedure for water tank ▪ Maintaining /repairing water tank ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
11.	Maintain fuel Steiner	**Maintaining fuel Steiner:** ▪ Concept and function of fuel Steiner ▪ Identification of fuel Steiner ▪ Identification of the need for maintenance of fuel Steiner ▪ Maintenance procedure for fuel Steiner ▪ Maintaining fuel Steiner	0.6	3.2	3.8

		▪ Related safety/precautions ▪ Related records to be kept			
12.	Maintain/repair pressure gauge	**Maintaining/repairing pressure gauge:** ▪ Concept and function of pressure gauge ▪ Identification of pressure gauge ▪ Identification of the need for maintenance /repairing of pressure gauge ▪ Maintenance/repairing procedure for pressure gauge ▪ Maintaining /repairing pressure gauge ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
13.	Maintain/repair level switch/pipe/glass	**Maintain/repair level switch/pipe/glass:** ▪ Concept and function of level switch/pipe/glass ▪ Identification of level switch/pipe/glass ▪ Identification of the need for maintenance /repairing of level switch/pipe/glass ▪ Maintenance/repairing procedure for level switch/pipe/glass ▪ Maintaining /repairing level switch/pipe/glass ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
14.	Maintain/repair oil heater	**Maintaining/repairing oil heater:** ▪ Concept and function of oil heater ▪ Identification of oil heater ▪ Identification of the need for maintenance /repairing of oil heater ▪ Maintenance/repairing procedure for oil heater ▪ Maintaining /repairing oil heater ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
15.	Maintain/repair burner ignition transformer	**Maintaining/repairing burner ignition transformer:** ▪ Concept and function of burner ignition transformer ▪ Identification of burner ignition transformer	0.6	3.2	3.8

		▪ Identification of the need for maintenance /repairing of burner ignition transformer ▪ Maintenance/repairing procedure for burner ignition transformer ▪ Maintaining /repairing burner ignition transformer ▪ Related safety/precautions ▪ Related records to be kept			
16.	Maintain/repair hooter	**Maintaining/repairing hooter:** ▪ Concept and function of hooter ▪ Identification of hooter ▪ Identification of the need for maintenance /repairing of hooter ▪ Maintenance/repairing procedure for hooter ▪ Maintaining /repairing hooter ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
17.	Maintain/repair inner jacket	**Maintaining/repairing inner jacket:** ▪ Concept and function of inner jacket ▪ Identification of inner jacket ▪ Identification of the need for maintenance /repairing of inner jacket ▪ Maintenance/repairing procedure for inner jacket ▪ Maintaining /repairing inner jacket ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
18.	Maintain/repair/replace V-belt	**Maintaining/repairing /replacing V-belt:** ▪ Concept and function of V-belt ▪ Identification of V-belt ▪ Identification of the need for maintenance /repairing/replacing of V-belt ▪ Maintenance/repairing /replacing procedure for V-belt ▪ Maintaining /repairing /replacing V-belt ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
19.	Maintain/repair air blower	**Maintaining/repairing air blower:**	0.6	3.2	3.8

		▪ Concept and function of air blower ▪ Identification of air blower ▪ Identification of the need for maintenance /repairing of air blower ▪ Maintenance/repairing procedure for air blower ▪ Maintaining /repairing air blower ▪ Related safety/precautions ▪ Related records to be kept			
20.	Replace gland	**Replacing gland :** ▪ Concept and function of gland ▪ Identification of gland ▪ Identification of the need for replacing the gland ▪ Replacing procedure for gland ▪ Replacing gland ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
21.	Replace relay	**Replacing relay:** ▪ Concept and function of relay ▪ Identification of relay ▪ Identification of the need for replacing the relay ▪ Replacing procedure for relay ▪ Replacing relay ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
22.	Replace photo cell sensor	**Replacing photo cell sensor:** ▪ Concept and function of photo cell sensor ▪ Identification of photo cell sensor ▪ Identification of the need for replacing the photo cell sensor ▪ Replacing procedure for photo cell sensor ▪ Replacing photo cell sensor ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
23.	Replace pump bearing	**Replacing pump bearing:** ▪ Concept and function of pump bearing ▪ Identification of pump bearing ▪ Identification of the need for replacing the pump bearing ▪ Replacing procedure for pump bearing	0.6	3.2	3.8

		▪ Replacing pump bearing ▪ Related safety/precautions ▪ Related records to be kept			
24.	Replace oil seal	**Replacing oil seal:** ▪ Concept and function of oil seal ▪ Identification of oil seal ▪ Identification of the need for replacing the oil seal ▪ Replacing procedure for oil seal ▪ Replacing oil seal ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
25.	Replace bulb indicator / switches	**Replacing bulb indicator / switches:** ▪ Concept and function of bulb indicator / switches ▪ Identification of bulb indicator / switches ▪ Identification of the need for replacing the bulb indicator / switches ▪ Replacing procedure for bulb indicator / switches ▪ Replacing bulb indicator / switches ▪ Related safety/precautions ▪ Related records to be kept	0.6	3.2	3.8
	Sub total:		**15**	**80**	**95**
	Total:		**85**	**305**	**390**

	Module: 5: Common module					
	Description: This module consists of skills and knowledge related to applied math, occupational health and safety, HIV/AIDS, first aid, communication, and small business management applicable in the related job performances.					
	Objectives: After its completion the trainees will be able: • To carry out simple mathematical calculations related to the occupation • To be familiar with hazards related to this occupation • To apply preventive measures for occupational health and safety • To apply first aid measures • To apply preventive measures for HIV/AIDS • To communicate with others • To apply skills of small business management					
	Sub modules: 1. Applied math 2. Occupational health and safety 3. First aid 4. HIV/AIDS 5. Communication 6. Small business management					
	Sub module: 1: Applied math					
	Description: It consists of skills and knowledge related to mathematical calculations applicable in the related occupational performances.					
	Objective: After its completion the trainees will be able: • To carry out simple mathematical calculations that must be done for the effective performance in the occupational job.					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(4 hrs) + Pr.(16hrs) = Tot.(20 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Carry out simple addition applicable in job situation		**<u>Addition</u>:** • Concept • Simple calculations • Application in the occupation	0.2	0.8	1
2.	Carry out simple subtraction applicable in job situation		**<u>Subtraction</u>**: • Concept • Simple calculations • Application in the occupation	0.2	0.8	1
3.	Carry out simple multiplication applicable in job situation		**<u>Multiplication</u>** • Concept • Simple calculations • Application in the occupation	0.2	0.8	1
4.	Carry out simple division applicable in job situation		**<u>Division:</u>** • Concept • Simple calculations	0.2	0.8	1

			• Application in the occupation			
5.	Carry out measurements		**Measurement:** • Concept • Application in the occupation	0.2	0.8	1
6.	Convert units of measurement		**Units of measurement:** • Concept • Units of measurement • Unit conversion • application	0.2	0.8	1
7.	Convert units of measuring temperature		**Units of measuring temperature:** • Concept • Units of temperature measurement • Unit conversion • Application	0.2	0.8	1
8.	Calculate area		**Area:** • Concept • Formula • Calculation • Application	0.2	0.8	1
9.	Calculate volume		**Volume:** • Concept • Formula • Calculation • Application	0.2	0.8	1
10.	Calculate weight		**Weight:** • Concept • Formula • Calculation • Application	0.2	0.8	1
11.	Calculate percentage		**Percentage:** • Concept • Formula • Calculation • Application	0.2	0.8	1
12.	Calculate ratio and proportions		**Ratio and proportions:** • Concept • Formula • Calculation • Application	0.2	0.8	1
13.	Apply Pythagoras formula		**Pythagoras formula:** • Concept • Formula • Calculation	0.2	0.8	1

			• Application			
14.	Apply unitary method		**Unitary method:** • Concept • Calculation • Application	0.2	0.8	1
15.	Calculate simple interest		**Simple interest:** • Concept • Formula • Calculation • Application	0.2	0.8	1
16.	Calculate unit cost		**Unit cost:** • Concept • Formula • Calculation • Application	0.2	0.8	1
17.	Calculate per unit income		**Per unit income:** • Concept • Formula • Calculation • Application	0.2	0.8	1
18.	Calculate profit and loss		**Profit and loss:** • Concept • Formula • Calculation • Application	0.2	0.8	1
19.	Perform billing		**Billing:** • Concept • Calculation • Bill format • Procedure • Application	0.2	0.8	1
20.	Prepare simple balance sheet		**Balance sheet:** • Concept • Format • Procedure • Application	0.2	0.8	1
	Total:			**4**	**16**	**20**
	Sub module: 2: Occupational health and safety					
	Description: It consists of skills and knowledge related to occupational health and safety applicable in the related occupational performances					
	Objectives: After its completion the trainees will be able: • To be familiar with hazards related to this occupation • To apply preventive measures for occupational health and safety					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
			Th.(2 hrs) + Pr.(8hrs) = Tot.(10 hrs)	Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
Be familiar with hazards related to this occupation						

1.	Be familiar with accident hazards		**Accident hazards:** • Concept • Causes • Procedures for managing this hazard	0.2	0.8	1
2.	Be familiar with physical hazards		**Physical hazards:** • Concept • Causes • Procedures for managing this hazard	0.2	0.8	1
3.	Be familiar with chemical hazards		**Chemical hazards:** • Concept • Causes • Procedures for managing this hazard	0.2	0.8	1
4.	Be familiar with biological hazards		**Biological hazards:** • Concept • Causes • Procedures for managing this hazard	0.2	0.8	1
5.	Be familiar with ergonomic/psychological / organizational factors:		**Ergonomic /psychological / organizational factors:** • Concept of : ▪ Ergonomic factors ▪ Psychological factors ▪ organizational factors • Procedures for managing hazards caused by these factors	0.2	0.8	1
	Sub total:			**1**	**4**	**4**
Apply preventive measures for occupational health and safety						
1.	Ware safety wares		**Safety wares:** • Identification • Needs • Wearing procedures	0.2	0.5	0.7
2.	Inspect workplace before working		**Workplace inspection:** • Concept • Principle and procedures • Records keeping	0.2	0.5	0.7
3.	Inspect tools/materials/equipment before use		**Inspection of tools/materials/equipment:** • Concept and identification • Principle and procedures • Records keeping	0.1	0.5	0.6
4.	Be prevented from accident hazards		**Prevention of accident hazards**:	0.1	0.5	0.6

			• Concept • Being prevented from accident hazards • Records keeping			
5.	Be prevented from physical hazards		**Prevention of physical hazards:** • Concept • Being prevented from physical hazards • Records keeping	0.1	0.5	0.6
6.	Be prevented from chemical hazards		**Prevention of chemical hazards**: • Concept • Being prevented from chemical hazards • Records keeping	0.1	0.5	0.6
7.	Be prevented from biological hazards		**Prevention of biological hazards**: • Concept • Being prevented from biological hazards • Records keeping	0.1	0.5	0.6
8.	Be prevented from ergonomic/psychological / organizational factors that create problems/hazards.		**Prevention of ergonomic/psychological / organizational factors that create problems/hazards:** • Concept • Being prevented from ergonomic/psychological / organizational factors that create problems/hazards • Records keeping	0.1	0.5	0.6
	Sub total:			**1**	**4**	**5**
	Total:			**2**	**8**	**10**
	Sub module: 3: First aid					
	Description: It consists of skills and knowledge related to first aid measures applicable in the related occupational performances.					
	Objective: After its completion the trainees will be able: • To **a**pply first aid measures					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
			Th.(1 hrs) + Pr.(4hrs) = Tot.(5 hrs)	Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Carryout simple dressings		**Carryout simple dressings:** • Concept • Needs • Procedures • Precautions	0.10	0.40	0.5

			• Recording			
2.	Apply simple bandages		**Apply simple bandages:** • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
3.	Apply first aid for simple wounds		**Apply first aid for simple wounds:** • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
4.	Apply first aid for heat /chemical burns		**Apply first aid for heat /chemical burns:** • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
5.	Apply first aid for injuries/cuts		**Apply first aid for injuries/cuts**: • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
6.	Apply first aid for fracture		**Apply first aid for fracture:** • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
7.	Apply first aid for simple bleeding		**Apply first aid for simple bleeding:** • Concept • Needs • Procedures • Precautions • Recording	0.10	0.40	0.5
8.	Apply first aid for insect bites		**Apply first aid for insect bites:** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25

9.	Apply first aid for animal bites		**Apply first aid for animal bites:** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25
10.	Apply first aid for frost bite		**Apply first aid for frost bite :** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25
11.	Apply first aid for simple poisoning		**Apply first aid for simple poisoning:** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25
12.	Apply first aid for electrical shock		**Apply first aid for electrical shock:** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25
13.	Apply first aid for choking/ drowning		**Apply first aid for choking/ drowning:** • Concept • Needs • Procedures • Precautions • Recording	0.05	0.20	0.25
	Total:			**1**	**4**	**5**
	Sub module: 4: HIV/AIDS					
	Description: It consists of skills and knowledge related to safety measures to be followed for the prevention of HIV/AIDS including its management.					
	Objectives: After its completion the trainees will be able: • To state the concept of HIV/AIDS • To apply safety measures for prevention of HIV/AIDS					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(1 hrs) + Pr.(4hrs) = Tot.(5 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	**State the concept of**		**State the concept of**	0.5	2	2.5

	HIV/AIDS 1. Define HIV 2. Enlist modes of transmission of HIV 3. Enlist signs and symptoms of HIV infected person 4. Enlist stages of HIV 5. Define AIDS 6. Enlist signs and symptoms of AIDS 7. Enlist current status of global HIV/AIDS 8. Enlist difference between HIV/AIDS		**HIV/AIDS:** **HIV**: • Definition of HIV: • Modes of transmission of HIV • Signs and symptoms of HIV infected person • Stages of HIV **AIDS**: • Definition of AIDS • Signs and symptoms of AIDS • Current status of global HIV/AIDS • Difference between HIV and AIDS			
2.	Apply safety measures for prevention of **HIV/AIDS:** 1. Keep touch with single partner for sexual intercourse 2. Ensure safe intercourse 3. Use condom carefully and consistently during each act of sexual intercourse incase of other than single sex partner 4. Keep away from sharing syringes, needles and other skin piercing instrument with HIV infected people 5. Keep away from sharing toothbrushes, blade razors or other instruments that could become contaminated from blood 6. Keep away from handling clothes or cloths that are visibly contaminated with blood 7. Follow positive health behavior 8. Get blood be tested to ensure HIV negative/positive		**Apply safety measures for prevention of HIV/AIDS:** • Keeping touch with single partner for sexual intercourse • Ensuring safe intercourse • Using condom carefully and consistently during each act of sexual intercourse incase of other than single sex partner • Keeping away from sharing syringes, needles and other skin piercing instrument with HIV infected people • Keeping away from sharing toothbrushes, blade razors or other instruments that could become contaminated from blood • Keeping away from handling clothes or cloths that are visibly contaminated with blood • Positive health behavior • Getting blood be tested to ensure HIV negative/positive	0.5	2	2.5
	Total:			1	4	5
	Sub module: 5 : Communication					
	Description: It consists of the skills and knowledge related to communication in the related occupation. Each task consists of its steps, related technical knowledge and hour distribution.					
	Objectives: After its completion the trainees will be able:					
	• To handle telephone calls		• To communicate with donors To			

	• To handle fax • To handle mail • To write letters • To write memos / tips / notes / notice • To perform internal communication • To perform external communication • To perform oral communication • To perform written communication		communicate with financial institutes • To link with media • To disseminate information • Write job application • Prepare Resume. • Communicate with senior. • Communicate with juniors. • Deal with customers • Request / purchase tool, supplies, materials and equipment. • Fill up leave requisition form.		
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
			Th.(2 hrs) + Pr.(8hrs) = Tot.(10 hrs)	Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
1.	Handle telephone calls		**Handling telephone calls:** • Concept, need, and importance • Operating principles and procedures • Care and maintenance • Safety precautions to be taken • Keeping activity records	0.1	0.4	0.5
2.	Handle fax		**Handling fax:** • Concept, need, and importance • Operating principles and procedures • Care and maintenance • Safety precautions to be taken • Keeping activity records	0.1	0.4	0.5
3.	Handle mail		**Handling mail:** • Concept, need, and importance • Operating principles and procedures • Care and maintenance • Safety precautions to be taken • Keeping activity records	0.1	0.4	0.5
4.	Write letters		**Writing letters:** • Concept, need, and importance • Types of letter	0.1	0.4	0.5

			• Component parts of each type of letter • Format of each type of letter • Writing letters • Precautions to be taken • Keeping activity records			
5.	Write memos / tips / notes / notice		**Writing memos / tips / notes / notice :** • Concept, need, and importance • Component parts of memos / tips / notes / notice • Format of memos / tips / notes / notice • Writing memos / tips / notes / notice • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
6.	Prepare simple report		**Preparing simple report:** • Concept, need, and importance • Component parts of a report • Format of a report • Writing a report • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
7.	Prepare simple proposal		**Preparing simple proposal:** • Concept, need, and importance • Component parts of a proposal • Format of a proposal • Writing a proposal • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
8.	Perform internal/ external communication		**Performing internal/ external communication:** • Concept, need, and importance • Principles, procedures, and application • Performing internal/ external communication • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
9.	Perform horizontal/vertical communication		**Performing horizontal/vertical communication:** • Concept, need, and	0.1	0.4	0.5

			importance • Principles, procedures, and application • Performing horizontal/vertical communication • Precautions to be taken • Keeping activity records			
10.	Perform oral/ written communication		**Performing oral/ written communication:** • Concept, need, and importance • Principles, procedures, and application • Performing oral/ written communication • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
11.	Communicate with financial institutes		**Communicating with financial institutes:** • Concept, need, and importance • Principles, procedures, and application • Communicating with financial institutes • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
12.	Link with media		**Linking with media:** • Concept, need, and importance • Principles, procedures, and application • Linking with media • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
13.	Disseminate information		**Disseminating information:** • Concept, need, and importance • Principles, procedures, and application • Disseminating information • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
14.	Write job application		**Writing job application:** • Concept, need, and importance • Component parts of job	0.1	0.4	0.5

			application • Format of job application • Writing job applications • Precautions to be taken • Keeping activity records			
15.	Prepare resume		**Preparing resume:** • Concept, need, and importance • Component parts of a resume • Format of a resume • Writing resume • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
16.	Communicate with senior.		**Communicating with senior:** • Concept, need, and importance • Principles, procedures, and application • Communicating with senior • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
17.	Communicate with juniors.		**Communicating with juniors:** • Concept, need, and importance • Principles, procedures, and application • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
18.	Deal with customers/stake holders		**Dealing with customers/stake holders:** • Concept, need, and importance • Principles, procedures, and application • Communicating with juniors • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
19.	Request / purchase tool, supplies, materials and equipment.		**Requesting / purchasing tool, supplies, materials and equipment**: • Concept, need, and importance • Principles, procedures, and application • Requesting / purchasing tool, supplies, materials and equipment • Precautions to be taken	0.1	0.4	0.5

			• Keeping activity records			
20.	Fill up leave requisition form		**Filling up leave requisition form**: • Concept, need, and importance • Principles, procedures, and application • Filling up leave requisition form • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
			Total:	**2**	**8**	**10**
	Sub module: 6 : Small enterprise development					
	Description: It consists of the skills and knowledge related to small enterprise development in the related occupation. Each task consists of its steps, related technical knowledge and hour distribution.					
	Objectives: After its completion the trainees will be able: • To be familiar with entrepreneurship development • To prepare a business plan					
	Tasks: To fulfill the objective the trainees are expected to get proficiency on the following tasks/skills/steps together with their related technical knowledge:					
	Th.(4 hrs) + Pr.(16 hrs) = Tot.(20 hrs)			Time(hrs)		
SN	Tasks or skills/ steps		Related technical knowledge	Th.	Pr.	Tot.
	Entrepreneurship development:		**Entrepreneurship development:**			
1.	Be familiar with business / entrepreneurship		**Business / entrepreneurship:** • Concept, definitions, need, and importance • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
2.	Develop qualities of a successful entrepreneur		**Qualities of a successful entrepreneur:** • Concept and needs • Qualities of a successful entrepreneur • Keeping activity records	0.1	0.4	0.5
3.	Follow professional ethics		**Professional ethics:** • Concept, need, and importance • Professional ethics • Interpretation • Precautions to be taken • Keeping activity records	0.1	0.4	0.5
4.	Analyze prevailing rules / regulations/ laws /acts related to the profession		**Prevailing rules / regulations/ laws /acts related to the profession:** • Concept, need, and importance	0.1	0.4	0.5

			• Prevailing rules / regulations/ laws /acts related to the profession • Interpretation • Precautions to be taken • Keeping activity records			
5.	Develop skills of good governance		**<u>Good governance:</u>** • Concept, need, and importance • Principles and procedures of good governance • Precautions to be taken • Keeping activity re	0.1	0.4	0.5
6.	Be familiar with entrepreneurship development/ factors affecting the growth of entrepreneurship		**<u>Entrepreneurship development/ factors affecting the growth of entrepreneurship:</u>** • Concept, need, and importance • Entrepreneurship development • Factors affecting the growth of entrepreneurship • Precautions to be taken • Keeping records	0.1	0.4	0.5
7.	Develop an entrepreneurship competency development [ECD] program		**<u>Entrepreneurship competency development [ECD] program</u>**: • Concept, need, and importance • Entrepreneurship competency development [ECD] • ECD program development • Precautions to be taken • Keeping records	0.1	0.4	0.5
8.	Be familiar with identification / selection/appraising/gaining instructional a support of a project • Be familiar with identification of a project • Be familiar with selection of a project • Be familiar with appraising of a project • Be familiar with gaining instructional a support of a project		**<u>Identification / selection/appraising/gaining instructional a support of a project:</u>** • Concept, need, and importance • Identification of a project • Selection of a project • Appraising of a project • Gaining instructional a support of a project • Precautions to be taken • Keeping records	0.1	0.4	0.5

9.	Be familiar with the preparation of a comprehensive business plan for starting / acquiring /running a business		**Be familiar with the preparation of a comprehensive business plan for starting / acquiring /running a business:** • Preparation of a comprehensive business plan for starting a business • Preparation of a comprehensive business plan for acquiring a business • Preparation of a comprehensive business plan for running a business • Precautions to be taken • Keeping records	0.1	0.4	0.5
10.	Be familiar with marketing of products		**Be familiar with marketing of products:** • concept of product, price, place, promotion • marketing of products • Precautions to be taken • Keeping records	0.1	0.4	0.5
			Sub total**:**	**1**	**4**	**5**
	Business plan:		**Business plan:**			
11.	Collect related information / data		**Collecting related information / data:** • Concept, need, and importance of data and information • Difference between data and information • Principles and procedures for collecting related information / data • Collecting related information / data • Precautions to be taken • Keeping records	0.4	1.6	2
12.	Prepare production plan		**Preparing production plan:** • Concept, need, and importance • Component parts • Format • Principles and procedures • Precautions to be taken • Keeping records	0.4	1.6	2
13.	Prepare cost plan		**Preparing cost plan:**	0.4	1.6	2

			• Concept, need, and importance • Component parts • Format • Principles and procedures • Precautions to be taken • Keeping records			
14.	Prepare financial plan		**<u>Preparing financial plan:</u>** • Concept, need, and importance • Component parts • Format • Principles and procedures • Precautions to be taken • Keeping records	0.4	1.6	2
15.	Prepare marketing plan		**<u>Preparing marketing plan:</u>** • Concept, need, and importance • Component parts • Format • Principles and procedures • Precautions to be taken • Keeping records	0.4	1.6	2
16.	Prepare a business plan		**<u>Preparing a business plan:</u>** • Concept, need, and importance • Component parts • Format • Principles and procedures • Precautions to be taken • Keeping records	0.6	2.4	3
17.	Appraise business plan		**<u>Appraising business plan:</u>** • Concept, need, and importance • Principles and procedures • Precautions to be taken • Keeping records	0.4	1.6	2
			Sub total:	3	12	15
			Total:	4	16	20
			Common module total:	14	56	70
			All total:	**99**	**361**	**460**

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	Tools, materials and equipment				
	▪ Wrench set ▪ Allen key set ▪ Venire caliper ▪ Flat brush ▪ Round brush ▪ Gauge meter ▪ Anometer ▪ Pliers ▪ Pin punch ▪ Die set ▪ Thermometer ▪ Safety goggles ▪ Line/phase tester	▪ Screw driver ▪ File ▪ Taco meter ▪ Seal ▪ Water test kit ▪ Multimeter ▪ Hacksaw frame ▪ Vice ▪ Grease gun ▪ Lather apron ▪ Pipe/slide wrench ▪ Chisel ▪ Drill machine			
	Reading materials				
	▪ Instructor selected textbooks/ reference books / manuals/ journals and articles available in the market	▪ Instructor prepared books, handouts, notes and manuals			
	Facilities				
	▪ Classroom (Spacious) ▪ Well equipped workshop ▪ Boilers ▪ Principal' room ▪ Admin/Account room ▪ Reception room ▪ Trainers room ▪ Still and Video Camera ▪ A/V room ▪ Vehicle(optional) ▪ Canteen(optional)	▪ Hostel(optional) ▪ OHP Multimedia projector ▪ Computer/Lap top ▪ Photocopier/Scanner/Printer ▪ Internet facilities ▪ Telephone ▪ Fax ▪ Well equipped library ▪ Water supply ▪ Power supply			

Modules, sub modules, tasks and time distribution

	Module: 1: Boiler introduction					
	Sub module: 1: Boiler fundamentals, operation and safety Sub module: 2: Boiler maintenance, inspection, testing & efficiency Sub module: 3: Enforcing safety measures Sub module: 4: Tools, materials & equipments Sub module: 5: Components/devices/accessories					
	Sub module: 1: Boiler fundamentals, operation and safety			Th.	Pr.	Tot.
1.	Be familiar with boiler fundamentals			1	1	2
2.	Be familiar with fundamentals of combustion and heat transfer			1	1	2
3.	Be familiar with burner operation and control			1	1	2
4.	Be familiar with boiler operation and testing			1	1	2
5.	Be familiar with boiler room safety			1	1	2
6.	Be familiar with cause and effect case study			1	1	2
	Sub total:			**6**	**6**	**12**
	Sub module: 2: Boiler maintenance, inspection, testing & efficiency					
1.	Be familiar with construction and design standards			1	1	2
2.	Be familiar with controls/safety devices for automatically fired boilers			1	1	2
3.	Be familiar with inspection/maintenance of commercial/industrial boilers			1	1	2
4.	Be familiar with boiler/burner efficiency			1	1	2
5.	Be familiar with trouble shooting			1	1	2
	Sub total:			**5**	**5**	**10**
	Sub module: 2: Enforcing safety measures					
1.	Enforce personal safety			0.2	0.4	0.6
2.	Enforce fuel valve for safety to fuel pump			0.2	0.3	0.5
3.	Enforce setting point of fuel			0.2	0.3	0.5
4.	Enforce point water level			0.2	0.3	0.5
5.	Enforce sensor functioning			0.2	0.3	0.5
6.	Ensure boiler room cleanliness			0.2	0.3	0.5
7.	Enforce buzzer (Hotter) functioning			0.2	0.3	0.5
8.	Enforce blower setting			0.1	0.3	0.4
9.	Enforce to the pipe line checking (fuel/water)			0.1	0.3	0.4
10.	Enforce safety valve conditioning			0.1	0.3	0.4
11.	Enforce trap valve functioning			0.1	0.3	0.4
12.	Minimize pollution			0.1	0.3	0.4
13.	Enforce setting temperature			0.1	0.3	0.4
	Sub total:			**2**	**4**	**6**
	Sub module: 3: Tools, materials & equipments					
1.	Handle wrench set			0.2	0.1	0.3
2.	Handle pliers			0.2	0.1	0.3
3.	Handle line/phase tester			0.2	0.1	0.3

4.	Handle multimeter			0.2	0.1	0.3
5.	Handle pipe/slide wrench			0.1	0.1	0.2
6.	Handle hammer			0.1	0.1	0.2
7.	Handle Allen key			0.1	0.1	0.2
8.	Handle pin punch			0.1	0.1	0.2
9.	Handle screw driver			0.1	0.1	0.2
10.	Handle hacksaw frame			0.1	0.1	0.2
11.	Handle chisel			0.1	0.1	0.2
12.	Handle sprit level			0.1	0.1	0.2
13.	Handle venire caliper			0.1	0.2	0.3
14.	Handle die set			0.1	0.2	0.3
15.	Handle file			0.1	0.2	0.3
16.	Handle vice			0.1	0.2	0.3
17.	Handle drill machine			0.1	0.2	0.3
18.	Handle nozzle brush			0.1	0.2	0.3
19.	Handle flat brush and round brush			0.1	0.2	0.3
20.	Handle thermometer			0.1	0.2	0.3
21.	Handle taco meter			0.1	0.2	0.3
22.	Handle grease gun			0.1	0.2	0.3
23.	Handle oil-can			0.1	0.2	0.3
24.	Handle holder			0.1	0.2	0.3
25.	Handle welding machine			0.1	0.2	0.3
26.	Handle safety goggles			0.1	0.2	0.3
27.	Handle hand seal			0.1	0.2	0.3
28.	Handle lather apron			0.1	0.2	0.3
29.	Handle chipping hammer			0.1	0.2	0.3
30.	Handle PH meter			0.1	0.2	0.3
31.	Handle gauge meter			0.1	0.2	0.3
32.	Handle arc welding rod			0.1	0.2	0.3
33.	Handle water test kit			0.1	0.2	0.3
34.	Handle anometer			0.1	0.2	0.3
35.	Handle fuel (kerosene/furnace oil/husu)			0.1	0.2	0.3
36.	Handle pressure gauge			0.1	0.2	0.3
	Sub total:			**4**	**6**	**10**
	Sub module: 4: Components/devices/accessories					
1.	Identify burner			0.1	0.2	0.3
2.	Identify decider plate			0.1	0.2	0.3
3.	Identify y-Steiner			0.1	0.2	0.3
4.	Identify non-return valve			0.1	0.2	0.3
5.	Identify safety valve			0.1	0.2	0.3
6.	Identify level switch/pipe/glass			0.1	0.2	0.3
7.	Identify nozzle			0.1	0.2	0.3
8.	Identify fuel pump			0.1	0.2	0.3
9.	Identify ball valve			0.1	0.2	0.3
10.	Identify gate valve			0.1	0.2	0.3
11.	Identify water pump			0.1	0.2	0.3
12.	Identify firing looking glass			0.1	0.2	0.3
13.	Identify release valve			0.1	0.2	0.3

14.	Identify coil			0.1	0.2	0.3
15.	Identify safety head			0.1	0.2	0.3
16.	Identify electronic rod			0.1	0.2	0.3
17.	Identify pressure switch			0.1	0.2	0.3
18.	Identify butterfly valve			0.1	0.2	0.3
19.	Identify inner jacket			0.1	0.2	0.3
20.	Identify economizer			0.1	0.2	0.3
21.	Identify fuel filter/hose pipes			0.1	0.1	0.2
22.	Identify cap-robber			0.1	0.1	0.2
23.	Identify cupper pipe			0.1	0.1	0.2
24.	Identify flinch			0.1	0.1	0.2
25.	Identify air blower			0.1	0.1	0.2
26.	Identify external (over) head			0.1	0.1	0.2
27.	Identify external body			0.1	0.1	0.2
28.	Identify flexible pipes			0.1	0.1	0.2
29.	Identify pressure gauge			0.1	0.1	0.2
30.	Identify photocell/sensors			0.1	0.1	0.2
31.	Identify heat proof cement (concrete)			0.1	0.1	0.2
32.	Identify foundation bolts			0.1	0.1	0.2
33.	Identify gaskets (heat proof)			0.1	0.1	0.2
34.	Identify V-belt			0.1	0.1	0.2
35.	Identify water tank/ fuel tank			0.1	0.1	0.2
36.	Identify hooter			0.1	0.1	0.2
37.	Identify burner ignition transformer			0.1	0.1	0.2
38.	Identify metal pipes/ water tank			0.1	0.1	0.2
39.	Identify heat proof gland			0.1	0.1	0.2
40.	Identify oil heater			0.1	0.1	0.2
	Sub total:			**4**	**6**	**10**
	Module: 2: Controlling / maintaining / inspecting systems					
	Sub module: 1: Fuel system Sub module: 2: Water system Sub module: 3: Inspect operating system					
	Sub module: 1: Fuel system					
1.	Read/Interpret fuel system			0.3	1.4	1.7
2.	Control/maintain fuel level			0.3	1.4	1.7
3.	Control/maintain fuel temperature			0.3	1.3	1.6
4.	Control/maintain fuel quality			0.3	1.3	1.6
5.	Control/maintain fuel pressure			0.4	1.3	1.7
6.	Control/maintain fuel quantity			0.4	1.3	1.7
	Sub total:			**2**	**8**	**10**
	Sub module: 2: Water system					
1.	Read/Interpret water system			0.3	1.0	1.3
2.	Control/maintain water level			0.3	1.0	1.3
3.	Control/maintain water temperature			0.3	1.0	1.3
4.	Control hardness			0.3	1.0	1.3
5.	Control/maintain water PH			0.2	1.0	1.2
6.	Control/maintain TDS			0.2	1.0	1.2

7.	Control/maintain water pressure			0.2	1.0	1.2
8.	Maintain water quantity			0.2	1.0	1.2
	Sub total:			**2**	**8**	**10**
	Sub module: 3: Inspecting operating system					
1.	Inspect fuel system			0.2	0.8	1.0
2.	Inspect electric system			0.2	0.8	1.0
3.	Inspect water system			0.2	0.8	1.0
4.	Inspect safety devices			0.2	0.8	1.0
5.	Inspect steam distribution system			0.2	0.8	1.0
6.	Inspect steam pipe line drain water			0.2	0.8	1.0
7.	Inspect steam drainage			0.2	0.8	1.0
8.	Inspect steam pipe line and valves			0.2	0.8	1.0
9.	Inspect steam pressure			0.2	0.8	1.0
10.	Inspect steam temperature			0.2	0.8	1.0
11.	Inspect water tank			0.2	0.8	1.0
12.	Inspect water pipe line and valves			0.2	0.8	1.0
13.	Inspect y-Steiner			0.2	0.8	1.0
14.	Inspect water level			0.2	0.8	1.0
15.	Inspect non return valve			0.2	0.8	1.0
16.	Inspect water level indicator			0.2	0.8	1.0
17.	Inspect case fire			0.2	0.8	1.0
18.	Inspect sensors			0.2	0.8	1.0
19.	Inspect emergency switches			0.2	0.8	1.0
20.	Inspect traps and NRV/PRV			0.2	0.8	1.0
21.	Inspect current consumption indicator			0.2	0.8	1.0
22.	Inspect leakage of electricity			0.2	0.8	1.0
23.	Inspect reset bottom			0.2	0.8	1.0
24.	Inspect electric wiring			0.2	0.8	1.0
25.	Inspect water temperature			0.2	0.8	1.0
26.	Inspect fuel pipe line			0.2	0.8	1.0
27.	Inspect level of fuel indicator			0.2	0.8	1.0
28.	Inspect fuel release valve			0.2	0.8	1.0
29.	Inspect fuel valve			0.2	0.8	1.0
30.	Inspect fuel pressure			0.2	0.8	1.0
31.	Inspect fuel pump			0.2	0.8	1.0
32.	Inspect RYB voltage indicator			0.2	0.8	1.0
33.	Inspect blow down valves			0.2	0.8	1.0
34.	Inspect safety valves			0.2	0.8	1.0
35.	Inspect indicators and hooters			0.2	0.8	1.0
	Sub total:			**7**	**28**	**35**
	Module: 3: Standard operation procedures (SOP)					
1.	Read/interpret boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram			0.8	3.3	4.1
2.	Check fuel			0.8	3.3	4.1
3.	Check valve of fuel			0.8	3.3	4.1
4.	Check valve of water			0.8	3.3	4.1
5.	Check electricity			0.8	3.3	4.1

6.	Switch on the fill position			0.8	3.3	4.1
7.	Switch on the boiler			0.8	3.3	4.1
8.	Check drain water			0.8	3.3	4.1
9.	Switch on the fire position			0.8	3.3	4.1
10.	Check the temperature			0.8	3.3	4.1
11.	Close valve of drain			0.8	3.3	4.1
12.	Open the supply valve			0.8	3.3	4.1
13.	Turn off boiler			0.8	3.3	4.1
14.	Close the supply valve			0.8	3.3	4.1
15.	Open the blow down valve			0.8	3.3	4.1
16.	Check supply pressure			0.8	3.3	4.1
17.	Close the blow down valve			0.8	3.3	4.1
18.	Re-switch on fill position			0.8	3.3	4.1
19.	Check the temperature display			0.8	3.3	4.1
20.	Shunt down boiler equipment			0.8	3.3	4.1
	Sub total:			**16**	**66**	**82**
	Module: 4: Efficiency tests					
1.	Conduct air pressure test			0.5	1.5	2
2.	Conduct fuel pressure test			0.5	1.5	2
3.	Conduct steam pressure test			0.5	1.5	2
4.	Conduct steam temperature test			0.5	1.5	2
5.	Conduct fuel temperature test			0.5	1.5	2
6.	Conduct air temperature test			0.5	1.5	2
7.	Check voltage			0.5	1.5	2
8.	Check current			0.5	1.5	2
	Sub total:			**4**	**12**	**16**
	Module: 5: Servicing, repair and maintenance					
	Sub module: 1: Preventive maintenance Sub module: 2: Servicing Sub module: 3: Troubleshooting Sub module: 4: Repair, replacement and maintenance					
	Sub module: 1: Preventive maintenance					
1.	Tighten loosen nut and bolts			0.6	2.4	3
2.	Perform preventive maintenance of pipe lines			0.6	2.4	3
3.	Perform lubrication			0.6	2.4	3
4.	Perform preventive maintenance of motor belts			0.6	2.4	3
5.	Perform preventive maintenance of fuel filter			0.6	2.4	3
6.	Perform preventive maintenance of economizer			0.6	2.4	3
7.	Clean water tank			0.6	2.4	3
8.	Clean fuel tank			0.6	2.4	3
9.	Clean furnace			0.6	2.4	3
10.	Remove dust/corrosion from panel board			0.6	2.4	3
	Sub total:			**6**	**24**	**30**
	Sub module: 2: Servicing					
1.	Perform servicing of tank(oil and water)			0.4	1.6	2
2.	Perform servicing of water pump			0.4	1.6	2
3.	Perform Servicing of sensor			0.4	1.6	2
4.	Perform servicing of contactor and relay			0.4	1.6	2

5.	Perform servicing of chimney			0.4	1.6	2
6.	Perform servicing of pressure release valve (PRV)			0.4	1.6	2
7.	Perform servicing of NRV			0.4	1.6	2
8.	Perform servicing of steam trap			0.4	1.6	2
9.	Perform servicing of safety valve			0.4	1.6	2
10.	Perform servicing of economizer			0.4	1.6	2
11.	Perform servicing of in panel board wire and cables			0.4	1.6	2
12.	Perform servicing of float valve			0.4	1.6	2
13.	Perform servicing of vessel descaling			0.4	1.6	2
14.	Perform servicing of strainer (fuel and water)			0.4	1.6	2
15.	Perform servicing of tube/coil			0.4	1.6	2
16.	Perform servicing of looking glass			0.4	1.6	2
17.	Perform servicing of photo cell			0.4	1.6	2
18.	Perform servicing of nozzle			0.4	1.6	2
19.	Perform servicing of electric rods			0.4	1.6	2
20.	Perform Servicing of limit switch			0.4	1.6	2
	Sub total:			**8**	**32**	**40**
	Sub module: 3: Troubleshooting					
1.	Troubleshoot burner problems			0.7	4	4.7
2.	Troubleshoot water coil problems			0.7	4	4.7
3.	Troubleshoot electric circuit			0.7	3	3.7
4.	Troubleshoot steam pass			0.7	3	3.7
5.	Troubleshoot fuel supply			0.6	3	3.6
6.	Apply hooter for trouble shooting			0.6	3	3.6
	Sub total:			**4**	**20**	**24**
	Sub module: 4: Repair, replacement and maintenance					
1.	Maintain fuel level indicator			0.6	3.2	3.8
2.	Maintain air vent			0.6	3.2	3.8
3.	Maintain/repair fuel pump			0.6	3.2	3.8
4.	Maintain fuel filter			0.6	3.2	3.8
5.	Maintain/repair fuel tank			0.6	3.2	3.8
6.	Maintain/repair /replace nozzle			0.6	3.2	3.8
7.	Maintain/repair valves			0.6	3.2	3.8
8.	Maintain/repair fuel pipe line			0.6	3.2	3.8
9.	Maintain/repair burner			0.6	3.2	3.8
10.	Maintain/repair water tank			0.6	3.2	3.8
11.	Maintain fuel Steiner			0.6	3.2	3.8
12.	Maintain/repair pressure gauge			0.6	3.2	3.8
13.	Maintain/repair level switch/pipe/glass			0.6	3.2	3.8
14.	Maintain/repair oil heater			0.6	3.2	3.8
15.	Maintain/repair burner ignition transformer			0.6	3.2	3.8
16.	Maintain/repair hooter			0.6	3.2	3.8
17.	Maintain/repair inner jacket			0.6	3.2	3.8
18.	Maintain/repair/replace V-belt			0.6	3.2	3.8
19.	Maintain/repair air blower			0.6	3.2	3.8
20.	Replace gland			0.6	3.2	3.8
21.	Replace relay			0.6	3.2	3.8

22.	Replace photo cell sensor			0.6	3.2	3.8
23.	Replace pump bearing			0.6	3.2	3.8
24.	Replace oil seal			0.6	3.2	3.8
25.	Replace bulb indicator / switches			0.6	3.2	3.8
	Sub total:			**15**	**80**	**95**
	Total:			**85**	**305**	**390**
	Module: 6: Common module					
	Sub module: 1: Applied math Sub module: 2: Occupational health and safety Sub module: 3: First aid Sub module: 4: HIV/AIDS Sub module: 5: Communication Sub module: 6: Small enterprise development					
	Tools, materials and equipment					
	▪ Wrench set ▪ Allen key set ▪ Venire caliper ▪ Flat brush ▪ Round brush ▪ Gauge meter ▪ Anometer ▪ Pliers ▪ Pin punch ▪ Die set ▪ Thermometer ▪ Safety goggles ▪ Line/phase tester ▪ Screw driver ▪ File ▪ Taco meter ▪ Seal ▪ Water test kit ▪ Multimeter ▪ Hacksaw frame ▪ Vice ▪ Grease gun ▪ Lather apron ▪ Pipe/slide wrench ▪ Chisel ▪ Drill machine					
	Reading materials					
	▪ Instructor selected textbooks/ reference books / manuals/ journals and articles available in the market ▪ Instructor prepared books, handouts, notes and manuals					
	Facilities					
	▪ Classroom (Spacious) ▪ Well equipped workshop ▪ Boilers ▪ Principal' room ▪ Admin/Account room ▪ Reception room					

	▪ Trainers room ▪ Still and Video Camera ▪ A/V room ▪ Vehicle(optional) ▪ Canteen(optional) ▪ Hostel(optional) ▪ OHP ▪ Multimedia projector ▪ Computer/Lap top ▪ Photocopier/Scanner/Printer ▪ Internet facilities ▪ Telephone ▪ Fax ▪ Well equipped library ▪ Water supply ▪ Power supply					

Duties & tasks Used (from DACUM)

Duty: A: Enforce safety
Tasks:

1. Enforce personal safety
2. Enforce fuel valve for safety to fuel pump
3. Enforce setting point of fuel
4. Enforce point water level
5. Enforce sensor functioning
6. Ensure boiler room cleanliness
7. Enforce buzzer (Hotter) functioning
8. Enforce blower setting
9. Enforce to the pipe line checking (fuel/water)
10. Enforce safety valve conditioning
11. Enforce trap valve functioning
12. Minimize pollution
13. Enforce setting temperature

Duty: B: Handle tools/equipments/materials
Tasks:

1. Handle wrench set
2. Handle pliers
3. Handle line/phase tester
4. Handle multimeter
5. Handle pipe/slide wrench
6. Handle hammer
7. Handle Allen key
8. Handle pin punch
9. Handle screw driver
10. Handle hacksaw frame
11. Handle chisel
12. Handle sprit level
13. Handle venire caliper
14. Handle die set
15. Handle file
16. Handle vice
17. Handle drill machine
18. Handle nozzle brush
19. Handle flat brush and round brush
20. Handle thermometer
21. Handle taco meter
22. Handle grease gun
23. Handle oil-can
24. Handle holder
25. Handle welding machine
26. Handle safety goggles
27. Handle hand seal
28. Handle lather apron

29. Handle chipping hammer
30. Handle PH meter
31. Handle gauge meter
32. Handle arc welding rod
33. Handle water test kit
34. Handle anometer
35. Handle fuel (kerosene/furnace oil/husu)
36. Handle pressure gauge

Duty: C: Perform identification of components/devices/accessories

Tasks:

1. Identify burner
2. Identify decider plate
3. Identify y-Steiner
4. Identify non-return valve
5. Identify safety valve
6. Identify level switch/pipe/glass
7. Identify nozzle
8. Identify fuel pump
9. Identify ball valve
10. Identify gate valve
11. Identify water pump
12. Identify firing looking glass
13. Identify release valve
14. Identify coil
15. Identify safety head
16. Identify electronic rod
17. Identify pressure switch
18. Identify butterfly valve
19. Identify inner jacket
20. Identify economizer
21. Identify fuel filter/hose pipes
22. Identify cap-robber
23. Identify cupper pipe
24. Identify flinch
25. Identify air blower
26. Identify external (over) head
27. Identify external body
28. Identify flexible pipes
29. Identify pressure gauge
30. Identify photocell/sensors
31. Identify heat proof cement (concrete)
32. Identify foundation bolts
33. Identify gaskets (heat proof)
34. Identify V-belt
35. Identify water tank/ fuel tank
36. Identify hooter
37. Identify burner ignition transformer
38. Identify metal pipes/ water tank
39. Identify heat proof gland

40. Identify oil heater

Duty: D: Control/maintain fuel system
Tasks:
1. Read/Interpret fuel system
2.Control/maintain fuel level
3.Control/maintain fuel temperature
4.Control/maintain fuel quality
5.Control/maintain fuel pressure
6.Control/maintain fuel quantity

Duty: E: Control /maintain water system
Tasks:
1. Read/Interpret water system
2. Control/maintain water level
3. Control/maintain water temperature
4. Control hardness
5. Control/maintain water PH
6. Control/maintain TDS
7. Control/maintain water pressure
8. Maintain water quantity

Duty: F: Inspect operating system
Tasks:
1. Inspect fuel system
2. Inspect electric system
3. Inspect water system
4. Inspect safety devices
5. Inspect steam distribution system
6. Inspect steam pipe line drain water
7. Inspect steam drainage
8. Inspect steam pipe line and valves
9. Inspect steam pressure
10. Inspect steam temperature
11. Inspect water tank
12. Inspect water pipe line and valves
13. Inspect y-Steiner
14. Inspect water level
15. Inspect non return valve
16. Inspect water level indicator
17. Inspect case fire
18. Inspect sensors
19. Inspect emergency switches
20. Inspect traps and NRV/PRV
21. Inspect current consumption indicator
22. Inspect leakage of electricity
23. Inspect reset bottom
24. Inspect electric wiring
25. Inspect water temperature
26. Inspect fuel pipe line

27. Inspect level of fuel indicator
28. Inspect fuel release valve
29. Inspect fuel valve
30. Inspect fuel pressure
31. Inspect fuel pump
32. Inspect RYB voltage indicator
33. Inspect blow down valves
34. Inspect safety valves
35. Inspect indicators and hooters

Duty: G: Perform standard operation procedures (SOP)

Tasks:

1. Read/interpret boiler manuals/ guidelines/ books /instructions/ drawing/ panel diagram
2. Check fuel
3. Check valve of fuel
4. Check valve of water
5. Check electricity
6. Switch on the fill position
7. Switch on the boiler
8. Check drain water
9. Switch on the fire position
10. Check the temperature
11. Close valve of drain
12. Open the supply valve
13. Turn off boiler
14. Close the supply valve
15. Open the blow down valve
16. Check supply pressure
17. Close the blow down valve
18. Re-switch on fill position
19. Check the temperature display
20. Shunt down boiler equipment

Duty: H: Conduct efficiency tests

Tasks:

1. Conduct air pressure test
2. Conduct fuel pressure test
3. Conduct steam pressure test
4. Conduct steam temperature test
5. Conduct fuel temperature test
6. Conduct air temperature test
7. Check voltage
8. Check current

Duty: I: Perform preventive maintenance

Tasks:

1. Tighten loosen nut and bolts
2. Perform preventive maintenance of pipe lines
3. Perform lubrication

4. Perform preventive maintenance of motor belts
5. Perform preventive maintenance of fuel filter
6. Perform preventive maintenance of economizer
7. Clean water tank
8. Clean fuel tank
9. Clean furnace
10. Remove dust/corrosion from panel board

Duty: J: Perform servicing
Tasks:
1. Perform servicing of tank (oil and water)
2. Perform servicing of water pump
3. Perform Servicing of sensor
4. Perform servicing of contactor and relay
5. Perform servicing of chimney
6. Perform servicing of pressure release valve (PRV)
7. Perform servicing of NRV
8. Perform servicing of steam trap
9. Perform servicing of safety valve
10. Perform servicing of economizer
11. Perform servicing of in panel board wire and cables
12. Perform servicing of float valve
13. Perform servicing of vessel descaling
14. Perform servicing of strainer (fuel and water)
15. Perform servicing of tube/coil
16. Perform servicing of looking glass
17. Perform servicing of photo cell
18. Perform servicing of nozzle
19. Perform servicing of electric rods
20. Perform Servicing of limit switch

Duty: K: Troubleshoot problems
Tasks:
1. Troubleshoot burner problems
2. Troubleshoot water coil problems
3. Troubleshoot electric circuit
4. Troubleshoot steam pass
5. Troubleshoot fuel supply
6. Apply hooter for trouble shooting

Duty: L: Maintain/repair/replace components/devices/accessories
Tasks:
1. Maintain fuel level indicator
2. Maintain air vent
3. Maintain/repair fuel pump
4. Maintain fuel filter
5. Maintain/repair fuel tank
6. Maintain/repair /replace nozzle
7. Maintain/repair valves
8. Maintain/repair fuel pipe line

9. Maintain/repair burner
10. Maintain/repair water tank
11. Maintain fuel Steiner
12. Maintain/repair pressure gauge
13. Maintain/repair level switch/pipe/glass
14. Maintain/repair oil heater
15. Maintain/repair burner ignition transformer
16. Maintain/repair hooter
17. Maintain/repair inner jacket
18. Maintain/repair/replace V-belt
19. Maintain/repair air blower
20. Replace gland
21. Replace relay
22. Replace photo cell sensor
23. Replace pump bearing
24. Replace oil seal
25. Replace bulb indicator / switches